

2016

GRADUATE STUDENT SHOWCASE



Celebrating Research and Creativity
November 15, 2016 • Lory Student Center



GRADUATE SCHOOL
COLORADO STATE UNIVERSITY



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Best of Ph.D. or M.S.-Thesis Researcher
Best of Non-Thesis Project
Warner Top Scholars

Thank you for joining us at the Graduate Student Showcase. Special appreciation goes to all of the graduate students who presented, as the Graduate Student Showcase would not have been possible without your willingness to share your creative works and scholarship. An additional thank you to the judges who volunteered for the Graduate Student Showcase. Your time and efforts truly made all the difference in allowing us to recognize and celebrate graduate student excellence here on campus.

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Octavius Jones	10:10 a.m.	1
Sam Killmeyer	10:20 a.m.	1
David Mucklow	10:30 a.m.	1
Meghan Pipe	10:40 a.m.	1
— Intermission —		
Morgan Riedl	11:00 a.m.	2
Debbie Vance	11:10 a.m.	2
Kelly Weber	11:20 a.m.	2
Zach Yanowitz	11:30 a.m.	2
Catie Young	11:40 a.m.	2

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5.	Kyle Singer	3
6.	Emily Sullivan	3
7.	Alyson Welker	3

Poster and Visual Art Presentations by Group

9:30 a.m.-11:30 a.m. **GREEN**
Poster and Visual Art Presentations

10:30 a.m.-12:30 p.m. **GOLD**
Poster and Visual Art Presentations

Please Note:

Odd-numbered abstracts are in the
GREEN presenting group.

Even-numbered abstracts are in the
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College of Health and Human Sciences

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Poster and Visual Art Presentations by Group

9:30 a.m.-11:30 a.m. **GREEN**
Poster and Visual Art Presentations

10:30 a.m.-12:30 p.m. **GOLD**
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174.	Gretchen Kroh	27	286.	Jenifer Shattuck	43	119.	Becky Gullberg	19
176.	Lindsay Lammers	28	289.	Hazheen Shirnekhi	44	127.	Daniel Hartman	21
179.	Vy Le	28	290.	Nate Sindt	44	134.	Natascha Heise	22
184.	Minwoo Lee	29	293.	Joey Smith	44	140.	Tim Hoffman	22
189.	Michael Link	29	297.	Michael Tarne	45	152.	Albert Jeon	24
190.	Alejandro Lopez Ceron	30	300.	Josh Thomas	45	154.	Tyler Johnson	24
191.	Eric Lopez	30	303.	Alison Thurston	46	168.	Katie Knappek	26
193.	Pam Lundeberg	30	305.	Paul Todd	46	170.	Jennifer Kopanke	27
201.	Michelle Mann	31	309.	Carlie Trott	47	181.	Carmen Ledesma Feliciano	28
203.	Mary Marisa	31	315.	Tara Van Surksum	48	183.	Erin Lee	29
205.	Frank Marrs	32	317.	Fer Vidal Pena	48	199.	Mike Mangalea	31
206.	Alyssa Marshall	32	319.	Charlie Vollmer	48	204.	David Markman	32
208.	Andy Martinolich	32	320.	Kevin Votaw	48	216.	Erin McWhorter	33
211.	Annalise Maughan	33	321.	Julie Walker	49	220.	Megan Miller	34
218.	Chris Miller	34	327.	Zach Weller	49	230.	Nora Jean Nealon	35
225.	Eve Mozur	35	330.	Micah White	50	231.	Brad Nelson	36
227.	Trey Murschell	35	331.	Ben Wiebenga-Sanford	50	252.	Frances Peat	39
228.	Rashmi Murthy	35	333.	Colin Willis	50	283.	Rachel Severson	43
235.	Matt Oberdorfer	36	334.	Alyssa Winter	50	288.	Mallory Shields	44
239.	Cristian Oliva Aviles	37	College of Veterinary Medicine and Biomed Sciences			328.	Rachel West	50
240.	Nicole Olivas	37	11.	Evan Acerbo	4	336.	Meilin Yan	51
242.	Tarik Ozumerzifon	37	20.	Asghar Ali	5	338.	Usman Zaheer	51
243.	Arnold Paecklar	37	31.	Chelcie Barnett	7	Warner College of Natural Resources		
244.	Lara Pantlin	37	35.	Heather Bender	7	54.	Conamara Burke	10
245.	Dylan Parker	38	56.	Molly Butler	10	164.	Chelsea Kincheloe	26
247.	Jamie Parnes	38	59.	Phillida Charley	11	185.	Patrick Lendrum	29
248.	Molly Parsons	38	64.	Elliott Chiu	12	214.	Nicole McMahon	33
253.	Ben Peters	39	65.	Nunya Chotiwan	12	217.	Malia Michel	34
256.	Nirmal Prajapati	39	69.	Allison Cleymaet	12	282.	Casey Setash	43
258.	Ryan Rahm-Knigge	39	78.	Shaun Cross	14	284.	Nikki Seymour	43
260.	Abbie Reade	40	85.	Tosapol Dejyong	15	295.	Leeann Sullivan	45
265.	Nada Rifai	40				304.	Thomas Timberlake	46
266.	Kerry Rippy	41						

Performing Arts

10:00-10:10 a.m.

Life Chart

CEDAR BRANT

DEPARTMENT: ENGLISH

Both science and poetry are organizational nets that I place over the erratic natural and emotional worlds and begin to track patterns, growth, and unlikely relationships. I explore idea of home in relation to landscape in small, personal ways, and in an increasingly global way. How does the increasing field of vision necessary to address the global impacts of our politics, consumption, and growth impact our complex sense of home? I seek to work at the intersection of language, science, and imagination to explore these shifts in scope personally, communally, and globally.

10:10-10:20 a.m.

Poetry, Praxis and Conservation Through Feminist Epistemologies

OCTAVIUS JONES

DEPARTMENT: ETHNIC STUDIES

The realities that climate change, ecosystem degradation, and environmental pollution affect the livelihoods of all people today and all future generations within the biosphere brings an urgency to my work as there is no longer any time left for certain populations within humanity to remain hermeneutically ignorant and refuse to utilize the knowledges of Indigenous people. My research, through the use of poetry and the creative arts, seeks to elucidate the ways in which African Feminist Epistemologies and Indigenous methodologies centered on love can provide a new path of solidarity and local autonomy for Indigenous.

10:20-10:30 a.m.

She

SAM KILLMEYER

DEPARTMENT: ENGLISH

She explores the tug between the monumental she and the phenomena of the life lived, including the motions and frustrations of the every day. The narrative and image driven poems in this collection put pressure on the pronoun and question the implications of claiming the label she.

Performing Arts Performance Times

Time	Performer	Time	Performer
10:00 a.m.	Cedar Brant	11:00 a.m.	Morgan Riedl
10:10 a.m.	Octavius Jones	11:10 a.m.	Debbie Vance
10:20 a.m.	Sam Killmeyer	11:20 a.m.	Kelly Weber
10:30 a.m.	David Mucklow	11:30 a.m.	Zach Yanowitz
10:40 a.m.	Meghan Pipe	11:40 a.m.	Catie Young

10:30-10:40 a.m.

Laramide Orogeny

DAVID MUCKLOW

DEPARTMENT: ENGLISH

This manuscript considers rural and natural places in Colorado and the American West, and questions what it is that lets us belong there. The poems use geological processes of orogeny, glaciation, weathering, and identification of rocks, along with history, and personal observation and feeling of decay in places. Through their ever changing state from oceans to mountains, boom towns to bust, working in the barn to buried in a grave, the speaker of these poems tries to work through an understanding of changing and dying rural places, and question what has allowed me to be here, and belong here?

10:40-10:50 a.m.

Great Granddaughters of the American Revolution: A Novel-in-Progress

MEGHAN PIPE

DEPARTMENT: ENGLISH

Great Granddaughters of the American Revolution is the working title of a novel project that draws on American history both recent and colonial to explore relationships among women in families, in the workplace, in historical contexts in a town on the North Shore of Long Island with ties to Revolution. Drawn from personal experience working in the field of historic preservation, the project considers the significance and complications of preserving story, place, and objects, and the ways those tangibles and intangibles come together to tell a history that can never be fully representative.

11:00-11:10 a.m.

Why She Fights

MORGAN RIEDL

DEPARTMENT: ENGLISH

Why She Fights is a work of literary journalism that investigates the theme of identity creation. The narrative follows a day in the life of a young female athlete training to become a UFC fighter. Braided with this single-day arc is the story of her growing up. This piece seeks to both be a part of and lens to understand the cultural obsession with sports. It features a lesser known sport, and focuses on the athlete herself, using the sport as a framework to understand her identity and the factors, both internal and external, that help shape it.

11:10-11:20 a.m.

Save the Ones Who Cannot Be Saved

DEBBIE VANCE

DEPARTMENT: ENGLISH

"Save the Ones Who Cannot Be Saved" is a short story within a larger story cycle that pulls sub-text from the Pleiades/Orion myth cycle to explore the power dynamics between seven sisters living on the eastern seaboard, pedophilia, and the way male sexuality so often shapes girls as they transition into women.

11:20-11:30 a.m.

Their Bones Remember Water:

A Fossil Poetry Collection

KELLY WEBER

DEPARTMENT: ENGLISH

Near the small town of Royal, Nebraska, Ashfall Fossil Beds State Historical Park is an ongoing excavation site where diggers reveal, without removing, some of the world's best-preserved fossils within an ancient ash bed. My poetry collection *Their Bones Remember Water* comprises a series of intimate retrospective snapshots informed by my time working as a site interpreter at Ashfall. Combining research and Latin terminology with my own personal accounts and the fictionalized stories of people who visited the site, this sequence of poems meditates on the philosophical implications of the skeletons and humans place in history.

11:30-11:40 a.m.

the UNLIMITED poems

ZACH YANOWITZ

DEPARTMENT: ENGLISH

T.S. Eliot: "Do I dare/Disturb the universe?/In a minute there is time/For decisions and revisions which a minute will reverse."

UNLIMITED attempts to push towards a New Modernism through potential and possibility. The tension from finding oneself surrounded at every moment by a literally infinite number of options and choices that compound themselves towards eternity. These poems turn that constricting web of paralyzing anxiety and terror into a security blanket of tangible moments that still pulse with the energy of those unlimited futures and pasts. The poems tear themselves apart under the weight of their own form, their hidden revisions.

11:40-11:50 a.m.

From Stopgap

CATIE YOUNG

DEPARTMENT: ENGLISH

The poems in *Stopgap* deal primarily with voids. They approach the blank spaces we all encounter – those left by family history, loss, religion, the human condition – and move through various attempts at filling them.

Visual Arts

1 Used My Mac to Make a Mac

MAGGIE ADAMS

DEPARTMENT: ART AND ART HISTORY

Graphic Design is a tool for communication. I strive for simplicity in my work; less is more. Exploring new techniques and material possibilities pushes the boundaries of my work. My diverse experience has taken me down the path of exploring three dimensional work and as a result I've become interested in installation art or any art that invades our space as a viewer. During my first ever sculpture class I was tasked with replicating my most prized possession in any material. I found it ironic that my Mac computer would be the tool I used to make a Mac computer.

2 Cast Into the Land

SONJA ALLEN

DEPARTMENT: ART AND ART HISTORY

I am a student in the Visual Arts Department disciplining in sculpture. My interests lie in the possibility of reconnecting with nature through art that is created outside of a gallery and using organic materials found on-site. The location of the work is significant, because it signifies areas that have been modified by human efforts. I postulate over how this has changed throughout human history, especially now in this age of technology. I would like viewers to wander upon these forms and contemplate their own footprints in the land.

3 New Methods in Intaglio Printmaking

ANDREW MEYER

DEPARTMENT: ART AND ART HISTORY

This body of work is an attempt to advance the technical application of Intaglio printmaking. Throughout history the ability to create a mark upon a matrix within Intaglio printmaking has been constantly evolving. The medium allows for a variety of techniques to be used to create a desired image etched or engraved into a metal plate. This body of research presents a brand new method of 'mark-making' in which the reaction of water to a copper plate coated with liquid rosin builds a new type of resist.

4 Still

CHRISTY NELSON

DEPARTMENT: ART AND ART HISTORY

My paintings explore the longing for safety and the items that bring the feeling of security. In this process, I am uncovering themes of Existentialism: trauma, anxiety, authenticity, and alienation. I also am discovering truths about all humans shared underlying basic needs and desires (Maslow's hierarchy of needs). I originally saw my work as a personal project. However, I also am discovering that it holds a visual haven and a therapeutic value through creation, that I would like to share experientially with others who have been silenced, ignored, or abused.

5 Sculptural Mixed Media With an Emphasis on Drawing and Construction

KYLE SINGER

DEPARTMENT: ART AND ART HISTORY

I hold a mirror up to myself to reveal fragmented, and overlapping, meaning. My memories are yours to digest, collapsing the distance between my mind and yours. Personal, public and private histories all come together, illuminating how information is consumed by the individual. The onslaught of information creates a form of thinking in which everything is tried, tested, and nothing is left sacred. Our life is built on the bones of the failures of our forefathers. In order to construct a new world, we must exhume the bones for all to see.

6 The Space Between Us

EMILY SULLIVAN

DEPARTMENT: ART AND ART HISTORY

The Space Between Us explores distance both literally and symbolically. Each of the 1,722 miles separating my husband and I are represented as a small square tile. The tiles are presented in varied stacks showing the weight of this separation. On each, I painted a plant growing in the regions between Colorado and North Carolina. In reality, the distance exists on the ground, where plants grow and make up each mile. I want to know the plants by their names, and to start piecing together their individual and collective stories. Despite the distance, there is thriving life between us.

7 Making Sense

ALYSON WELKER

DEPARTMENT: SCHOOL OF EDUCATION

Teaching, learning, and researching can become a complex constellation of knowledge, people, artifacts, and reality. Education often attempts to separate parts of the whole artificially yet also struggles to find the power in the collective. The systematic relations within this piece represent the artifacts that have agency in our lives and research, especially within the classrooms where we teach, learn, and study. Attempted replications do not respond the same to each medium, canvas, brush, or day; students, similarly, cannot always be generalized. This continual process of becoming can at once be exhausting and freeing. Research, Scholarship, and Entrepreneurship

Research, Scholarship, and Entrepreneurship

8 Diving Deep: The Marine Mammal Dive Response

DOMINIQUE MONTANO

DEPARTMENT: BIOLOGY

Marine mammals, like seals and sea lions, possess unique adaptations to sustain dives for several hours off of one breath of air. Research from the Kanatous Laboratory serves to study these fascinating adaptations. From their heart, to their muscles, to their blood and at the cellular level, marine mammals exhibit what is known as a “dive response,” helping them to conserve oxygen in an environment underwater where there is none. This interest in a mammalian ability to sustain such long breath holds and exercise under them has far-reaching implications to study other mammalian responses to hypoxic, or low oxygen environments.

9 A Physics-Based Model for Twisted and Coiled Actuator

ALI ABBAS

DEPARTMENT: MECHANICAL ENGINEERING

A recently discovered artificial muscle actuator is made out of polymeric fibers, like nylon fishing line. It is made by twisting and coiling the fiber into helical structure. This twisted and coiled actuator (TCA) generates reversible actuation when a temperature stimulus is applied; moreover, it is low-cost and easy to fabricate. Despite such remarkable qualities, theoretical models to describe the static and dynamic response of the TCAs are still missing. In this study our goal is to develop physics based static and dynamic models. These models are based on the utilization of physical parameters and mechanical properties of the TCA.

10 Sources and Seasonality of Volatile Organic Compounds in Northern Colorado

ANDY ABELEIRA

DEPARTMENT: CHEMISTRY

Since 2008 the Northern Front Range Metropolitan Area of Colorado has been deemed an ozone (O₃) nonattainment zone despite continued work on ozone precursor reductions. Volatile organic compounds (VOCs) are important ozone precursors, and emissions are relatively uncharacterized in the NFRMA. During March-May and July-September 2015, a suite of VOCs was measured during two eight-week measurement campaigns in Erie, Colo. Using Positive Matrix Factorization, we identified four unique VOC sources in the spring and five in the summer with oil and natural gas sources providing a large percentage of reactive carbon.

11 Histological Analysis of the Bacterial Infection *Burkholderia Pseudomallei* in Mice

EVAN ACERBO

DEPARTMENT: ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

Burkholderia pseudomallei, a bacterial pathogen native to Thailand and northern Australia is the causative agent of the fatal disease melioidosis. The pathology of the infection is not well understood and thus current treatment of the disease still results in fairly high mortality rates. Previous research from our laboratory has recently discovered a new potential treatment to the infection. A deeper histological analysis of the lung, liver, and spleen tissues of infected mice provides valuable insight into the success of the previous research by creating a better understanding the pathogenesis of this disease.

12 College Students Coping With Loss

JOHN ADAMS

DEPARTMENT: PSYCHOLOGY

At any given time, between 22 and 30% of college students have experienced a death loss within the last 12 months. Students grieve their losses in different ways. Some attempt to grow personally from a traumatic loss, while others maintain a posthumous spiritual or symbolic connection with their loved one. This study explored the relationship between these approaches to grief and mental health outcomes within a college student sample.

13 Predictors of Leaving Treatment Among Homeless Heroin Users

REUBEN ADDO

DEPARTMENT: SCHOOL OF SOCIAL WORK

Individuals who experience homelessness have a greater chance of being injection drug users; they have a greater chance of death as a result of heroin overdose and may be exposed to HIV/AIDS and Hepatitis C. This secondary data analysis examines the factors that predict treatment outcomes among homeless heroin injection users. Results indicate gender, length of stay, number of prior treatment episodes, and age separately significantly predicted leaving treatment against professional advice. This study suggests long-term re-hab facilities may need to differentiate treatment for homeless youth to increase their odds of completing treatment.

14 Cu₃SbSe₃ Nanodiscs: Shaping up for Carrier Transport

DANIEL AGOCS

DEPARTMENT: CHEMISTRY

We have demonstrated a synthesis of nanocrystalline Cu₃SbSe₃ for use as a new material for solar cells. Our work utilizes a solution-based route for the formation of nanodiscs, where we can tailor the shape of the particles. This has implications for self-assembly, which may ultimately lead to improved electronic properties.

15 Myocardial Afterload is an Epigenetic Regulator of Cardiac Valve Formation

NEHA AHUJA

DEPARTMENT: UNIVERSITY WIDE – 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.

16 Bid or No Bid Decision Making Tool Using AHP

DUYGU AKALP

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

The ultimate purpose of this study is to develop a practical decision-making tool to assist decision makers in the construction industry to select the most appropriate projects to bid on using Analytic Hierarchy Process (AHP) and test its validity. The validation of the bid/no bid decision-making tool was performed based on two participants' responses; and the tool provided accurate results for one of the evaluations. Because of insufficient response rate to the validation process, it cannot be concluded that the bid/no bid decision-making tool is validated; however, the results of the participants point out the need for further research.

17 Understanding Barley Variety's Impact on Beer Flavor Through Metabolomics

HARMONIE AKERS

DEPARTMENT: 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.

18 Simulating Ambient Organic Aerosol in 3-D Air Quality Model

ALI AKHERATI

DEPARTMENT: MECHANICAL ENGINEERING

Combustion-related primary organic aerosol (POA) is now known to be semi-volatile and reactive. Intermediate volatility organic compounds (IVOC), multigenerational chemistry and vapor wall losses during chamber experiments have all been shown to be important for the atmospheric production of secondary organic aerosol (SOA). While some of these processes have been accounted for in 3-D chemical trans-

port models, it is unclear how these processes interact with each other at varying spatial and temporal scales and control the size, mass, composition and source contribution of ambient organic aerosol (OA) in urban and regional airsheds.

19 Improving English Pronunciation Among Arab Learners

ELLA ALHUDITHI

DEPARTMENT: ENGLISH

It is important for English language learners to work on their pronunciation to avoid being misunderstood. A number of factors might influence their oral production, including native language transfer. It is believed that more language errors would occur if learners' native language is different from their second language. Since Arabic and English belong to different set of language trees, numbers of phonemes exist only at one language sound system. This leads Arabs to face difficulties in producing certain English sounds. A number of activities that target their common pronunciation errors are developed to help them improve their L2 oral production.

20 Lin28A-B Double Knockout Using CRISPR/Cas9 System in Human Trophoblast Cells

ASGHAR ALI

DEPARTMENT: BIOMEDICAL SCIENCES

During early pregnancy, the fetal-derived extravillous trophoblast cells invade the maternal uterus. Defects in this process can lead to severe complications during pregnancy. Consequently, a detailed understanding of the mechanisms that underlie trophoblast invasion is necessary. LIN28 is an RNA binding protein with two homologues, LIN28A and LIN28B that are highly expressed in undifferentiated cells. In this study, a double KO trophoblast cell line was created using CRISPR-Cas9-based genome editing. We show a change in expression of let7 miRNA and downstream targets of let7 miRNA including important stemness genes like HMGA2, cMYC, H-RAS and VEGFA following DKO of LIN28.

21 Characterization of Zebrafish Models of Filamin C Related Cardiomyopathy

RASHA ALNEFAIE

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

Dilated cardiomyopathy (DCM) is a group of heart muscle diseases. The genetic basis remains unknown for 50% of DCM cases. Recently, we reported novel splicing variants in the filamin c (FLNC) gene in two cardiomyopathy-afflicted families, suggesting that FLNC mutation is linked to DCM. To better understand how mutations in FLNC contribute to cardiac phenotypes, we created a zebrafish loss-of-function model for FLNC genes. Knockdown of zebrafish FLNC led to dysmorphic cardiac chambers, suggestive of systolic dysfunction. Ultrastructural analysis indicated disorganized myofibrils with fewer consecutive sarcomeres. Together, our results suggest that FLNC is required for heart development and functionality.

22 Audiovisual Training Program for Latino Dairy Workers in Colorado Dairies

FLOR AMAYA-SOTO

DEPARTMENT: ANIMAL SCIENCES

Dairy in the U.S. is an industry with high rates of injuries and illnesses and lacks consistent and culturally appropriate training programs. Based on previous studies; animal handling hazards, content, delivery method and extent of training were chosen as important topics for this study. A video training about the risks of Infectious and Zoonotic Diseases and preventive behaviors on dairy farms was developed. Additionally, pre and post training questionnaires were applied to evaluate the effect of the training on the possible transfer of knowledge and the change of behavior among workers.

23 Mindfulness Relates to Disinhibited Eating in Adolescents At-Risk for Diabetes

SHELLY ANNAMEIER

DEPARTMENT: HUMAN DEVELOPMENT AND FAMILY STUDIES

Mindfulness-based programs show promise for addressing obesity and type 2 diabetes in adults. Theoretically, mindfulness enhances present-moment awareness of hunger/satiety cues, which lessens excess weight and diabetes risk. Virtually no work has described the relationship of mindfulness with eating in adolescents, despite the importance of understanding this connection for diabetes prevention. We examined the association of mindfulness with eating behavior during test meals in adolescents at-risk for diabetes. Mindfulness did not relate to eating when hungry, but instead was inversely associated with eating without hunger. Mindfulness may promote more effective regulation of food intake in response to appetitive cues.

24 Modelling Flows in River Bends

OLADAPO ASEPERI

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

Water is essential for sustenance of life on Earth and hence the means by which it is conveyed from place to place is thus important. Natural rivers and manmade channels are common conveyance systems that typically have meandering (curved) geometries. A better understanding of the flow dynamics as well as the associated complex flow structures in river bends is critical for developing improved engineering design methods for protecting such conveyance systems against failure due to erosion. This research is aimed at contributing towards fundamental understanding of the flow structure in river bends using computational simulations.

25 Reasons Behind High Dropout Rate of Secondary Students in Cambodia

FARISHTA ASMATY

DEPARTMENT: COLLEGE OF BUSINESS

Cambodia, a developing country in Asia, is facing a high dropout rate in secondary school students. In our month long primary research, we tried to find the reasons behind the high dropout rates in secondary school students and to devise a solution for it. Based on our primary

findings, there are three main reasons behind the high dropout rates; financial difficulties of students' families, negative peer influence, and poor industry marketing strategies. The youth deserve quality education, and therefore, our solution is an affordable blended learning system that would help in bridging this gap.

26 In-Motion, Optical Sensing for Assessment of Livestock Musculoskeletal Unsoundness

COLTON ATKINS

DEPARTMENT: ANIMAL SCIENCES

Application of Animal-In-Motion-Optical-Sensor (AIMOS) measurements were investigated for inspecting livestock musculoskeletal unsoundness. An optical sensor-based AIMOS Platform was used to collect in-motion, weight-related information. Eight steers, weighing 1500 to 2500 lbs., were evaluated twice. Animal hoof-load impacts caused plate flex that was optically sensed. Observed kinematic and kinetic differences between animals' strides at a walking gait with significant force and pressure distributions of animal's hoof impacts allowed for observation of real-time, biometric patterns. Overall, optical sensor-based identification of musculoskeletal differences between and within animals in-motion may allow for earlier diagnosis of musculoskeletal unsoundness that could not be observed subjectively.

27 Evaluating Management Practices: Linking Logging Residues to Soil Biogeochemistry

BETHANY AVERA

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Mountain pine beetle (MPB) has affected more than 7 million hectares of lodgepole pine forests in North America with high overstory mortality. Best management actions are uncertain because the impact of salvage-logging and logging residue retention on ecosystem productivity and carbon stores are unknown. This work is evaluating the role of ectomycorrhizal fungi (EMF) on basic nutrient cycles and impacts to EMF by MPB outbreaks and quantifying changes in soil organic matter stocks and nitrogen allocation due to logging and logging residue treatments. This research hopes to unite science findings and management constraints to identify a management solution for MPB-impacted stands.

28 Investigating the Inhibitory Effect of *Bacillus Pumilus* on *Nannochloropsis Salina*

MIRNA AYSHOA

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

Microalgae have the potential to be a source of a wide range of industrial materials. To provide the biomass for these products, algae are grown in large volumes. At these scales, there are other microbial species living in algal cultivation systems and some of them have been found to be bacterial species that inhibits algal growth, so it's important to understand the interactions in these industrial ecosystems. In this research, we focused on an elite algae species, *Nannochloropsis salina*, and a bacterial species, *Bacillus pumilus*. In previous research in our laboratory, *B. pumilus* culture filtrate had inhibitory effects towards *N. salina*.

29 Improving Fuel Economy of Hybrid Vehicles with Speed Prediction

DAVID BAKER

DEPARTMENT: MECHANICAL ENGINEERING

In EcoCAR 3, the Colorado State University Vehicle Innovation Team is tasked with converting a 2016 Chevrolet Camaro into a hybrid electric vehicle. The goal of the project is to increase the energy efficiency of the vehicle, while maintaining the safety and performance that consumers expect in a performance car. The control of the powertrain is an integral part of improving energy efficiency. This research shows, through simulation, that predictions about future vehicle speed can be used to make better decisions about when to operate the internal combustion engine to improve the fuel economy of a hybrid powertrain.

30 Sustainable Transfer of Innovative Drinking Water Technology to Sub-Saharan Africa

JESSICA BAKER

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

According to the UN, 10% of the world's population does not have access to safe, disinfected water, a basic need for life, even after generations of international development efforts. Experience suggests this is due to a combination of many factors, including cultural, political, or economic. Innovative technology alone is not enough; how that technology is transferred is critical to its sustainability and impact. For this project, I will be taking pre-engineered water tanks and modifications developed at CSU and transferring these technologies to a developing nation in Sub-Saharan Africa, taking into consideration both the technical and the social aspects.

31 Geospatial Analyses of Childhood Malaria Incidence Following Repeated Ivermectin Administrations

CHELICIE BARNETT

DEPARTMENT: ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

Malaria is a major global health concern, with more than 3.2 billion people living at risk of infection. Current interventions and treatments are losing their effectiveness as mosquitoes and malarial parasites develop resistance. Through a secondary analysis of a novel preventative intervention, the Gedis-Ord (Gi*) spatial autocorrelation statistic was utilized to evaluate geospatial clustering of childhood malarial incidence in the study region. Clustering of high incidence density values was found in all study villages and throughout the entire region; however, some of these patterns may indicate the potential for this intervention to provide regional protection, even for those not directly treated.

32 Trait-Mediated Interactions Overlooked in Food-Webs Detrimental to Management?

THERESA BAROSH

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Indirect species interactions can have a profound effect on community structure. When herbivores share a food source, they impact one another indirectly through resource competition and trait-mediated

interactions. Distinguishing between these two types of indirect interactions is very difficult in plant-based systems. Using the invasive Russian knapweed as a study system, I explore how the plant mediates interactions between its biological control agent, a gall midge, and grazing mammals. Management for Russian knapweed can include a combination of biocontrol and grazing. Therefore, this research has the potential to inform weed management strategies and understanding of indirect interactions in food webs.

33 Role of the Gut Microbiome in Obesity-Related Vascular Dysfunction

MICAH BATTSON

DEPARTMENT: 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. The gut microbiome has recently emerged as an important factor influencing human health and disease, and deleterious changes in the composition of the intestinal microbiota, termed dysbiosis, is associated with obesity and Western-diet (high fat/high sugar) feeding. Our results suggest that intestinal dysbiosis contributes to the development of vascular dysfunction in obese mice fed a Western diet and provides evidence for the efficacy of gut microbiome-targeted therapies for treating obesity-related vascular dysfunction.

34 Vulnerability of Stream Algae to Nutrients in a Changing World

WHITNEY BECK

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Nutrient enrichment is leading to dramatic changes in algal communities across the globe. I investigated the vulnerability of several Poudre watershed streams to nutrient additions in 2015 and 2016. I also completed a meta-analysis of 650 published experiments to understand how experimental and environmental factors affect algal responses to nutrients. Algae in most Poudre streams was limited by nitrogen or co-limited by nitrogen and phosphorus. The meta-analysis highlighted the importance of consistent experimental design, and the importance of land use, season, temperature, in-stream nutrients, and light. These findings will push forward the fields of algal science, policy, and bioassessment.

35 Crossing the Blood Brain Barrier: siRNA Treatment for Prion Diseases

HEATHER BENDER

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

We are using prion diseases as a model for neurodegenerative diseases. Specifically, we are investigating whether siRNA treatment can decrease neuronal PrPC and extend the lifespan of prion-infected mice. We are also assessing whether our delivery vehicle, liposome-siRNA-peptide complexes, is efficient in crossing the blood brain barrier. We have shown that LSPCs, when injected intravenously, can decrease neuronal PrPC 30-40%. We are now starting terminal disease studies to assess whether siRNA treatments are an efficacious therapeutic option for prion diseases.

36 Regulation of Halloween and Ecdysone-Responsive Genes in Blackback Land Crab

SAMIHA BENRABAA

DEPARTMENT: BIOLOGY

Molting is a natural process and requirement for growth and development in crustaceans. Halloween genes are expressed in the molting gland (Y-organ) and encode enzymes that catalyze the synthesis of ecdysteroid hormones that coordinate molting processes during the pre-molt stage. Ecdysteroid receptor (EcR/RXR) binds active molting hormone, which induces serial activation of ecdysone-responsive genes. We used insect genes to extract and characterize the land crab orthologs from a Y-organ transcriptome. RNA-Seq data was used to quantify relative gene expression over the molt cycle

37 Shifting Identities: Gentrification and Neighborhood Social Cohesion in Portland, Oregon

STEFANIE BERGANINI

DEPARTMENT: ANTHROPOLOGY

This research proposal comprises a 10-week comparative study to assess the effects of gentrification in the neighborhoods of Portland, Oregon. Using the city's gentrification risk assessment maps, five neighborhoods have been selected from areas not yet experiencing population displacement, and five from areas experiencing moderate to severe displacement. Through surveys and focus groups, and building on a successful 10-week pilot project as well as theory in urban anthropology and the anthropology of place, this research seeks to fill a gap in the literature by providing data related to three key variables: priorities in neighborhood dynamics, social cohesion, and neighborhood-specific identity.

38 Cu(II) Coordination of Amyloid Models Impacts Inter-Peptidic Metal Exchange Kinetics

CHERYLE BEUNING

DEPARTMENT: CHEMISTRY

Metal chelation of peptides like amyloid beta (A) leads to aggregation, oligomerization, and precipitation into insoluble plaques causing neurodegeneration, a hallmark of Alzheimer's disease. Most biological Cu(II) are bound so understanding inter-peptidic metal exchange kinetics is important. Differences in Cu(II) coordination of A binding models, DAHK/DAHW and GHK/GHW, was shown to affect their metal exchange kinetics despite having similar binding affinities. Exchanges from DAHW-Cu(II) to DAHK/GHK are incredibly slow (days). The GHW-Cu(II) to DAHK/GHK exchanges are much faster (minutes) and conditional rate constants were determined, $k = 50 \pm 20$ (DAHK) and 140 ± 20 (GHK) $1/(M \cdot s)$.

39 Innate Immunity Induced by BCG

TOM BICKETT

DEPARTMENT: UNIVERSITY WIDE - CELL AND MOLECULAR BIOLOGY

For almost 100 years, newborns in many countries have been vaccinated with the Bacillus Calmette-Guérin (BCG) vaccine to protect

against Mycobacterium tuberculosis. M. tuberculosis currently infects one third of the world's population and is responsible for millions of deaths annually. However, vaccination efficacy varies widely and protection wanes over time. BCG continues to be enigmatic and very little is known about why it is a poor vaccine. 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.

40 Coupling Laboratory and Field Measurements to Improve Cookstove Emissions Estimates

KELSEY BILSBACK

DEPARTMENT: MECHANICAL ENGINEERING

Air pollution from rudimentary cooking devices, used in the developing world, is known to contribute to climate change and human disease; however, there are still considerable uncertainties regarding the nature of cookstove pollution. One reason is that the majority of cookstove emissions data are derived from laboratory experiments, which do not adequately represent cooking conditions. In this work, we develop a novel laboratory testing approach and emissions models, which can be coupled to improve cookstove emissions estimates. The results could drive cookstoves towards better real-world performance and aid climate, air quality and health studies in better understanding cookstove impacts.

41 Federated Cloud Computing as System of Systems

YAHAV BIRAN

DEPARTMENT: COLLEGE OF ENGINEERING

Energy and Resource utilization efficiency are two of the significant differentiators in the contemporary Cloud computing marketplace. We address both of these from system of systems architectural and optimization viewpoints. It will allow multiple cloud providers to optimally utilize compute resources. It will do this by lowering the data-centers deployments per provider ratio, share and scheduling available energy via aggregators and lastly to employ renewable and carbon free engines. This is an embodiment of a cloud-federation. This new cloud federation SoS paradigm will employ a new control methodology that is both financially attractive and energetically and environmentally advantageous.

42 Regional Characteristics of the Difference Between Compensation and Productivity

CHRIS BLAKE

DEPARTMENT: ECONOMICS

What regional elements exist in the relationship between the compensation workers receive and their productivity? I analyze estimates of average compensation and labor productivity for four key sectors in the economy. This comparison shows that the relationship between compensation and productivity supports the amenity literature. Namely, workers are willing to receive lower compensation than their productive contributions if a region has relatively high amenities and workers necessitate compensation boosts above productivity to live in less desirable areas.

43 Utilizing Paper-Based Microfluidics for Antimicrobial Resistant Bacteria Detection

KAT BOEHLE

DEPARTMENT: CHEMISTRY

Due to the overuse of antimicrobial agents, the prevalence of antimicrobial resistant (AMR) bacteria is on the rise. Currently, AMR is monitored in the environment by transporting samples to a central laboratory for testing, increasing expenses and time to results. We have developed an inexpensive and more rapid microfluidic paper-based analytical device (μ PAD) to test for the presence of β -lactamase-mediated resistance using a nitrocefin substrate. This device was demonstrated by detecting β -lactam-resistant bacteria in sewage water samples. By utilizing a paper and wax platform impregnated with substrate, a user friendly device was developed for approximately \$0.17.

44 Responding to Suicidal Ideations in Online Peer Support Groups

NICHOLAS BOEHM

DEPARTMENT: JOURNALISM AND MEDIA COMMUNICATION

This study examines if moderated online peer groups for those experiencing suicidal ideations differ than non-moderated online peer groups in three ways: frequency of pro-suicide response, frequency of non-civil response, and frequency of therapeutic response. A content analysis was conducted on one moderated website with peer support groups for those experiencing suicidal ideations as well as one non-moderated website with online peer support groups for those experiencing suicidal ideations. Findings showed pro-suicide and non-civil comments to be more frequent on the non-moderated peer groups. Additionally, the moderated peer groups contained almost twice as many therapeutic responses than the non-moderated groups.

45 New Tools to Study the “Molecular Kiss of Death”

SARAH BOLLINGER

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

Ubiquitination, or the addition of ubiquitin to other proteins, provides a mode of regulation that is used in a slue of metabolic pathways including protein degradation, hence the nickname molecular kiss of death. Since its needed at many different times and locations, cellular free ubiquitin (i.e. not attached to other proteins) is highly regulated. We know that too much or too little free ubiquitin leads to neuronal defects, but there isn't much quantitative information about this system. We propose tools that facilitate quantitation of ubiquitin concentrations and rate of movement in the cell to help us better understand this system.

46 Can Mainland Island Sanctuaries Restore Birds and Seed Dispersal?

SARA BOMBACI

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Invasive species are a leading threat to island fauna, which threatens animal-mediated ecosystem processes like seed dispersal. Invasive species eradications on small islands have helped recover many threatened populations globally, but it is difficult to eradicate invasive species from large islands or mainland areas. New Zealand conservation organizations have constructed mainland island sanctuaries, with invasive mammal-proof fencing, to restore threatened species to mainland New Zealand. My research tests whether these sanctuaries can protect bird diversity and associated seed dispersal processes. Preliminary findings indicate higher abundance and diversity of several native birds, and higher seed dispersal, in sanctuaries versus unprotected sites.

47 Music as a Tool for Learning in Children's Educational Television

MADELINE BOMBARDI-MOUNT

DEPARTMENT: JOURNALISM AND MEDIA COMMUNICATION

As television screens become a ubiquitous part human life, researchers continue the decades-old debate concerning the advantages and disadvantages of children's exposure to television during early childhood development. This study argues for three core features that demonstrate how music facilitates memorization and procedural concept learning: music provides a neurological/cognitive framework that is compatible with academic learning, music tends to elicit responses in listeners that are positively correlated with heightened affect, arousal, and mood, and finally, the repetition of musical segments (repeated melody, verse, etc.) and content increases the availability, accessibility, and applicability of a specific knowledge structure.

48 Application of Radar Derived Kinematics to Characterize Monsoon Intra-Seasonal Variability

SOUMOJIT BOSE

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

Generally known for its expertise in measuring microphysical properties of clouds, this work aims to showcase the wind profiling abilities of the Ka-band millimeter wave radar. Its high sensitivity along with high temporal and spatial resolution make it a potential candidate for acquiring high quality winds. A new algorithm has also been proposed for the retrieval of wind field kinematics. Dynamical characteristics of the monsoon winds have also been brought out.

49 Edible Superhydrophobic Coatings

LEWIS BOYD

DEPARTMENT: MECHANICAL ENGINEERING

We used FDA-approved, edible materials to fabricate superhydrophobic coatings in a simple, low cost, scalable, single step process. Our coatings display high contact angles and low roll off angles for a variety of liquid products consumed daily and facilitate easy removal of liquids from food containers with virtually no liquid residue. Even at high concentrations our coatings are non-toxic as shown using toxicity tests.

50 Genetic Mark-Recapture as an Alternative to Traditional Lek Counts

JESSICA BRAUCH

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Successful management and conservation of greater sage-grouse populations requires accurate and defensible estimates of population size and trend, however, the use of lek count data to accurately estimate these has been criticized. For this reason, the development of innovative methods to evaluate the lek count index and monitor greater sage-grouse populations is critical. We employed a non-invasive, genetic mark-recapture method to estimate abundance and pre-breeding sex ratio of a small population in northwestern Colorado. We collected nearly 2,500 fecal pellet and feather samples during two consecutive winters to identify individual birds using DNA microsatellites and estimate population abundance.

51 Estimation of Ionosphere Total Electron Content From 3-Frequency GPS Measurements

BRIAN BREITSCH

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

A principal observation derived from GNSS (Global Navigation Satellite Systems) signals is ionospheric total electron content (TEC), which is a measure of free electron density integrated along the signal path. TEC is usually derived using two signals with different carrier frequencies, thereby taking advantage of the frequency dispersive effects of ionosphere plasma on microwave band propagation. Here we look at using the GPS L5 signal in conjunction with L1CA and L2C signals to estimate ionosphere TEC along with related parameters receiver inter-frequency biases (IFB) and carrier ambiguities, which must be estimated simultaneously. These parameters are of scientific and engineering interest.

52 The Exiled Princess: Incestual Medievalism Motifs in The Mortal Instruments

LINDSAY BROOKSHIER

DEPARTMENT: ENGLISH

The exiled princess is a motif that appears in medieval texts such as the tale of Constance, the poem Emaré, and Geoffrey Chaucer's Canterbury Tales. This motif is replicated as a medievalism in the young adult fantasy series The Mortal Instruments by Cassandra Clare. The protagonist of this popular series, Clary, represents a traditional princess in exile that evades a dualism of innocent and sinister incestual desires. This influence of medieval cultural concepts on popular fiction demonstrates the heavy influence that remains in popular culture and in turn offers a contemporary lens to view classic medieval texts.

53 The Sensitivity of Surface Ozone Concentrations to Anthropogenic NO_x Emissions

JENNIE BUKOWSKI

DEPARTMENT: ATMOSPHERIC SCIENCE

While beneficial in the stratosphere, ozone is a harmful compound at the earth's surface. Ozone is corrosive and causes respiratory illness, making it detrimental to human health. The components necessary for surface ozone accretion are the presence of nitrogen oxides (NO_x),

volatile organic compounds (VOCs), and sunlight. In particular, the distinctive meteorology of the Great Lakes region, combined with an abundance of precursor chemicals often results in air pollution exceedances. Here, a high resolution model was employed to test the sensitivity of ozone concentrations to future anthropogenic NO_x emissions to inform policy makers and improve air quality in the region.

54 Modeling Fire Behavior in Forest Treatments With Heterogeneous Clumping Patterns

CONAMARA BURKE

DEPARTMENT: FOREST AND RANGELAND STEWARDSHIP

Forest restoration treatments are increasingly being implemented in ponderosa pine forests to remove flammable biomass while reestablishing heterogeneous forest structure. However, it is poorly understood how heterogeneous forest structure characterized by variable tree clumping patterns influences fire behavior. The Wildland Urban-Interface Fire Dynamics Simulator, which is an advanced physics based computer model, was used to explore the relationship between heterogeneous structure and fire behavior, and determine the relative importance of considering clumping patterns in forest treatments. WFDS model outputs indicate that understory fuel load levels are a stronger driver of creating differences in fire behavior than various clumping patterns.

55 Laser Cooling Hydrogen and Anti-Hydrogen: Delving Deep Into Fundamental Physics

ZAK BURKLEY

DEPARTMENT: PHYSICS

As the simplest atom, physicists check and revise their theory by its agreement with experimental hydrogen measurements. Using a ytterbium-fiber-amplifier we demonstrate a novel laser system that produces 6.3 W at a wavelength of 972.5 nm. We frequency quadruple this source in two resonant doubling stages to generate 530 mW at 243.1 nm. With an unprecedented amount of power at 243.1 nm, this laser can be used to improve studies on hydrogen and anti-hydrogen, and opens the door to the possibility of laser cooling these atoms. Slower atoms mean better measurements of hydrogen, anti-hydrogen, and thus tests of fundamental theory.

56 A Novel Retroviral Sequence Identified in Gunnison's Prairie Dogs

MOLLY BUTLER

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

Gunnison's prairie dogs are highly susceptible to sylvatic plague. Understanding this susceptibility has important implications for plague management. Here we report thymic tumors found in three prairie dogs and 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. Amplicons were cloned and sequenced. Analysis of this sequence resulted in identified homology to other retroviral protease and polymerase genes. Further studies are indicated to extend the known sequence and to screen additional prairie dogs.

57 Spruce Beetles Influence Vegetation Recovery in the West Fork Fire

AMANDA CARLSON

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

The West Fork Complex fire, which ranks among the largest wildfires recorded in Colorado history, occurred in a subalpine forest in the midst of a highly severe spruce beetle outbreak. We assessed whether these overlapping severe disturbances produced a compounded effect on vegetation recovery two years after the fire, using Normalized Difference in Vegetation Index (NDVI) and pre-fire beetle outbreak estimated from change in Normalized Difference in Moisture Index (NDMI), derived from Landsat imagery. Sequential autoregression models accounting for topography, fire weather, and pre-disturbance NDVI found a significant negative correlation between outbreak severity and post-recovery NDVI.

58 Validation of Smartphone-Based Measures of a Young Adult's Lower Limb Power

MATT CARNAL

DEPARTMENT: HEALTH AND EXERCISE SCIENCE

Portable, quantitative measures of leg power would be clinically valuable in special populations. We assessed the accuracy of the iPod Touch as a movement sensor against two expensive, lab-based devices during the sit to stand task. The values from the inexpensive smartphone were highly correlated with the other devices. The findings suggest an easily implemented, portable device for use in the assessment of leg power in remote clinical settings.

59 Members of the Arenaviridae and Bunyaviridae Stall and Repress XRN1

PHILLIDA CHARLEY

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

Members of the Flaviviridae virus family (e.g. Dengue, West Nile and Hepatitis C) use a knot-like RNA structure located in their 5' or 3' untranslated region (UTR) to stall/repress XRN1, a major exoribonuclease in eukaryotic cells. We have discovered that select RNAs of the Arenaviridae (e.g. Junín virus) and Bunyaviridae (e.g. Rift Valley fever virus) also stall and repress XRN1, likely via novel structures. These data demonstrate that XRN1 is a key enzyme targeted for inactivation by viral RNA structures. The conservation of this mechanism suggests that reduced activity of XRN1 may positively contribute to viral replication and pathogenesis.

60 An Ultrasensitive Humanized Mouse Model for Detection of Latent HIV

PAIGE CHARLINS

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

As we get closer to developing a cure for HIV, a more sensitive assay is needed for detection of latently infected cells, which can go undetected by current assays. These assays rely on detection of live virus or integrated HIV DNA isolated from a patient's cells. Such reliance on specific detection methods can greatly overestimate or underestimate the size

of the latent pool and effect patient care. We propose that the use of humanized mice will enable a more sensitive detection of latently infected cells and become a vital tool for HIV detection as curative strategies continue to be developed.

61 Grassland Ecosystem Recovery After Loss of a Dominant Plant Species

FRANCIS ANDREA CHAVES RODRIGUEZ

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

The loss of dominant plant species from ecosystems causes dramatic declines in ecosystem function. Due to competitive release, it also creates opportunities for other species to become abundant and compensate for the loss of dominant species, resulting in ecosystem recovery. However, as in tallgrass prairie ecosystem, compensation does not always occur. Low resource availability and lack of functionally equivalent plant species are proposed as constraints on ecosystem recovery. Increasing water availability increases aboveground biomass production, but not enough to fully compensate for loss of a dominant grass species, indicating abundance of functionally equivalent species can also be in play.

62 Urban Weather Hazards Detection and Mitigation Using High-Resolution Radar Network

HAONAN CHEN

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

Due to the Earth's curvature, complex terrain and urban deployment challenges, the physically large, high-power, long-range radars in the current operational network have severe limitations in observing the lower part of troposphere where many hazardous weather events occur. In this research, we aim to improve urban weather sensing by deploying dense networks of low-power small high frequency radars. A new methodology is developed to collaboratively operate the radar networks and adapt them to the changing atmospheric conditions. Through observing and tracking the storm cells in a dynamic manner, real-time hail, tornado, and flood products are generated for natural disaster mitigation.

63 Developing a Replacement of a Lock-In Amplifier

MING-HAO CHENG

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

Fluorescence microscopy has become an irreplaceable tool for biomedical research due to its high specificity. However, a significant drawback to fluorescent microscopy is the high cost of fast detection. The lock-in amplifier (LIA) is a common tool of phase-sensitive detection of fluorescence. In order to resolve the lifetime of tryptophan, this requires a detection system with a sampling rate greater than 1 GHz, and this kind of LIA is commercially unavailable. This project aims to replace the LIA with a high speed analog to digital converter (ADC) with integrated digital downconverter (DDC) board.

64 Feline Leukemia Virus Outbreak in Florida Panthers (Puma Concolor Coryi)

ELLIOTT CHIU

DEPARTMENT: VETERINARY MEDICINE AND BIOMEDICAL SCIENCES

In the early 2000s, Florida panthers experienced an FeLV outbreak which claimed the lives of at least three individuals. Between 2010 and 2016, Florida Fish and Wildlife found six additional deceased Florida panthers that tested positive FeLV. We hypothesize that the current FeLV outbreak consists of two virus strains. Viral isolates of panthers were sequenced, and genetically analyzed to viral genomes from the previous outbreak. Three FeLV subtypes were detected. Here we document the second FeLV outbreak in the Florida panthers, a species in which the virus was not previously endemic, and provide a cautionary perspective for disease management.

65 Rapid and Specific Detection of Asian-Lineage Zika Virus

NUNYA CHOTIWAN

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

The spread of Zika virus (ZIKV) in America post the need for a rapid Zika-specific assay for diagnosis and surveillance. We have developed rapid and sensitive loop-mediated isothermal amplification assay that is highly specific for the Puerto Rico isolate and the related isolates within the Asian clade. The assay does not detect ZIKV from Africa and other co-circulating viruses such as dengue and chikungunya. This assay allowed direct detection of ZIKV in cells, mosquitoes, blood, plasma, saliva, urine and semen without RNA isolation and reverse transcription. The assay offers rapid, specific, sensitive and inexpensive detection of the current circulating ZIKV.

66 Real-Time Visualization of miRNA/AGO2 Translation Repression

CHARLOTTE CIALEK

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

All cells use specialized and controlled mechanisms to regulate gene transcription and protein translation. In one method of RNA interference (RNAi), micro RNA (miRNA) binds to protein Argonaute 2 (AGO2) to direct gene silencing. Though well-studied, the mechanism of miRNA/AGO2 inhibition of mRNA transcripts is unclear due to limitations of technology. I will use 4-month-old imaging technology to capture and define the never-before-seen highly dynamic mechanism of AGO2/miRNA silencing during translation. This system can answer many of the outstanding questions about the kinetic and mechanistic details of RNAi. I hope to discover how subcellular localization impacts AGO2/miRNA repression mechanisms.

67 Induced Herbivory Defense Increases Canada Thistle Susceptibility to Fungal Pathogens

AMY CLARK

DEPARTMENT: BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT

Cirsium arvense, Canada thistle, is the most damaging weed to U.S. agricultural, range and natural areas. Biological agents show potential

as a control, particularly *Puccinia punctiformis* (CT-rust) as it solely attacks Canada thistle. However, CT-rust rarely reaches epidemic proportions. Insect herbivory could increase infection levels by changing plant hormones. Jasmonic acid (JA) increases following herbivory and acts in opposition to salicylic acid (SA) which defends against pathogens. When JA was applied to young thistle plants following inoculation the rate of symptomatic infection increased, suggesting that CT-rust could be more effective when used in conjunction with other insect biological control agents.

68 Effect of Protest Images on Perceived Legitimacy of #BlackLivesMatter

JORDIN CLARK

DEPARTMENT: COMMUNICATION STUDIES

This experiment tested the effect of news imagery of Black Lives Matters die-in protest on peoples (N = 44) perception of the movements legitimacy. Previous research examines how media delegitimizes movements through textual frames. However, little research analyzes how the use of protest images, an important tactic to gain media attention, affects perceptions of legitimacy. This study uses a post-test experimental design to observe how exposure to images of protests affects the audience's perceptions of the movement's legitimacy. Though there were no significant findings to answer the research question, other results emerged questioning the reliability of the Perceived Legitimacy Measure Scale.

69 Opioids Inhibit Intrinsically-Photosensitive Retinal Ganglion Cells; Implications for Opioid Epidemic

ALLISON CLEYMAET

DEPARTMENT: CLINICAL SCIENCES

Opioid (ab)users suffer from circadian dysregulation that negatively impacts quality of life and retards opioid abuse therapy. Intrinsically photosensitive retinal ganglion cells (ipRGCs) are exclusively responsible for the photoentrainment of the sleep-wake cycle. Systemically administered opioids accumulate in the eye. We found that ipRGCs express opioid receptors and elucidated the molecular mechanism by which opioids inhibit light-evoked firing of ipRGCs. Characterizing retinal ipRGCs as a novel site of action for systemically administered opioids may have significant impact on addressing the challenges posed by the current opioid epidemic, with regard to therapeutic mediation of circadian rhythm pathology in opioid users.

70 Information-Seeking in Family Caregivers: A Synthesized Cognitive Model

SUSAN CLOTFELTER

DEPARTMENT: JOURNALISM AND MEDIA COMMUNICATION

One in every five adults in America is a family caregiver – someone who provides significant, unpaid, para-medical, logistical, financial or emotional support to a chronically ill loved one. The value of the time they spend is estimated at \$470 billion per year – close to Wal-Mart's global sales. But research on the best ways to help this vulnerable yet essential population in their search for information has not yet converged on conclusions. Synthesizing three information-seeking theories yields a model of the family caregiver's information-seeking process that could be built on and tested in future studies and interventions.

71 Thermal Modeling of Photobioreactors for Algal Growth

SAM COMPTON

DEPARTMENT: MECHANICAL ENGINEERING

Photobioreactors (PBR) represent an under explored cultivation platform for the production of algal biomass. This study explored methods of computer modeling the thermal behavior of outdoor photobioreactors. Solar radiation, ambient air temperature, wind speed, and system geometry were among the key information inputs the model used to develop results. Early modeling iterations suggest that sites in the southwestern United States may provide feasible temperature and light conditions for mixotrophic algal photobioreactors with the most dramatic input sensitivities belonging to light conditions and ambient temperature.

72 Investigation of Genetic Predispositions to Copy Number Variation

HAILEY CONOVER

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

Nearly half of the genetic differences between individuals are rooted not in their nucleotide DNA sequences, but instead are due to changes of chromosome structure known as copy number variations (CNVs). Data from observational genomic analyses of CNV-prone loci in human patients suggest that de novo recurrent CNVs arise from recombination between repeated DNA sequences and have recently been recognized as a significant source for a wide range of human diseases. Using an innovative assay in yeast, I will test experimentally the hypothesis that the presence, size and relative location of repeated DNA sequences influence the likelihood of CNV formation.

73 Globally Competent Engineers – Do International Experiences Matter?

ALISTAIR COOK

DEPARTMENT: SCHOOL OF EDUCATION

In a world of increasingly complex and trans-national issues, engineers have to become global citizens to manage and understand the multiplicity of complications they face in their professional careers. Engineering design project classes are where engineering students gain the professional skills they require for their careers and introducing global perspectives is a recognized method to help students understand these skills in other contexts/cultures. Through comparing local and international design projects in classrooms, alongside international experiences through design based study abroad programs and extra-curricular projects we seek to understand the level and role of international experiences in engineering students' global competence.

74 Evaluation of a Middle School Sexual Violence Prevention Program

HOPE CORNELIS

DEPARTMENT: HUMAN DEVELOPMENT AND FAMILY STUDIES

This project evaluates Speak Up!, a middle school sexual violence (SV) prevention program. Although SV is common among young people, a majority of SV prevention efforts have targeted college-aged individu-

als. Less is known about the effectiveness of SV prevention strategies targeting youth. This evaluation utilizes pre- and posttest data from the 2014-15 implementation of Speak Up!. Main effects and moderators of program impact will be assessed by comparing participants pre- and posttest levels of risk and protective factors for SV. This project contributes to SV prevention literature by offering insight into best practices for SV prevention with younger populations.

75 Continuously Functionally Graded Thermoelectric ZnO Material

CORSON CRAMER

DEPARTMENT: MECHANICAL ENGINEERING

ZnO is a promising thermoelectric generating (TEG) material. Properties of thermoelectrics have been exploited to make homogeneous improvements with carrier concentration affecting the Seebeck and resistivity. One way to improve overall efficiency and widen the useful temperature range of bulk material involves a microstructural gradient, where larger and smaller grains will have increased TEG properties in low and high temperature regimes respectively. A material with micron- to nano-sized grains is achieved with spark plasma sintering (SPS). The process, which uses an induced thermal gradient during sintering, and system is characterized, and the functional properties are measured.

76 Sensory Gating in Autism: Evidence for Impaired Neural Synchronization

JEWEL CRASTA

DEPARTMENT: OCCUPATIONAL THERAPY

Sensory gating refers to the brain's ability to filter out redundant information. Gating was examined in twenty children with ASD and 20 typically developing children using the paired-click EEG paradigm. While typical children showed gating at the P50, N1, P2, and N2 ERP components, children with ASD had significantly less robust gating at the P50, N1, and P2 components. Time-frequency analyses indicated reduced neural power and phase synchronization to auditory stimuli. Behavioral measures of sensory processing correlated with neural measures of gating. These findings indicate that auditory processing deficits observed in ASD could arise from atypical neural gating and synchronization.

77 Political Landscape of Carbon Pricing Instruments Within the U.S.

SETH CREW

DEPARTMENT: POLITICAL SCIENCE

Municipalities and States across the U.S. are becoming more interested in developing carbon pricing instruments (carbon tax, cap-and-trade) to help meet climate resiliency and greenhouse gas reduction goals. Policymakers and public officials could create better policy and be better prepared to approach conflict with a clear illustration of the political factors that might impinge or enable the implementation of climate policies. First, we must build a qualitative research design that allows us to identify the most significant variables constituting the political landscape within a theoretical framework that links political dimensions to carbon pricing instruments.

78 Cold Sores: Going Below the Surface

SHAUN CROSS

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY
AND PATHOLOGY

Herpes Simplex Virus-1 (HSV-1) is the cause of common cold sores, with most of the population infected. The scope of the project evaluated the effectiveness of tumor necrosis factor (TNF) as a possible treatment for HSV-1 infections by comparing it to the standard treatment method (acyclovir), measured its effect on the gene expression of thymidine kinase (TK), and evaluated the necessity of TK in the HSV-1 life cycle and its ability to replicate. These aspects were measured through cell culturing, extraction of RNA and analysis via RT-PCR. This research provides future direction in controlling and understanding HSV-1.

79 Effect of Heterosis on Pulmonary Arterial Pressure in Beef Cattle

RANDIE CULBERTSON

DEPARTMENT: ANIMAL SCIENCES

Cattle located in high altitude regions (> 1,500 m) are susceptible to the development of pulmonary hypertension, leading to a condition known as brisket disease or high altitude disease (HAD). Pulmonary arterial pressure (PAP) is a veterinary procedure used as an indicator of cattle's susceptibility to pulmonary hypertension and HAD. A regression analysis was used to examine the effect of heterosis (i.e. crossbreeding) on PAP measurements in a multi-breed population. The estimated regression coefficient for PAP on heterosis was -0.04 ± 0.02 mm Hg/percent ($P < 0.017$). These results suggest that crossbreeding could help to reduce PAP measurements in beef cattle.

80 Evaluating Radiation Exposure Biomarkers in Wild Boar in Fukushima, Japan

KELLY CUNNINGHAM

DEPARTMENT: UNIVERSITY WIDE – CELL AND
MOLECULAR BIOLOGY

The purpose of this project is to evaluate the health effects of environmental exposures to ionizing radiation on wild boar populations in Fukushima, Japan following the nuclear power plant accident. Accurate quantifications of external and absorbed radiation doses will allow us to better understand relationships between low dose, chronic irradiation and biological markers of physiologic effects (e.g., DNA damage response, changes in chromosome conformation, telomere length maintenance) as a direct function of dose. Such information is not only important for critical evaluation of long term radiological effects on wildlife populations, but also for assessing potential health effects on human populations.

81 Modeling HIV-2 Evolution from SIV_{smm} Using a Humanized Mouse Model

JAMES CURLIN

DEPARTMENT: UNIVERSITY WIDE – CELL AND
MOLECULAR BIOLOGY

Multiple independent cross-species transmission events of Simian Immunodeficiency Virus from sooty mangabeys (SIV_{smm}) have given

rise to Human Immunodeficiency Virus type 2 (HIV-2; A-H). Serial passaging of SIV_{smm} in multiple generations of humanized mice enables the recapitulation of genetic changes that allowed the jump from monkeys into humans, and an understanding of HIV-2's evolution. We analyzed multiple hu-mouse passaged and human cell adapted viruses at different stages by NextGen nucleotide sequencing. Numerous non-synonymous mutations were observed in serially passaged progeny viruses when compared to the original virus stock, indicating viral genetic changes as an adaptation response to a new host.

82 Complexation and Redox Buffering of Iron(II) by Natural Organic Matter

ELLEN DAUGHERTY

DEPARTMENT: CHEMISTRY

Iron is an essential element for most living organisms, but its bioavailability is limited by its solubility and oxidation state. Environmental observations of organic-matter-associated Fe(II) under conditions favorable for Fe oxidation have suggested that natural organic matter (NOM) can preserve Fe(II), yet little is known about how Fe(II) complexes NOM. Using X-ray absorption spectroscopy analyses, we determined the coordination environment of Fe(II) added to chemically reduced NOM at pH 7 to be dominated by carboxyl functional groups, which generally promote Fe oxidation. Oxidation experiments revealed that the presence of reduced NOM limited Fe(II) oxidation, perhaps by a redox buffering mechanism.

83 Modeling the ATP Hydrolysis Cycle for the Dengue NS3 Enzyme

RUSSELL DAVIDSON

DEPARTMENT: CHEMISTRY

The dengue virus is a public health threat that causes serious morbidity and mortality globally. For this virus, the non-structural 3 (NS3) protein is a viral helicase enzyme that translocates along and unwinds the viral RNA polymer, preparing it for the replication machinery to synthesize a new strand of RNA. Theoretical modeling of NS3 has provided atomic-level insights into the translocation mechanism used by NS3. Results presented will focus on RNA-protein interactions that are altered during the fuel burning cycle (ATP hydrolysis). These results will aid the development of antiviral therapeutics targeting the dengue NS3 protein.

84 Decentralized Biogas Potential Mapping and Cookstove Development

TOM DECKER

DEPARTMENT: MECHANICAL ENGINEERING

In certain climatic regions of emerging markets, small scale decentralized anaerobic digestion systems can provide an alternative source of productive, dispatchable and affordable energy and fertilizer, solving several energy access and cooking paradigms. However, domestic level anaerobic digestion technologies have historically struggled to achieve scale in a sustainable fashion. This research focuses on overcoming certain barriers to scale through the development of a biogas potential heat map using spatial analysis methods and biogas cookstove design modifications to strengthen the offering of downstream use appliances.

85 Risk Estimation of Introduction of ASFV by Importing Pig Products

TOSAPOL DEJYONG

DEPARTMENT: CLINICAL SCIENCES

Thailand imports pig products from Italy. During the same time in 2015, an African swine fever (ASF) outbreak was occurring on Sardinia Island. This put Thailand at potential risk for introduction of ASF virus. The objective of our study was to estimate the potential risk of introduction of ASFV by importing pig products from Italy into Thailand in 2015 utilizing qualitative risk assessment approaches. The estimation was composed of hazard identification, qualitative risk assessment, risk mitigation and risk communication. The results showed the overall risk was negligible. The study provided baseline information for improving preventive measures to the country.

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

ANTHONY DEMARIO

DEPARTMENT: MECHANICAL ENGINEERING

Miniature robots at the centimeter scale are becoming more popular with applications from environmental monitoring, to surveillance and search and rescue. Due to their small size and relative complexity, traditional manufacturing and assembly methods cannot be used. This project leverages multi-material 3D printing to print miniature robots as single unit with soft material as the joints and rigid material as the links. 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, reducing time and cost for design and fabrication of small robots.

87 Losing the News: How Good Journalism Fails Cognitive Processing

CHRIS DEROSIER

DEPARTMENT: JOURNALISM AND MEDIA COMMUNICATION

News media have always understood their work as a fight to gain and hold attention. Journalists developed means such as the inverted pyramid writing style to cater to attention span issues, but no work seems to exist examining when and why readers mentally disengage from a story. This literature review brings together studies of working memory capacity, cognitive load, attention span, eye movement, orienting response and time constraint. It then looks at how those components, individually and together, affect news processing and reader engagement and disengagement. The paper concludes with suggested best practices based on findings.

88 Understanding and Improving Organic Solar Cell Lifetime

NICHOLAS DEWEERD

DEPARTMENT: CHEMISTRY

Commercial advancement of organic photovoltaics (OPVs) requires drastic improvements in device lifetimes. To achieve this goal this project explores photo-stability of organic acceptors. PCBM films were aged under operating conditions and analyzed; detrimental effect of oxidation of PCBM on device performance was determined. These results

stress the importance of avoiding PCBM-oxides forming in OPV devices or their unintentional addition due to impure starting materials. Future work will focus on the effect of the donor molecule on the PCBM degradation rates, and additionally, more photo-stable acceptors will be tested to achieve OPV devices with comparable performance, but longer lifetimes.

89 Potential Interaction Between Mycobacterium Tuberculosis-Derived Extracellular Vesicles and Host-Derived Exosomes

GUSTAVO DIAZ

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

Within the infected host, Mycobacterium tuberculosis (Mtb) proteins can be incorporated into host exosomes, however the mechanism by which bacterial proteins are targeted to these vesicles is undescribed. Mtb can release proteins by traditional secretion (culture filtrate-CF) or within extracellular vesicles (MtbEVs). Proteomic analysis indicates that distinct proteins are sorted into the MtbEV fraction by the mycobacteria. We have applied a differential labeling scheme to decipher the incorporation of CF and MtbEVs proteins into exosomes from human cells. The proteomic analysis of the exosome samples will confirm the role of MtbEVs in the incorporation of bacterial molecules into host-derived exosomes.

90 Growth of Extremely Low-Damping Yttrium Iron Garnet Films by Sputtering

JINJUN DING

DEPARTMENT: PHYSICS

We report the optimization of the sputtering and annealing processes that enabled the growth of YIG films thicker than 20 nm but with extremely lower damping. A 75-nm-thick Y₃Fe₅O₁₂ (YIG) film grown on a (111) Gd₃Ga₅O₁₂ substrate, showed magnetic damping constant down to 5.27E-5 according to frequency-dependent ferromagnetic resonance (FMR) measurements in perpendicular magnetic fields. In-plane FMR measurements yielded magnetic damping constant about 5.26E-5, which confirms the reliability of the measured damping constant. It is important to emphasize that these values represent the lowest damping constant ever reported for nm-thick magnetic films.

91 Shame and Social Connectedness

RACHEL EBY

DEPARTMENT: PSYCHOLOGY

Social connectedness has frequently been positively related to both psychological and physical health, making it an important construct to understand. Two of the earliest-in-life predictors of later social outcomes are personality and attachment tendencies. Shame proneness has been linked to both attachment tendencies and social outcomes. Shame aversion shows promising evidence as a more specific predictor than trait-level shame. These variables have never been studied in a single model. It is hypothesized that personality and attachment predict social connectedness through shame proneness and shame aversion. Structural equation modeling is used for analyses. Results could have implications for theory and intervention.

92 Enzymatic Isolation and Viability Assessment of Canine Ovarian Primordial Follicles

KATHLEEN EDDY

DEPARTMENT: BIOMEDICAL SCIENCES

Seventy-five percent of the world dog population is feral; within the United States, damage exceeds \$620 million annually. Current non-surgical sterilization methods have limited efficacy, requiring multiple applications; a single, permanent option is lacking. Finite ovarian primordial reserves represent the total reproductive potential of an individual; depletion would result in permanent sterility. The objective of the current study was to partially characterize a method to distinguish proteins in cultured, non-growing canine primordial follicles in preparation for proteomic analysis. The overall aim of this research is identification of compounds that can be used to cause primordial follicle depletion and permanent sterility.

93 Spatio-Temporal Co-Optimization of Wind Energy and Electric Vehicles Resources

FATHALLA ELDALI

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

Wind energy generation is growing significantly due to its favorable attributes such as cost-effectiveness and environment-friendly quality. Due to the variability of wind generation and the challenge in forecasting, the problem of curtailment rises. Wind energy storage is an applicable solution; but, storing large amounts of energy over long time periods is very lossy and expensive. Plug-in Hybrid Electric Vehicles (PHEVs) are recognized as one of the assets to integrate electricity storage due to the Vehicle-to-Grid (V2G) concept. Thus, PHEVs present themselves as a distributed storage technique on the distribution side of the grid.

94 Photo-Spin-Voltaic Effect

DAVID ELLSWORTH

DEPARTMENT: PHYSICS

This presentation reports the discovery of a photo-spin-voltaic (PSV) effect, in which photons induce a spin current in a nonmagnetic metal that is in proximity to a magnetic insulator. This new phenomenon is an analogy to the photo-voltaic effect in semiconductors, best known for its use in solar cells, but produces a pure spin current instead of an electric current. Such spin currents can potentially be used to develop a new generation of electronics that consumes significantly lower energy and the PSV effect offers a very easy, yet effective, approach for the generation and manipulation of pure spin currents.

95 Students With Independent Backgrounds: Developing Autonomy to Increase Graduation Rates

ELISE EPPARD

DEPARTMENT: SCHOOL OF EDUCATION

The Fostering Success Program (FSP) at Colorado State University provides the resources students from independent backgrounds need

to succeed in college. Research demonstrates that graduation rates for Independent Students are between 2-9%. Using an emerging grounded theory, the project seeks to identify how autonomy can be developed as a pathway to graduation. By providing students and FSP staff the ability to work together and create a peer mentoring program, students will have the opportunity to build individual autonomy and take ownership of their college experience. This sense of purpose is predicted to lead to higher graduation rates for Independent Students.

96 Impacts of Oil and Gas Development on Wintertime Haze

ASHLEY EVANOSKI-COLE

DEPARTMENT: ATMOSPHERIC SCIENCE

The development of hydraulic fracturing and horizontal drilling has increased oil and natural gas production in the United States but their effects on air quality are relatively unknown. This study investigates the impacts of oil and gas related activities on atmospheric particulate matter (PM) and haze formation. A field campaign was conducted over two winters to characterize PM and associated gaseous pollutants in the Bakken Formation region within the United States. Analysis of chemical tracers and meteorological variables correlated elevated concentrations of PM with activities associated with oil and gas development.

97 Open-Path Hydrocarbon Laser Sensor for Oil and Gas Facility Monitoring

BETSY FARRIS

DEPARTMENT: MECHANICAL ENGINEERING

Increased oil and gas production in the United States and specifically the Colorado Front Range has created a need for facility monitoring of hydrocarbons for detecting leaks or unwanted emissions. Such measurements are necessary to meet air quality regulations, identify potential contributors to climate change, and detect precursors of ozone that may also have adverse health effects. The present contribution presents a proof-of-principle demonstration of an open-path laser absorption sensor. The sensor will be validated in a field demonstration at the Environmental Protection Agency Research Triangle Park Test Facility.

98 Fueling the Fire: Exploring Material Types Used for Cookstove Startup

KRISTEN FEDAK

DEPARTMENT: ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

Three billion people globally burn solid fuel for domestic energy, primarily in inefficient cookstove systems. The resulting pollution is a leading contributor to global disease. Anecdotal evidence suggests that non-standard fuels such as plastic and paper are used to ignite stoves; these materials may have unique emissions compared to standard fuels. However, data on startup materials and their emissions is lacking. We conducted an expert elicitation survey to gather information about startup practices worldwide. A laboratory-based emissions monitoring campaign informed by the survey results is currently underway, which will further inform conclusions about the health-relevant impacts of different startup practices.

99 Asymmetries in Ecological Responses to Precipitation Extremes

ANDREW FELTON

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

At large spatial scales, a predictive relationship emerges between ecosystem productivity and mean annual precipitation. Yet, at interannual time scales the relationship between variability in precipitation and ecosystem productivity is less clear. Growing evidence suggests ecosystems are differentially sensitive to dry versus wet precipitation extremes. Climate change forecasts include increased frequencies of precipitation extremes; however, uncertainties remain concerning the mechanisms of ecosystem sensitivity to these stressors. To address this, we experimentally exposed an intact grassland ecosystem to a gradient of growing season precipitation amount and extremity, of which ranged from the driest to the wettest conditions of historical precipitation.

100 A Novel Protein-Complementation Assay for Viral Detection

JESSIE FILER

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

Infectious disease diagnostics are generally esoteric and expensive and alternatives are needed that can diagnose patients in low resource settings. New paper-based diagnostic assays are cheap, reliable alternatives to traditional diagnostics for detecting disease. We are developing a new protein-complementation assay that can detect the presence of virus particles in a paper-based assay. We have engineered the Beta-galactosidase enzymes such that they only become enzymatically active when they are concentrated on a surface, and addition of a colored substrate allows visual detection only in the presence of virus. This new technology provides an exciting new platform for diagnostics development.

101 Comparing U.S. Precipitation Extremes Under Two Climate Change Scenarios

MIRANDA FIX

DEPARTMENT: STATISTICS

Precipitation extremes are expected to increase in a warming climate, which may have serious impacts. We use a general circulation model to investigate U.S. precipitation extremes under two climate change scenarios. We fit non-stationary generalized extreme value models to annual maxima simulated from two initial condition ensembles under the RCP8.5 and RCP4.5 scenarios. Under RCP8.5 between 2005 and 2080, the 1 percent annual exceedance probability (AEP) level is projected to increase by 17% on average. Compared to RCP8.5 in the year 2080, RCP4.5 is projected to reduce the 1% AEP level by 7% on average.

102 Investigating Deficit Irrigation as a Climate-Smart Management Opportunity

NORA FLYNN

DEPARTMENT: SOIL AND CROP SCIENCES

Long term agricultural sustainability and productivity in semi-arid climates depends on an enhanced understanding of how irrigation management interacts with key soil processes. This study examines deficit irrigation (DI) as a strategy to reduce water usage while minimally

impacting corn yield. We hypothesize that deeper root growth and reduced surface moisture under DI leads to increased carbon storage potential and lower greenhouse gas emissions from the soil, thus contributing to climate change mitigation. Greenhouse gas emissions and multiple soil physical, biological and chemical properties were evaluated across a range of irrigation treatments to test this hypothesis.

103 X-TINKER: An Algorithm for the Rational Design of Halogenated Drugs

MELISSA FORD

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

Halogens have historically been known to have uses ranging from strong chemical leaving groups to substituents on potent inhibitor drugs. The use of computers in drug and material design is rising exponentially, yet there remains an inaccuracy of our current computational programs to simulate halogen atoms. Thus, we have developed and parameterized an empirical force field for biological halogen bonds. With this force field in hand, I have derived and implemented a set of unique algorithms into the code of the program TINKERcreating X-TINKER. We anticipate X-TINKER can remove the current barriers in designing drugs and materials with halogens.

104 CEBL3: A New Software Platform for Developing Brain-Computer Interfaces

ELLIOTT FORNEY

DEPARTMENT: COMPUTER SCIENCE

Brain-Computer Interfaces (BCIs) are systems that allow a user to interact with a computerized device using only voluntary changes in their mental state. BCIs have important applications in assistive technologies, neural rehabilitation and various other forms of human computer interaction. The Colorado Electroencephalography and BCI Laboratory (CEBL3) is a new software platform that is designed to streamline the process of creating new BCI technologies. CEBL3 provides advanced functionality and supports all phases of the research and development cycle. Currently, CEBL3 includes modules for a virtual keyboard, an mp3 player, the “pong” video game and interfaces for two types of robots.

105 Mindfulness and Binge-Eating Relate to Adiposity in At-Risk Adolescents

JILLIAN FOSS

DEPARTMENT: UNIVERSITY WIDE – COLORADO SCHOOL OF PUBLIC HEALTH

Childhood obesity is a multisystem disease with potentially devastating consequences. In recent years, mindfulness-interventions have gained increased attention for their potential value in obesity prevention efforts. The purpose of this study was to explore the association of dispositional mindfulness (defined as the ability to attend nonjudgmentally to one's own physical and mental processes) with binge-eating and adiposity in adolescents at-risk for excess weight gain. In multivariate analyses predicting percent adiposity from mindfulness, binge-eating, symptoms of anxiety and depression, and controlling for sex and age, dispositional mindfulness was the only significant, unique predictor of adiposity ($t = -2.23, p = 0.03$).

106 Understanding Biology Through Mathematical Models: Dynamics of Gene Expression

ZACH FOX

DEPARTMENT: SCHOOL OF BIOMEDICAL ENGINEERING

Mathematical models are everywhere. They are in our cell phones and cars. They help us take rockets to space and investigate the origin of the universe. However, mathematical modeling in biology and medicine has yet to become ubiquitous. One of the main reasons for this is the fundamentally complex nature of biology, which occurs at many spatial and temporal scales. Because of this complexity, mathematical modeling in biology can be computationally demanding, and predictive models are hard to come by. My research project aims to alleviate these challenges by integrating state-of-the-art experimental data with mathematical models.

107 The Use of Unmanned Aerial Systems in Lower Atmospheric Research

SEAN FREEMAN

DEPARTMENT: ATMOSPHERIC SCIENCE

Unmanned Aerial Systems (UASs; commonly referred to as drones) have become cheaper, more capable, and easier to use in recent years. UASs are now easily purchased from commercial vendors and have a larger range of capabilities, with some UASs able to carry nearly 50 lb. payloads and fly for up to 5 km. However, their use in lower atmospheric research is currently limited by regulations, payload capacity, and the maximum altitude that UASs can fly. This presentation examines some of the uses and limitations of UASs in lower atmospheric research and presents results of several UAS flights around Colorado.

108 Identifying a Gene That Makes Plants Gigantic-1: Characterizing Rice-Mutant mpg1

MICHAEL FRIEDMAN

DEPARTMENT: BIOLOGY

To aid in the production of stable, sustainable sources of energy, plant material is currently being explored. A rice mutant containing a portion of a transfer DNA (T-DNA) expression cassette was found averaging a 7-fold increase in biomass and a 3.6-fold increase in seed yield compared to wild-type plants. Due to the increase in biomass we refer to this mutant as mpg1 (Makes Plants Gigantic-1). Identification of the mechanism responsible for the increased biomass and seed yield in mpg1 may lead to strategies that could be applied to other plants to aid in both energy and food security alike.

109 A Time-Varying Model of Outcomes Associated with Onset of Motherhood

CELIA FULCO

DEPARTMENT: PSYCHOLOGY

Those who become mothers early in life seem to face poorer outcomes related to social, economic, educational, and health factors for both

mother and child (Hobcraft and Kiernan, 2001). Yet, the literature often uses teenage and early pregnancy interchangeably as predictors of associated outcomes. It may then be necessary to identify a true age window during which outcomes for mothers become more optimal. In order to improve our current understanding of when is most appropriate to define early motherhood, we plan to apply a time-varying effect modeling technique to national longitudinal data.

110 Turbulent Mixing and Transport in Oceanic Flows

AMRAPALLI GARANAİK

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

Large-scale (~years/km) ocean climate, including the meridional overturning circulation, the uptake of anthropogenic carbon dioxide, heat by the ocean and global biogeochemical cycling, are impacted by the small-scale (~seconds/cm) turbulent fluxes that cause mixing without which the ocean would turn into a pool of cold salty water. The focus of our present study is to investigate the variability of the mixing efficiency using oceanic turbulence data. Our findings suggest that existing parameterizations of mixing efficiency employed in global climate models are not universal and ambiguous. More robust parameterizations of mixing are thus required to enhance fidelity of climate models.

111 Restoring Arid Lands Under Threats of Drought and Invasive Species

MAGDA GARBOWSKI

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Restoration of arid ecosystems is often constrained by low and variable precipitation and invasion by exotic species such as *Bromus tectorum*. With their ability to absorb moisture when it is abundant and slowly release it, superabsorbent polymers (SAP) may decrease soil moisture variability during restoration. In this study, we aimed to investigate the interactive effects of precipitation timing, drought, *B. tectorum*, and SAP on soil moisture and developing restoration plant communities. During the initial establishment year, we observed higher densities of native species with SAP, and negative impacts of *B. tectorum* and drought on soil moisture and native species establishment.

112 The Potosi-Cobija Route: Archaeology of European Extractivism in the Andes

FRANCISCO GARCIA ALBARIDO GUEDE

DEPARTMENT: ANTHROPOLOGY

Potosi (Bolivia) has been one of the most important sources of minerals exploited by European nations throughout history. Focusing on archaeological and historic information about the road that connected Potosi with the port of Cobija, Colonial and early Republican transportation is analyzed, providing a new insight into this important aspect of European extractivism in the Andes. This route, by which resources were moved to the Pacific and onward to Europe, was investigated using a mixture of strategies including remote sensing, archaeological inspection and a historiographical review.

113 Performance Model of a Waste Heat Driven Turbo-Compression Cooling System

SHANE GARLAND

DEPARTMENT: MECHANICAL ENGINEERING

Waste heat recovery systems can offer performance and economic benefits for power generation systems, including power plants and diesel generators. One method of waste heat recovery is to use a turbo-compressor to convert low grade waste heat into a cooling effect. The cooling effect can be used to offset cooling loads, provide air conditioning, or offer alternate cooling uses for markets. This study determines the COP of a turbo-compression cooling system at a 250kWth output scale with realistic turbine and compressor geometry while the system provides 7°C chilled water under various ambient conditions (i.e., from 15°C to 40°C).

114 Evidence for Life That Defies the Replicon Hypothesis

ALEXANDRA GEHRING

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

The Replicon Hypothesis postulates that genomic DNA replication necessitates both i) a defined DNA sequence(s) termed the replication origin(s) and ii) an initiator protein(s) that binds the origin and initiates assembly of the replication machinery. Bioinformatic analyses of the genome of the genetically-accessible hyperthermophilic archaea *Thermococcus kodakarensis* predicted a single origin of replication adjacent to the gene encoding the presumptive initiator protein, *Cdc6/Orc1*. Here we demonstrate that *cdc6* can easily be deleted from the *T. kodakarensis* genome without a fitness consequence, and the presumptive origin of replication is also dispensable with no observed consequences to cellular growth or DNA replication.

115 Antimicrobial Resistant *Escherichia Coli* in Environmental Waters in Northern Colorado

JAKE GILLILAND

DEPARTMENT: ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

Given the increasing attention on antimicrobial resistance in our environment and clinical settings, two major classes including Extended Spectrum Beta Lactamases (ESBL) and *Klebsiella pneumoniae* Carbapenemase (KPC) resistance were examined in waste water, river water and sewage from northern Colorado. Sampling from environmental waters resulted in a total relative abundance of ESBL at 2.58% and KPC at 1.17%. The relative abundance of ESBL was 0.164% and 0.100% for KPC for *E. coli*. Isolated strains were further analyzed for resistance to seven classes of drugs by disk diffusion and also screened for resistance gene expression via PCR.

116 The Importance and Progress of Listening in the Music Classroom

REBECCA GOMEZ

DEPARTMENT: SCHOOL OF MUSIC, THEATRE, AND DANCE

The purpose of this project is to examine ways which music listening was taught in the early twentieth century and show the progress to the current day. The Clark dissertation (Stoddard 1968) was researched for a 1908 Listening Lesson example and interviews were conducted with Eisen and Robertson focused on their contemporary listening lessons book. It was found that Clark focused on providing great role models for her students as well as giving them the experience of hearing an orchestra for the first time. Eisen and Robertson included music listening in their General Music Lessons because it reinforced learned concepts.

117 Community Codominance in a Changing Tallgrass Prairie

JESS GRAY

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Two grass species, *Andropogon gerardii* and *Sorghastrum nutans*, together account for the great majority of individuals, biomass, and possibly genetic diversity in plant communities of the tallgrass prairies of the Great Plains, U.S. As competitors with similar niches, it is not clear what mechanisms facilitate their stable coexistence, but it may rely on the high variability of environmental conditions that characterize grassland ecosystems. Because these grasses are mainstays of their communities, it is critical that we understand the factors influencing the stability of their dynamics, and what effects changes to those factors through climate change might have.

118 Tracing the Life of Sumiko Takumi Oka

HAILEY GROO

DEPARTMENT: HISTORY

In the early twentieth century, many Japanese immigrants lived, worked, played, and died in a small section of Denver. Each one of these immigrants lived vibrant lives, but many of their stories have been lost in obscurity. From the discovery of a small, unadorned tombstone in a decrepit cemetery, the stories of women like Sumiko Takumi Oka are brought back to life. Uncovering the details of her life illuminates what it was like to be a young female immigrant living in the United States during the early 1900s.

119 Intracellular Lipid Composition Impacts Dengue Virus Particle Infectivity

BECKY GULLBERG

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

The changing geographic distribution of arboviruses such as dengue (DENV), West Nile and recently Zika viruses remind us of the need for effective therapeutic treatments. The key to this goal is an understanding of virus-host interactions. As an obligate intracellular parasite, DENV are dependent upon the host cell for their metabolic needs. We have determined that a key enzyme in generating unsaturated fatty acids, stearoyl-CoA desaturase (SCD), is critical for viral replication and the generation of infectious particles. As such, SCD is an attractive therapeutic target with the potential to re-purpose existing drugs.

120 Fluvial Abrasion on Bone Surface Modifications Using High-Resolution 3-D Scanning

MERVE GUMRUKCU

DEPARTMENT: ANTHROPOLOGY

The objective of this research is to understand the effects of fluvial abrasion on cut marks and carnivore tooth marks using high-resolution 3-D data. An experimental study was undertaken by tumbling cattle and deer bones in a rock tumbler filled with sand and water. The 3-D data from cut marks and carnivore tooth marks was collected and analyzed using a Nanovea ST400 white-light confocal profilometer. The results indicate that the depth values at the deepest points of the cut marks and tooth marks were significantly altered after tumbling, and cut marks were affected by tumbling more than tooth marks.

121 Adaptive Digital Filtering for Time-Resolved Optical Spectroscopy and Imaging

SAURABH GUPTA

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

Field Programmable Gate Arrays (FPGAs) are actively being used for Digital Signal Processing these days. These devices allow for a portable and a low-cost processing platform and is being put to use by different industries such as automobiles, warfare, data centers, etc. This research is oriented at utilizing its computational capability in the biomedical domain that can possibly identify Melanoma, which is the most common form of skin cancer. Alternatively, this system can be used to estimate tissue oxygenation when involved in a phosphorescence lifetime experiment.

122 Covered Bug Life in Water: An Uncovered Uphill Story

CAROLINA GUTIERREZ

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Aquatic insects' food web structure in streams is well known for temperate zones, due to advanced taxonomic knowledge. However, little is known about what happens to food webs in streams when canopy coverage changes; and how this relates to water temperature. Since aquatic insects support food webs in streams, allowing this ecosystem to provide fishing, game and wildlife services, it's the aim of this study to understand how food sources for aquatic insects in streams change with elevation, canopy coverage and water temperature; especially in light of a rapidly changing landscape where deforestation of riparian vegetation is altogether too common.

123 College Student-Athletes: Substance Use or Abuse

AMY HAGGARD

DEPARTMENT: SCHOOL OF EDUCATION

Student-athletes today find themselves participating in recreational substance use. Whether it is to fit into a social norm in a campus climate, added stress and additional pressure from school and athletics, or just for fun on the weekends, there is an increase in substance use within athletics. There is ample research on binge drinking and the rates that student-athletes are engaging in this behavior, but the research

on other substances such as marijuana and performance enhancing drugs are minimal. This quantitative study will thoroughly examine substance-use among collegiate student-athletes at Coastal Carolina University, through the implementation of an anonymous survey.

124 Investigation of a Small Molecular Compound for Parkinson's Disease Therapeutics

SEAN HAMMOND

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

Parkinson's disease (PD) is characterized by the degeneration of dopaminergic neurons of the ventral midbrain and associated with inflammatory activation of glial cells. To date, there is no known disease-modifying treatment for PD. However, we previously reported that the phytochemical-based compound, C-DIM12, suppresses inflammatory gene expression in glial cells and induces a dopaminergic phenotype in neuronal cultures. In current studies, an in vivo approach was undertaken to examine the capacity of C-DIM12 to protect against loss of dopaminergic neurons from neurotoxic insult in a mouse model of PD.

125 Utilizing Spectroscopy to Elucidate Energy Partitioning Trends Within Plasma Systems

ANGELA HANNA

DEPARTMENT: CHEMISTRY

Low-temperature, inductively coupled plasmas (ICP)s are widely employed in industrial, environmental, and medical fields. To fully utilize plasma technology capabilities for a given application, we must have solid, foundational knowledge of the species and their interactions within the plasma. A critical, currently missing, piece to the plasma puzzle concerns how energy is partitioned between electronic, vibrational, and rotational states for a given plasma species. Specifically, we have studied various nitrogen- and oxygen-containing systems and fluorocarbon plasmas using optical emission spectroscopy (OES) and broadband absorption spectroscopy (BAS) to determine energy partitioning for plasma species such as NO, N₂, and CF.

126 Characterizing Porous Protein Crystals for Applications in Bionanotechnology and Nanomedicine

LUKE HARTJE

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

Large-pore protein crystals (LPCs) are recently identified biologically-derived nanoporous materials exhibiting pore diameters greater than 10 nm. These substantial pores enable engineered LPCs to uptake various macromolecular guests, mediate inorganic nanoparticle assembly, and coordinate enzymatic pathways. This research demonstrates the chemical versatility, physical stability, and biological compatibility of these unique materials. Various crosslinking chemistries (aldehyde, EDC), are shown to physically stabilize the molecular structure of LPCs increasing their tolerance to harsh conditions while exhibiting moderate to low cytotoxicity in the presence of human dermal fibroblast cells. These remarkable traits make LPC materials attractive targets for applications in bionanotechnology and nanomedicine.

127 Preliminary Assessment of Rift Valley Fever Virus Transmission in Colorado

DANIEL HARTMAN

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY
AND PATHOLOGY

Rift Valley Fever Virus (RVFV) Is a Vector-Borne Pathogen That Causes Outbreaks in Ruminants and Humans. The Range of the Virus Has Been Expanding From Eastern Africa, and Represents a Major Threat for Introduction to the United States. We Seek to Evaluate the Entomological Risk Factors for Transmission of RVFV in Colorado, Investigating Feed Lots as Potential Amplification Foci. We Used a Paired-Site Design (With and Without Cattle) to Determine the Influence of Cattle Presence on Mosquito Community Composition, the Feeding Preferences of Potential Vectors, and Differences in Virus Transmission, Using West Nile Virus as a Surrogate for RVFV.

128 Re-Use of Fly Ash Amended Mine Waste in Earthwork Projects

MOHAMMAD REZA HASSANZADEH GORAKHKI

DEPARTMENT: CIVIL AND ENVIRONMENTAL
ENGINEERING

The objectives of this study were to evaluate the effect of fly ash amendment on mechanical, environmental, and hydraulic behavior of mine tailings and assess applicability of using the amended materials in earthworks. Natural and synthetic (i.e., laboratory prepared) mine tailings were used to assess the effects of tailings particle-size and tailings solids content on mixture behavior. Two types of off-specification fly ashes and Type I-II Portland cement were used as cementitious binders. In general, fly ash amended mine tailings met the environmental, hydraulic and mechanical requirement for using as cemented paste backfill and flowable fill.

129 Estimating Activity in Older Adults in Relation to Cognitive Ability

CASSIE HATT

DEPARTMENT: HUMAN DEVELOPMENT AND
FAMILY STUDIES

Understanding the connection between late-life activity engagement and cognitive performance has been complicated by the questionable accuracy of self-reported activity information. Literature suggests reports may be distorted because of positive self-representation, social desirability, or because relevant information cannot be retrieved from memory. This study examined the accuracy of activity estimation in older adults by comparing two assessments (weekly vs. daily). We predicted that actual daily activity was more accurate and strongly related to cognitive performance. Results revealed significant differences between activity assessments, participants tended to underestimate total activity, however no distinctions were found in terms of relation to cognitive ability.

130 Pretesting to Enhance Learning From Reading Texts

HANNAH HAUSMAN

DEPARTMENT: PSYCHOLOGY

Prior research suggests taking factual pretests enhances learning factual information from reading a text. Yet, a central goal of education is

to develop conceptual understanding. The present experiments investigated whether conceptual pretests facilitate learning concepts from reading texts. Participants were given factual or conceptual pretests; a control group was not given a pretest. All participants then read passages and took a final test with factual and conceptual questions, some of which were repeated from the pretest and some of which were new. Although factual pretest questions improved learning for identical factual questions, conceptual pretest questions did not enhance conceptual learning.

131 Characterizing a Methyl-Specific RNA-Binding Protein in Stem Cells

ADAM HECK

DEPARTMENT: UNIVERSITY WIDE – CELL AND
MOLECULAR BIOLOGY

Methylation of mRNAs influences virtually all aspects of their metabolism, and has been connected with a variety of biological processes including obesity, cancer and stem cells. Despite this broad range of effects, the roles and regulation of proteins that recognize methylated mRNAs are not well characterized. Our lab has shown that one of these methyl-readers, YTHDF2, is highly expressed in stem cells as compared to fully differentiated cells. This project is focused on characterizing how YTHDF2 is regulated and how it influences gene expression in stem cells.

132 Improving Blood Compatibility of Surfaces by Adsorbing Glycocalyx-Mimetic GAG Brushes

MOHAMMADHASAN HEDAYATI

DEPARTMENT: CHEMICAL AND BIOLOGICAL
ENGINEERING

Blood-compatible materials, i.e., materials that can be used for making medical devices that remain in contact with blood without causing harm to blood, are required for many medical and biomedical devices. Artificial materials induce the coagulation of blood and adhesion of blood platelets, eventually leading to the formation of blood clot. By adsorbing polysaccharide brushes made of heparin and chondroitin sulfate, blood compatibility of surfaces can be improved. The overall goal of this work is to understand protein-surface interactions governing mechanisms of blood compatibility of the endothelial glycocalyx, and to translate this understanding into design principles for improving blood-contacting materials.

133 Social Norms, Goal Affirmation, and Physical Activity Performance

CHARLES HEIDRICK

DEPARTMENT: PSYCHOLOGY

In three studies, we investigated the impact of social cues on goal-setting and performance in a physical activity context. In study 1, participants were more likely to achieve physical activity goals when their goals were affirmed by a researcher with positive acknowledgment. In study 2, participants were more likely to set more challenging physical activity goals when provided social comparison information. In Study 3, the affirmation of goals came from a computer rather than a human and had no effect on exercise performance. In studies 1 and 2, social influences exerted prior to beginning a task impacted goal-setting and performance.

134 Evaluation of a Digital Anatomy Program in Human Anatomy Instruction

NATASCHA HEISE

DEPARTMENT: BIOMEDICAL SCIENCES

Teaching human gross anatomy is an expensive undertaking requiring human cadavers, large spaces, and specialized equipment. Many institutions are looking at alternatives including replacing cadaveric instruction with digital anatomy programs, use of virtual reality, and even plastic models. Unfortunately, these have been relatively ineffective. Here, we took a novel approach using cross sections in a digital anatomy program to supplement cadaveric instruction. Cross sections and the Visible Human Dissector were incorporated into the curriculum through Canvas based assignments and assessments. Results suggest students improve in key skill areas such as orienting and proper use of directional terms in 2D images.

135 Extrusion Printing of Ceramic Nanopowder Parts for Sintering

TUCKER HENSEN

DEPARTMENT: ENGINEERING

This research investigates feasibility of an additive manufacturing (AM) approach to producing alumina (Al₂O₃) parts. Currently, manufacturing of ceramics is limited to relatively simple shapes. This inevitably leads to ceramic parts with less-than-optimal geometries for the application. Through AM, complex geometries, including overhangs or hollow enclosures are possible, which would be highly valuable in many applications. To achieve this, extrusion printing of a ceramic nanopowder suspension was investigated. In this case, a slurry was prepared, capable of extrusion and subsequent solidification to retain the intended geometry, followed by sintering to achieve maximum density; making the parts useful for engineering purposes.

136 Death and Family: Testing Andean Lineage Tombs Through Cranial Non-Metrics

SARAH HERRERA

DEPARTMENT: ANTHROPOLOGY

Little has been done using bioarchaeological methods to test assumptions about ayllus and ancestor worship based on historical records in the Conchucos region of Peru. Non-metric traits on 106 crania from 15 different tombs were scored and used to calculate a numerical summary of biological distances. The results do not provide enough information to positively identify each tomb as a unique family burial, but may be more indicative of a wider ayllu group present at Marcajirca. It does appear, however, as though many of these records can be accurately applied to the interpretations for this archaeological site.

137 Utilizing Power Plant Exhaust in Microalgae Biofuel and Biogas Production

DEREK HESS

DEPARTMENT: MECHANICAL ENGINEERING

Industrial production of microalgae will require the integration of CO₂ sources such as flue gas from coal power plants. Heavy metals in flue gas will ultimately be introduced into the microalgae growth system and impact the quality of produced biofuel and biogas. Flue gas heavy metals were found to have a negative impact on microalgae

(*Nannochloropsis salina*) growth and lipid (biofuel) yields, decreasing by 67.5% and 31.9% while having a positive impact on lipid recovery efficiency and methane production, increasing by 9% and 37% compared to control. A net negative impact of 71% is seen in heavy metal contaminated systems.

138 Maternal Health Matters: The Home Food Environment and Chronic Disease

SARAH HIBBS-SHIPP

DEPARTMENT: FOOD SCIENCE AND HUMAN NUTRITION

Mothers function as gatekeepers of the home food environment and role models for children's dietary intake. Research on how maternal dietary intakes and chronic disease risk factors interact with the home food environment, and whether these parameters associate with child weight status is critical. This cross-sectional study explored correlations among home food availability, maternal dietary intake, maternal chronic disease risk factors, and child weight status. Preliminary analyses indicate that significant associations exist between maternal dietary intake components, individual chronic disease markers, and select home food categories. Income, acculturation, and ethnicity will be important covariates when evaluating these relationships.

139 Mechanistic Studies Into Cr-Photocatalyzed Oxidative Reactions

ROBERT HIGGINS

DEPARTMENT: CHEMISTRY

Photocatalysis offers a way to perform reactions without the use of expensive/caustic reagents while synthesizing useful products. Recently, a Cr-photocatalyzed cyclization was reported while still lingering questions about the mechanism remained, specifically regarding the role of oxygen. We were able to find oxygen had three separate but important roles in the mechanism. We then attempted to apply these findings to a similar cyclization. Interestingly, this Cr-photocatalyzed reaction had an orthogonal mechanism despite the similar substrates and conditions. Our future work will focus on developing new earth abundant photocatalysts containing metals, such as iron, and determining the scope of their reactivity.

140 Multimethod Computational Modeling Analysis of Mitochondrial Dysfunction Underlying Degenerative Senescence

TIM HOFFMAN

DEPARTMENT: ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

A decline in mitochondrial function is one of the most well-established characteristics of aging cells. However, it is unclear whether mitochondrial dysfunction serves as the root cause of the aging process. To obtain additional insights about this theory, we utilize a novel multimethod simulation approach to integrate the crucial components of this relationship. The results of these in silico experiments show that the proposed biological network accounts for the natural and xenobiotic-modulated quantitative decline in mitochondrial function and eventual cell death. This approach provides a deeper understanding of this aging mechanism and of possible pharmacological targets for age-related diseases.

141 Deadly Honeybee Infections Threaten Bumblebees: Pathogen Spillover in the U.S.

ALISON HOGEBROOM

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Global decline of pollinators threatens human food security. Pathogens are a primary driver of pollinator decline, and can spread from managed bees to bumblebees. The deadly pathogen, *Nosema ceranae*, infects 43% of honeybee colonies in Colorado. We do not know if *N. ceranae* infects bumblebees in the U.S., or how it affects bumblebee health. I propose to assess prevalence of *N. ceranae* in bumblebees, examine how it affects bumblebee health, and identify tools to reduce pathogen infections. The results of this study will be used to advise best management practices for successful beekeeping, and promote the health of managed and wild pollinators.

142 Will We Be Able to Smell Global Climate Change?

JULIE HOLDER

DEPARTMENT: CHEMISTRY

Every time you smell a flower or freshly cut grass, your nose is detecting biogenic volatile organic compounds (BVOCs). These fragrant and other BVOCs emitted from plants make up a large portion of the reactive chemical species in the atmosphere and are key components in air quality and climate change. Despite the magnitude of global BVOC emissions, little is known about their lifecycle and the affects future global change have on them. To close this knowledge gap, experiments in both ambient and controlled conditions are required. Results from a forest field study and a greenhouse laboratory design will be presented.

143 Efficiency or Equity? The Impacts of Differing Groundwater Management Policies

AARON HROZENCIK

DEPARTMENT: AGRICULTURAL AND RESOURCE ECONOMICS

Groundwater management policies are a means to conserve scarce water resources for future use. However, there remain important questions regarding how the costs and benefits of aquifer management vary across space and time for heterogeneous groundwater users. We develop a dynamic, spatially explicit hydro-economic model to explore the distributional impacts of differing groundwater management policies. Results suggest that there exist important tradeoffs between efficiency and equity in the impacts of differing policy mechanisms and the magnitude of these tradeoffs vary across locations according to the spatially varying characteristics of the physical system.

144 Ethnic Diversity in the 19th Century Colorado Insane Asylum

ELLIOT HUBBARD

DEPARTMENT: ANTHROPOLOGY

Frequencies of dental non-metric traits vary in relation to the geographic origin of some human populations. In this regard, an analysis of teeth can reveal the ethnic diversity of skeletal samples. This study

compares the ethnic composition of the 19th Century Colorado Insane Asylum derived from medical records to the frequency of dental traits from skeletons recovered from the institutions cemetery (n = 123). Presently, a few discrete dental traits indicative of Native American and African descent indicates a more complex population structure than reported. Race in 19th century Colorado and politics embedded in the social context of mental institutions are discussed.

145 Maintaining Eligibility Versus Career Development: Exploring Coaches' Impact on Student-Athletes

AMY HUFF

DEPARTMENT: SCHOOL OF EDUCATION

As division 1 collegiate sports become more publicized, the desire for prestige drives faculty and administration to focus on maintaining a winning athletic program. Maintaining eligibility is the focus of all and the needs of the student-athlete become secondary (Croissant, 2001). By interviewing collegiate coaches, their student-athletes, and athletic advisors, this question will be addressed. How does a coach's views impact career and identity development for student-athletes on a Division 1 athletic team? The investigator expects to reveal the need for coaches to put their student-athletes' academics and identity development first for the sake of their future career pursuits.

146 INSiGHT: Investigative Search for Graph Trajectories

BENJAMIN HUNG

DEPARTMENT: COLLEGE OF ENGINEERING

INSiGHT is a technology to determine the match trajectories of entities that exhibit a pattern of attributes or connections for a latent behavior over time. It provides analysts with the ability to find full or partial matches against a query pattern as well as a means to quantify the pace of the appearance of the indicators. This technology has a variety of potential applications to include detecting the radicalization of home-grown violent extremists, recognizing signs for individual suicide risk among veterans, and determining which customers are undertaking projects that involve multiple purchases over time.

147 Exploring the Affect and Effect of Political Internet Memes

HEIDI HUNTINGTON

DEPARTMENT: JOURNALISM AND MEDIA COMMUNICATION

Political internet memes are a tool for citizens to participate in the digital public sphere, and have generated attention from mainstream media during the two most recent presidential election cycles. However, memes effects as political media on viewers is not yet well understood or established. This study responds to calls for research to establish political internet memes effects and measurement of those effects. A survey-based quasi-experiment was conducted to explore relationships among viewing internet memes and political beliefs, affect, and perceptions of memes persuasiveness. This study represents a starting point for understanding the role of user-generated media in political contexts.

148 Photoreactive Blockcopolymer Micelles as Building Blocks for Tunable Elastomeric Hydrogels

NABILA HUQ

DEPARTMENT: CHEMICAL AND BIOLOGICAL ENGINEERING

Our group has created a large range of materials using blends of AB and ABA copolymer, which when swollen with water form an elastic hydrogel network. The mechanical properties of the hydrogel can be finely tuned using the concentration of ABA. We have since built on this framework by replacing both components with a single, photoreactive AB diblock copolymer. This provides flexibility to install specific concentrations of ABA triblock copolymer tethering molecules at any point in the fabrication process through irradiation with UV light.

149 Innovative Types of Simple Blast Walls Systems

ASSAL HUSSEIN

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

Several planned attacks on civil infrastructure have been recorded in the U.S. and around the world since the beginning of the last century. These attacks have typically resulted in loss of life with substantial social and economic consequences. Blast walls have been primarily used for protecting military facilities. This study presents a summary of analysis of simple blast walls under air blast loading. Finite element analysis is conducted using ABAQUS/Explicit software to represent the interaction between air blast wave and the structure and level of protection around the blast wall is examined to identify the safe zone of blast field.

150 Extracting Copper from Dairy Footbaths to Prevent Heavy Metal Bioaccumulation

SAM JALALI

DEPARTMENT: ANIMAL SCIENCES

Copper Sulfate (CuSO_4) is typically used three times a day in dairy farm footbaths and then released in to the premise lagoon. Copper can accumulate in soil and plants in the area where the lagoon contents are applied. Heavy metal contamination of soil may pose risks and hazards to humans. The objectives are 1) To separate Cu from footbath solutions, via electrolysis, prior to the footbath contents being discharged into the premise lagoon to prevent environmental bioaccumulation, and 2) Develop a long term recycling plan for the Cu and CaSO_4 generated during this process.

151 Tropical West Pacific Influence on U.S. Heat Waves

ANDREA JENNEY

DEPARTMENT: ATMOSPHERIC SCIENCE

Abnormal storminess over the Tropical West Pacific and Asian Monsoon Region is shown to precede eastern us extreme heat events as early as eighty days in advance. The possible role of the Extratropical Pacific in this teleconnection is explored.

152 Small Molecular Adjunct Strategy to Potentiate Antibiotics Against Mycobacterium Tuberculosis

ALBERT JEON

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

Controlling the global spread of tuberculosis (TB) continues to be a challenge due in part to the lack of new anti-TB drugs and the emergence of drug-resistant Mycobacterium tuberculosis (Mtb). We hypothesized that 2-AI would reverse inherent resistance of Mtb against β -lactam drugs and allow practical use β -lactam drugs in TB therapy. When combined with 2-AI compounds, β -lactam drugs showed improved bactericidal capacity. Additionally, we revealed reduced β -lactamase activity and hypersensitivity against SDS for Mtb treated with 2-AI compounds. These data suggest that 2-AI based small molecules may be effective at reversing inherent drug resistance of Mtb to β -lactam drugs.

153 Employment Status, Cognitive Performance and Brain Health in Aging

YUQIN JIAO

DEPARTMENT: HUMAN DEVELOPMENT AND FAMILY STUDIES

There are positive links between social, physical and cognitive engagement and better neurocognitive outcomes in aging. Employment can be viewed as a lifestyle enrichment. In 247 adults age 60 to 79, we found that full employment was related to faster processing speed and better fitness than in fully retired group. Ongoing work will focus on different structural brain correlates of employment status in older adults to better understand effects of engaged lifestyle on aging brain.

154 Therapeutic Carbon Monoxide: Snaking Its Way Into the Clinic

TYLER JOHNSON

DEPARTMENT: VETERINARY MEDICINE AND BIOMEDICAL SCIENCES

Bleeding disorders from pit viper envenomation are caused by decreased clot strength and faster clot breakdown. Using a thromboelastograph (TEG), a device that measures rate and strength of clot formation and breakdown, we show that carbon monoxide released from carbon monoxide releasing molecule (CORM) can almost reverse the loss of clot strength and the faster clot breakdown induced by rattlesnake venom in vitro and in plasma from naturally envenomated dogs. This therapy holds promise for mitigating the coagulopathy induced by venomous snakes not only from North America, but also from areas of antivenom shortage such as South America and Africa.

155 Child Parent Relationship Therapy for Adoptive/Foster Families: A Literature Review

KAREN JOLLY

DEPARTMENT: SCHOOL OF SOCIAL WORK

The purpose of this analysis is to explore the efficacy of Child Parent Relationship Therapy (CPRT) for adoptive and foster families. Professionals advocate for the use of CPRT with adoptive and foster families, yet little is known about the efficacy of CPRT with this population. The literature review included relevant journals by way of database searches. Small numbers of studies examined the efficacy of CPRT among adoptive and foster families, yet our review suggests that CPRT has a positive impact on child- parent relationship outcomes. Further research is needed to determine whether CPRT is effective for child-parent relationship outcomes.

156 Re-Historing Rocky: How Environmental History Illuminates Natural and Cultural Resources

MAGGIE JONES

DEPARTMENT: HISTORY

Field work in natural resources and environmental history illuminates present-day concerns and provides a direction for future protective ecologically-minded actions. In the National Park Service, the divide between natural and cultural resources is difficult to bridge. However, environmental history offers solutions for both cultural and natural resource management practice. My research and field work experience shows the interconnections among both types of resources as well as the value of mutually beneficial collaborative efforts between the public sector and academia.

157 Prion Protein is a Master Regulator of the Immune System

SARAH KANE

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

Previous work revealed the necessity for the prion protein (PrPC) in establishing prion disease. However, the normal role of PrPC remained elusive. We provide evidence that PrPC helps establish and maintain a robust immune response against pathogens. PrPC-knockout mice exhibit impaired B-cell receptor signaling, T-helper cell activation of antigen presenting cells, and resulting impaired antibody responses to vaccination.

158 Anisotropic Hyperbolic PC Expansion for High-Dimensional Variability Analysis of Systems

ISHAN KAPSE

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

A new polynomial chaos approach is presented, which uses an alternative scheme to intelligently create a sparse meta-model, for the faster, yet reliable analysis of complex systems. This sparsification scheme

studies the contribution of different random parameters of a complex system to the total response of the system and accordingly sets different degrees of reliability requirements for each random parameter. The proposed approach results in substantially fewer amount of simulations required for the analysis of the system, for marginal loss of accuracy.

159 Modeling How Metabolic Rate Influences Foraging and Life History

KEZIAH KATZ

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Metabolic rate is the fundamental biological rate that determines the acquisition and processing of energy and thereby determines all life processes. The observed intraspecific variation in metabolic rate has generated a lot of interest regarding its relevance for life history differences. We modeled the behavior of individuals with different metabolic rates in different environments and measured various parameters related to foraging success and life history. We found individuals with high and low metabolic rates to be favored in different environments. Our findings bring new insights into the gene environment interactions that are involved in the evolution of different metabolic rates.

160 Quantifying Experimental Cut Mark Micromorphology Using High-Resolution 3-D Scanning

TREVOR KEEVIL

DEPARTMENT: ANTHROPOLOGY

Cut marked bones represent an important resource in the archaeological record for reconstructing past hominin behaviors that concern temporal and spatial patterning of stone tool industries. A quantitative connection between cut marks and the tools that created them can be established through reconstructions of cut mark micromorphology using a 3-D laser scanner. Results from this project suggest that cut marks made by different Early Stone Age tools create statistically distinct cut marks morphologies. These results have valuable applications for linking cut marked bones in archaeological assemblages to the tool technologies that created them.

161 A Low-Cost Sensor Network for Wildfire Smoke Detection and Monitoring

SCOTT KELLEHER

DEPARTMENT: MECHANICAL ENGINEERING

Cost associated with monitoring prescribed burns and wildfires is one of the main reasons that monitoring data is limited. A small, low-cost air sampler developed at Colorado State University, was modified to serve as affordable tool for monitoring wildfire emissions. The result is a solar powered, autonomous, weather-proof, air sampler that can be controlled from a cell phone. Thirteen of these low-cost air samplers were deployed and validated on one of the largest prescribed burns ever, in the State of Colorado. Maps of air quality concentrations with respect to time allow visualization of fire smoke impacts at the ground level.

162 Comic Books in the Classroom: Interdisciplinary Teaching Through Comic Books

JAMES KELLEY

DEPARTMENT: ENGLISH

Comic book curriculums and interdisciplinary teaching have faced similar resistance in the American public education system, specifically in secondary education. Teachers have questioned the value of using comic books in their teaching, while others have asked similar questions about incorporating different subjects into their teaching. Through Common Core State Standards, teachers have been directed to incorporate more interdisciplinary teaching, and as an educator and comic book reader, the goal of this research is to determine how a comic book curriculum can help teachers to incorporate interdisciplinary teaching by using comics to teach science literacies in an English Language Arts classroom.

163 Cross-Species Disease Transmission From Domestic to Wild Cats

ANNIE KELLNER

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Wild and domestic felids are susceptible to many of the same pathogens and co-exist near the interface of natural and developed landscapes. Our study evaluates cross-species transmission of *Mycoplasma haemominutum* (Mhm) between free-ranging domestic cats and wild felid species. We combined model selection and phylogenetic analyses to determine that cross-species transmission has occurred primarily in one direction, following the trophic network from lower to higher levels. Our results support the hypothesis that domestic cats are a source of Mhm infection on a global scale, and suggest that wild felids worldwide may be at risk for pathogen spillover from domestic cats.

164 Perceived Shifts in Culture and Livelihoods Amongst Samburu Moran

CHELSEA KINCHELOE

DEPARTMENT: HUMAN DIMENSIONS OF NATURAL RESOURCES

Samburu pastoralist, known as Moran, are being put to the test in their ability to remain resilient and adaptive in the 21st century through the hardships of land fragmentation, human population growth and climate change. Morani are currently at a tipping point forcing young pastoralists to make difficult decisions about the future of their culture and livelihoods. This project provided Moran with fifteen possible options derived from traditional and emerging livelihoods and cultural practices. Results indicate a strong support of education and varying answers to the rest, leading to the conclusion that Morani remain unclear on the future of pastoralism.

165 Cannabis Use in Persons With Neurological Diseases: An Online Investigation

JOHN KINDRED

DEPARTMENT: HEALTH AND EXERCISE SCIENCE

Cannabis has been medicinally used for over a thousand years. Even with this storied history, many questions linger about its efficacy in

treating modern neurological conditions, like Parkinson's Disease and Multiple Sclerosis. To answer these questions, we are conducting an anonymous on-line survey, designed to identify cannabis use practices and self-reported domains of neurological disability. Currently we have 517 respondents, with 220 reporting current cannabis use. In our initial analysis cannabis users had lower disability scores in three domains: mood, swallowing, and bowel function. Future cannabis interventions aimed at improving clinical outcomes in neurological patients should focus on these areas.

166 Measuring Self-Advocacy Skills Among Student Veterans With Disabilities

ADAM KINNEY

DEPARTMENT: OCCUPATIONAL THERAPY

This study sought to understand what explains self-advocacy skills and academic performance among student veterans with disabilities, and to evaluate the psychometric properties of the SV-SASA, a novel measure of self-advocacy skills in this population. Regression analysis conducted on 49 participants in a supported education program led to the identification of several factors that influence self-advocacy skills and academic performance among student veterans. The SV-SASA demonstrated adequate psychometric properties as an assessment of self-advocacy skills in this population. Results inform our understanding of self-advocacy skills and academic performance in student veterans, and have implications for service providers and researchers.

167 The TODAY Project: Taking On Diabetes to Advance You

TARA KLINEDINST

DEPARTMENT: OCCUPATIONAL THERAPY

The TODAY Project is a multi-phase project to identify and enhance occupational performance and participation, health, and lifestyle status in individuals with type-2 diabetes mellitus (T2DM). Phase 1 of TODAY determined the extent of impairments in occupational status, psychosocial status and health status of economically-marginalized individuals (low SES) with T2DM. We generally found that individuals with low SES and T2DM seen in primary care were experiencing moderate limitations in occupational and psychosocial status, and were experiencing moderate levels of anxious and depressive feelings. These results will inform TODAY-Phase 2, an intervention aimed at increasing successful self-management of type-2 diabetes.

168 Correlates of Determining New Endpoints of Mice in Disease Studies

KATIE KNAPEK

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

Research with Select Agents in mice often results in death as an endpoint, intentional or not. Establishing a means to identify an early endpoint using indicators of morbidity that can be applied to multiple agents would be invaluable for those working with infectious disease models. Mice are a prey species making it difficult to assess their pain and distress. Numerous parameters were used to assess the effects and course of infection with *Burkholderia pseudomallei* (Bpd), *Bacillus anthracis* (Banx), and *Francisella tularensis* (Ft).

169 Catching Viruses in the Act

AMANDA KOCH

DEPARTMENT: BIOCHEMISTRY AND
MOLECULAR BIOLOGY

Viral RNA contains sequences called IRESs (Internal Ribosomal Entry Sites) used to hijack host cell translation machinery and efficiently replicate. Due to technological limitations, no studies have analyzed the translation dynamics of IRES-mediated translation at the single-molecule level in living cells. The Stasevich lab recently developed a technique to image live-cell translation. By visualizing actively translating proteins, translation dynamics can be quantified. This technology can be utilized to distinguish between IRES or host translation. With the described imaging technology and a proper sensor, many questions about IRES-mediated translation can be answered at a resolution that has never been observed before.

170 Effects of Low-Level Brodifacoum Exposure on the Feline Immune Response

JENNIFER KOPANKE

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY
AND PATHOLOGY

Anticoagulant rodenticides have recently been identified as potential factors for the development of notoedric mange in wild felids. These predominantly correlative studies have not provided direct evidence of a causative association between rodenticide exposure and immune suppression. The present study therefore sought to determine whether chronic, low-level exposure to brodifacoum resulted in alterations in the direct and recall immune response in domestic cats.

171 Ecosystem State Transition and Beaver Mediation in Yellowstone National Park

DAN KOTTER

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

In the 20th century in Yellowstone National Park, heavy browsing on woody vegetation degraded riparian structure and removed vital dam building material for beaver. Consequently, streams with intermittent beaver occupancy for thousands of years were abandoned and began incising, lowering riparian water tables and converting floodplains into a Willow-Elk-Grassland state. Following wolf re-introduction in 1995, an experimental study was initiated in 2001 to determine the effects of ungulate browsing and water availability on willow growth. As exceptional ambient willow sites with high groundwater availability begin to exceed a 2 m height threshold, potentially suitable biomass for beaver activities could be restored.

172 Protein Crystals as Biotemplates for Gold Nanorod Growth

ANN KOWALSKI

DEPARTMENT: CHEMICAL AND BIOLOGICAL
ENGINEERING

Highly anisotropic metal nanostructures are of interest for their optical properties and potential applications in sensors, solar cells, biological imaging, electronics, energy storage devices, and cancer therapies. However, these nanoparticles and nanorods can be difficult to synthesize homogeneously, economically, and in bulk. Biotemplating is an emerging field for the three-dimensional control of metal nanoparticle

placement and growth. Here we show that protein crystals are a successful target as biotemplates for the immobilization of gold nanoparticles and subsequent growth of high aspect ratio gold nanorods, which can then be released from the scaffold and analyzed with transmission electron microscopy.

173 Reduced Dimensional Polynomial Chaos for Uncertainty Quantification of RF Networks

ADITI KRISHNA PRASAD

DEPARTMENT: ELECTRICAL AND COMPUTER
ENGINEERING

This work presents a dimension reduction based polynomial chaos (PC) approach for the uncertainty quantification of RF networks. The key feature is the utilization of a high dimensional model representation (HDMR) for quantifying the relative impact of each random dimension on the network responses when acting alone. These impact factors enable the intelligent identification and subsequent pruning of the least impactful random dimensions from the original random space. Performing a PC expansion in the resultant low-dimensional random subspace leads to the recovery of a sparser set of coefficients with negligible loss in accuracy.

174 Characterization of Leaf Iron Prioritization During Iron Deficiency

GRETCHEN KROH

DEPARTMENT: BIOLOGY

We studied iron prioritization in leaves when the plant is iron deficient. We have characterized changes in a suite of chloroplastic proteins and analyzed the function of thylakoid complexes. Our results indicate that proteins comprising the cytochrome b6f complex are significantly affected by iron deficiency, while PSI and PSII are relatively less affected. This material is based upon work supported by the National Science Foundation Graduate Research Fellowship under Grant No. DGE-1321845. Any opinion, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

175 PharmCat: Physiologic-Based Pharmacokinetic Models for Virtual Drug Dosing in Cats

RENEE LAKE

DEPARTMENT: SCHOOL OF BIOMEDICAL
ENGINEERING

Due to significant differences between dogs and cats regarding metabolism and transport of certain drugs, a need exists for feline-specific physiologic-based pharmacokinetic (PBPK) models to investigate the dosing and pharmacokinetic profiles of drugs used in treating feline disease. A case study was performed using a five-compartment Bayesian-based PBPK model developed for predicting the absorption, distribution, metabolism, and elimination process of mirtazapine, a 5-HT₃ receptor antagonist used for its anti-nausea, anti-emetic and appetite-stimulating properties in cats. Such models represent a potential clinical tool that for optimizing feline clinical protocols via tailoring of dosing regimens and/or identifying mechanisms of drug interactions.

176 Receptor Num1 Activates Dynein Motility: An In Vitro Odyssey

LINDSAY LAMMERS

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

During mitosis, the mitotic spindle is positioned at the future site of cell division by a motor protein, cytoplasmic dynein. Since the spindle position can govern whether a cell divides symmetrically or asymmetrically, dynein function is essential during development and important for tissue homeostasis. My research aims to study the regulation of dynein to do its function at the right place and in the right time in budding yeast cells. We have identified a possibly novel mechanism for regulation of dynein through its cortical anchor Num1 in vivo and have begun to examine this mechanism using single molecule microscopy.

177 Modeling River Channel Erosion as a Nutrient Source

ROD LAMMERS

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

Nutrient pollution (nitrogen and phosphorus) causes harmful algal blooms in rivers, lakes, and oceans around the world. A potential pollutant source, erosion of stream channels, has been largely overlooked and quantification of this process is difficult. The purpose of this research is to develop a simple to use model to predict sediment and phosphorus loading from channel erosion. This model will use publicly available data sources to allow application in a variety of areas. Initial progress is promising for this important tool for quantifying a source of nutrient pollution in watersheds.

178 Quantifying the Health Effects of Wildfire Smoke Exposure

WILLIAM LASSMAN

DEPARTMENT: ATMOSPHERIC SCIENCE

Exposure to air pollution is a major cause of mortality worldwide. In the western U.S., wildfires can cause severe degradation of local and regional air quality for episodes lasting several days to weeks. However, there is much uncertainty in how exposure to this type of air pollution can impact human health. In this project, we combine output from an atmospheric chemistry model with satellite and surface observations in a statistical framework to estimate smoke concentrations. We then calculate how smoke affects human health. We show results from a case study of the Washington 2012 wildfire season.

179 Studies Toward the Total Synthesis of Fennebricin B

VY LE

DEPARTMENT: CHEMISTRY

Fennebricin B (1) was first isolated in 2014 from dorid nudibranch extract. The biological activity of Fennebricin B is unknown since it is only present as a trace amount. However, structural similarity of Fennebricin

B and Ecteinascidin 743 (a FDA-approved anticancer drug) suggested comparable biological activities of these natural products. The limited supply of 1 from marine organisms has precluded detailed biological evaluation; hence an efficient approach to total synthesis of Fennebricin B is necessary for future studies of the natural product.

180 White Pine Blister Rust Progression on Rocky Mountain Limber Pines

LEDDY LEDDY

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

White pine blister rust disease, caused by an invasive fungus, has had catastrophic effects in North America. As the disease front moves into the Rocky Mountains, it is believed it will have an enormous effect on Colorado white pines which play a large role in snow retention, erosion control, hydrology and the scenic beauty of areas like Rocky Mountain National Park. This research assessed conditions of limber pine in 81 U.S. Forest Service health plots from 2006-2016 to determine the current disease progression and to develop models to assess future disease impacts in order to prepare for and mitigate damage.

181 Feline Foamy Virus: Infection Kinetics, Immune Response, and Disease Associations

CARMEN LEDESMA FELICIANO

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

Feline foamy virus (FFV) is a Retrovirus that has been regarded as apathogenic despite life-long infection in cats. Because of this, FFV carries potential applications in vaccine and gene therapy development. To verify apathogenicity and further understand immune response, we inoculated cats with FFV or a potential vaccine vector candidate. Viremia was persistent and detected as early as 21 days post-infection. No cats developed overt clinical disease, however some kidney changes occurred that could potentially lead to disease after longer periods of infection. Cats inoculated with the vaccine candidate developed an immune response, paving the way for potential vaccine development.

182 Endoplasmic Reticulum Stress Modulates Vascular Function in Diabetic Mice

DUSTIN LEE

DEPARTMENT: FOOD SCIENCE AND HUMAN NUTRITION

Endoplasmic reticulum (ER) stress is associated with multiple metabolic diseases such as obesity and diabetes. We hypothesized that ER stress also contributes to vascular dysfunction in diabetic (db/db) mice. Db/db mice displayed increased arterial stiffening at baseline compared to wild type controls (457 ± 25 vs 348 ± 26). The ER stress inhibitor tauroursodeoxycholic acid decreased arterial stiffening after 4 weeks (402 ± 12) and improved maximal endothelium dependent dilation compared to controls (49.1 ± 6.1 vs $19.8 \pm 9.6\%$). These results indicate ER stress contributes to the vascular dysfunction observed in db/db mice, and that inhibiting ER stress improves measures of vascular function.

183 Isolating Specific Blood Cell Phenotypes from Syrian Hamster Peripheral Blood

ERIN LEE

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

Syrian hamsters (*Mesocricetus auratus*) are susceptible to transmissible mink encephalopathy (TME) infection, and are used as a natural system to study prion pathogenesis. Flow cytometry (FACS), magnetic cell sorting (MCS), and real time quaking-induced conversion will be used to determine the roles of different blood cells in TME infection. FACS and MCS use fluorophore-conjugated cell surface antibodies to identify and harvest blood cell types with high purity, therefore we sought to identify antibodies that cross-react with hamster blood cell types. We identified cell phenotype markers with cross-reactivity to hamster blood cells, including B cell, Pan T cell, and Pan lymphocyte.

184 Efficient Sampling of Continuous Actions for Octopus Arm Control

MINWOO LEE

DEPARTMENT: COMPUTER SCIENCE

An octopus arm is a hard problem that requires high dimensional, continuous action control in continuous state-action space. This research proposes a solution for the octopus arm problem with a novel relevance vector sampling approach in relevance vector machines (RVM) based RL framework (RVM-RL). We examine the hypothesis that relevance vectors (RV) are placed on the modes of the value approximation surface, and we select actions in RVs to maximize the estimated state-action values. We report the efficiency of the proposed approach by controlling a simulated octopus arm with RV-sampled actions.

185 How Prey Distribution and Anthropogenic Disturbance Influence Predation Risk

PATRICK LENDRUM

DEPARTMENT: FISH, WILDLIFE, AND CONSERVATION BIOLOGY

Human-mediated landscape changes alter habitat configuration, which strongly structures species distributions and interspecific interactions. We investigated the relationship between predation sites, habitat features, and mule deer distributions in two contiguous areas with markedly different degrees of energy extraction across periods of high and low intensity development. Predation risk decreased closer to pipelines and well pads regardless of the level of development, and increased closer to major roads except for when human disturbance was highest. The emergence of varied interactions between predation and landscape features across contexts and years highlights the complexity of interspecific interactions in landscapes altered by human activities.

186 The Long-Run Economic Impact of the 2005 Hurricane Season

RYAN LEVITT

DEPARTMENT: ECONOMICS

There is a growing body of literature that examines the long-run economic impacts of natural disasters. Much of this literature is at the macro scale. In the United States damages from disasters tend to be highly

localized. Given that regional effects may diverge from what is observed at the country scale, this research explores the long-run outcomes of Hurricane Katrina at a more granular level. In doing so, preliminary results suggest that not only were damaged areas effected, but that there were significant spillovers impacting neighboring areas.

187 Relationship Between Electroencephalographic Measures and Occupational Performance in Children

MEI-HENG LIN

DEPARTMENT: OCCUPATIONAL THERAPY

The Error-Related Negativity (ERN) is a neural indicator of response monitoring, an ability that monitors ongoing behaviors and detects errors. This study investigates the relationship between ERN and occupational performance in children aged 8 to 12 years. Electroencephalography (EEG) data were collected from 14 typically developing children (M = 9.98 years old, SD = 1.39; male = 5). Occupational performance was measured using the Assessment of Motor and Process Skills and the Evaluation of Social Interactions (ESI). Results showed that ERN latency significantly predicted ESI scores, suggesting the faster the brain detects errors, the better children perform social interactions.

188 Holy Smokes! Impacts of Wildfire Smoke on Front Range Photochemistry

JAKOB LINDAAS

DEPARTMENT: ATMOSPHERIC SCIENCE

Wildfire smoke has large impacts on U.S. air quality and is expected to have even larger impacts in the future. We present a case study on the effect of smoke on urban air quality using measurements of a wide variety of chemical species at a location near Erie, Colo., during summer 2015. Wildfire smoke was present in Front Range air in both July (four days) and August (two weeks). This smoke changed abundances of many species; the most important contribution was to higher ozone levels. High ozone exacerbates asthma and other respiratory problems, and is also harmful to crops.

189 Relating Volatility to Chemical Composition in Biogenic Secondary Organic Aerosol

MICHAEL LINK

DEPARTMENT: CHEMISTRY

We present the application of an online method for analyzing the molecular constituents of organic aerosol using chemical ionization mass spectrometry (aerosol-CIMS). To assess the performance of the aerosol inlet, a mixture of biogenic hydrocarbon precursors (*n*-pinene, limonene, terpinolene) were oxidized via atmospheric gas-phase oxidation in an oxidative flow reactor and the gas and aerosol phase oxidation products were measured by aerosol-CIMS. As the temperature of the aerosol inlet was increased, we observe changes in average carbon oxidation state of the gas phase constituents and highly functionalized species. We relate this observation to the thermodynamic properties of the aerosol.

190 Stress Responsive Genes in the Molting Cycle of *Gecarcinus lateralis*

ALEJANDRO LOPEZ CERON

DEPARTMENT: BIOLOGY

A de novo transcriptome assembly was built to quantify gene expression in the molting cycle of *Gecarcinus lateralis*. Specific gene-coding contigs for AMP-activated protein kinase subunits, Sirtuin proteins, Heat Shock proteins and Hypoxia Inducible Factors were isolated, identified and described. The relative expression of contigs revealed an overall decrease through intermolt, premolt and postmolt. Stress response triggers adjustments in metabolic pathways at extreme conditions that may reduce the energy available for protein synthesis. Genes in the mTOR pathway may reduce ecdysteroid secretion by the down-regulation of mTOR genes in response to stress.

191 Infrared Near-Field Optical Microscopy for Nano-Materials Characterization

ERIC LOPEZ

DEPARTMENT: CHEMISTRY

Scattering near-field optical microscopy (SNOM) is used to characterize material surfaces with resolution beyond the limit of diffraction. It is capable of studying organic, biological, geological, and inorganic samples. from can be effectively studied using this this instrument. Spatially correlated sample topography and infrared near-field images are used determine local sample composition by identifying bond vibration modes in the near-field image. The goal of this project is to develop a scattering near-field microscope with two-dimensional infrared (2D-IR) spectroscopy in order to determine vibration couplings and ultrafast time dynamics in an experimental system.

192 Graduate Students: The Key to Success in Interdisciplinary Research

HANNAH LOVE

DEPARTMENT: SOCIOLOGY

To solve many of the wicked problems now facing our world, scientists will need to work in an interdisciplinary fashion to combine and transform knowledge. However, working with other scientific disciplines presents many challenges. For almost two-years I have studied eight interdisciplinary research teams at Colorado State University. Our research has found that often graduate students are the members of scientific team who bridge academic silos. This presents a problem because graduate students are frequently left out of arenas where faculty create and transfer knowledge. Therefore, we have developed a model to better incorporate graduate students into interdisciplinary research.

193 Actively Managing Stress: Easing College Adjustment With Physical Activity

PAM LUNDEBERG

DEPARTMENT: PSYCHOLOGY

Physical activity (PA) and mindfulness training offer similar psychological benefits, and the present study sought to compare the two among

incoming students transitioning to the university setting. First-year college students (N = 52) voluntarily elected to participate in a 4-week PA or mindfulness workshop that emphasized college adjustment outcomes (e.g., stress reduction). Outcome variables were measured prior to the start of the workshop (T1) and at the final workshop (T2). Preliminary analyses indicate greater efficacy for the PA intervention compared to the mindfulness program, suggesting a benefit of utilizing PA as a method of easing the transition to college.

194 Project Employ Youth

TAMARA MACK

DEPARTMENT: COLLEGE OF BUSINESS

Market research to explore opportunities for job creation for youth in the Caribbean. Research conducted in Jamaica, St. Lucia and Trinidad and Tobago identified that potential employees possessed skills and aptitudes for business process outsourcing opportunities, entrepreneurial aspirations, and a desire to work in the tourism industry. Research of U.S. businesses identified potential customer segments in the banking sector and SMEs interested in outsourcing customer care and accounting services. Field research has laid the foundation for an online booking website to promote local employment opportunities in sustainable tourism.

195 Artwork in the Workplace – A Positive Effect?

JEANNE MACKENZIE

DEPARTMENT: SCHOOL OF EDUCATION

Being exposed to art has been said to be inspiring, enlightening, and beneficial. So why is it that so many people shy away from the thought of engaging in an art experience? To find out how those surrounded by art in their workplace interact with their environment, I embarked on a qualitative research project that delved into the observations and reactions of those that were exposed to varied artwork in varied contexts. The outcomes found that the companies that educated their workforce on the whys, whats and hows of their aesthetic surroundings brought a greater enhancement to the work environment.

196 Surveillance Robot Using MATLAB

RAAKESH MADHANAGOPAL

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

We propose a surveillance system for intruder detection using video processing and robotics. The area under surveillance is continuously captured using a web camera and processed in MATLAB for any kind of object in the video path. In case of any kind of object intrusion a notification is passed from MATLAB via RS232 to 8051 controller. The controller is programmed to strike out the object with a laser beam along with a buzzer. This robot thus detects the intruders and prevents them from crossing borders illegally.

197 Engineering Safer Systems in an Increasingly Complex World

HANEET MAHAJAN

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

The conception of autonomous vehicles and enormous advances in our technology have led to concerns about the safety implications of autonomy. With increase in complexity of systems, there is a need for a systems-based approach to hazard analysis. An emerging technique, Systems Theoretic Process Analysis (STPA), allows for inclusion of new causal factors by focusing on component interactions. This project demonstrates the application of STPA on a lane detection and correction system, resulting in identification of design constraints and requirements needed to engineer a safer system. This study should encourage a change in hazard analysis methods for complex systems.

198 Water to Drink or Water to Grow?

MANIJEH MAHMOUDZADEH VARZI

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

Historically agriculture was the main water consumer in Colorado. But the states demand for water has increased because of rapid urban growth and development of oil and gas industry. Urban communities started buying agricultural water rights to satisfy their growing demands. However, alternative land uses for farms without water right are limited and often they are left fallow. Therefore, this process is called buy and dry. Colorado's rural communities are believed to be at risk because of the fast pace of this change. A middle ground is, hence, sought to sustain agriculture.

199 Breaking Biofilms: Nitrate Inhibits Biofilm Formation in Burkholderia Pseudomallei

MIKE MANGALEA

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY AND PATHOLOGY

Burkholderia pseudomallei is a saprophytic bacterium inhabiting wet soils in tropical regions where it persists in biofilm communities. Melioidosis, the result of infection with B. pseudomallei, is a disease of high mortality that generally affects a wide variety of animals, immunocompromised people, and specifically targets agricultural workers. We discovered that nitrate inhibits biofilm formation in vitro and identified five genes responsible for sensing nitrate and altering biofilm growth. Our data implicates nitrate metabolism in the regulation of biofilm formation in response to environmental conditions. We propose a model for B. pseudomallei transition from its environmental reservoir to establish infections.

200 Birds in Orchard Ecosystems: Habitat Use and Ecosystem Services/Disservices

ANNA MANGAN

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Understanding how birds use and impact agroecosystems is important for decision-making that reflects conservation needs and fulfills production demands. We examined habitat use in Colorado's organic apple orchards as well as how birds influenced production positively through

codling moth pest control and negatively through fruit damage. Orchards provided habitat for many species yet only one had codling moth DNA in fecal samples, and five were observed damaging apples. Levels of bird damage however, were minor and birds did not reduce codling moth damage. Results demonstrate that organic apple orchards can potentially provide habitat for diverse bird communities without compromising production.

201 Development of Tunable Antibacterial Biomedical Polymers Using Low-Temperature Plasma Processing

MICHELLE MANN

DEPARTMENT: CHEMISTRY

Polymeric biomedical devices typically have surfaces that encourage bacterial attachment and proliferation. Such surfaces promote infection, arising from non-ideal material surface properties. Plasma processing provides a sterile environment for biomaterial modification where bulk properties are maintained while tuning surface chemistry through surface functionalization or film deposition. Here, we describe two plasma-based strategies to tune antibacterial biopolymers: (1) controlled release of antimicrobial nitric oxide from Tygon®; (2) film fabrication derived from essential oil constituents. Both methods exemplify the utility of plasma processing to fabricate materials with tunable surface properties, and thus, afford control of drug release and/or bacterial attachment behavior.

202 Evaluating Innovations against Heat Stress on Dairy Calves: Reflective Covers

DIEGO MANRIQUEZ ALVAREZ

DEPARTMENT: ANIMAL SCIENCES

The effect of aluminized reflective covers (ARC) on In-hutch temperature and Temperature-Humidity-Index (THI), and on health of dairy calves during summer was evaluated. One-hundred calves enrolled at birth, and allocated into covered (n = 50) or control (n = 50) hutches were studied during 60 days. No significant differences were found on health scores, rectal temperature, or in time to disease occurrence. In-hutch temperature and THI were higher in covered compared with control. Hutch wall temperatures were lower in covered than control hutches. Therefore, ARC reduced wall temperatures but did not improve health performance. This suggests that sunlight reflection does not relieve heat stress.

203 Understanding the Effect of Synthesis Conditions on Morphology of Biominerals

MARY MARISA

DEPARTMENT: CHEMISTRY

Many biomaterials are formed via precipitation in aqueous media where morphology can be influenced by modification of components in the aqueous solution. These synthesis modifications can result in changes to the crystallite shape, size, or the polymorph of the resulting product. Selectively changing the shape or polymorph of the resulting material can impact the properties of the material allowing for tuning of bio-inspired materials. Here, changes to the reaction solution, experimental geometry, and reaction environment are employed to effect changes in the morphology of calcium hydroxyapatite and calcium carbonate species.

204 Amoeba: The Next Hurdle for Disease Prevention and Detection

DAVID MARKMAN

DEPARTMENT: BIOLOGY

The emergence of human and wildlife diseases are difficult to forecast due to complex interactions between pathogens, hosts, and their environment. Many pathogens are characterized by outbreaks followed by periods of dormancy. A critical question is where do pathogens hide during dormancy? This research has identified amoeba in soil and water as a culprit. We discovered amoeba are capable of: 1) protecting certain pathogens over long time periods, 2) aiding in transmission of these pathogens, and 3) preventing modern disinfection measures from killing the pathogens. This research is instrumental for preventing disease outbreaks by targeting pathogens before human illness occurs.

205 Estimating Relationships in Social Networks

FRANK MARRS

DEPARTMENT: STATISTICS

Our world is overflowing with network data. We endeavor to make sense of this type of data in a principled way. We provide a methodology for estimating a measurable response about relationships in a network based on some measured data from the network and the actors therein. We examine an application in international trade. The trade between 58 states over multiple decades is analyzed based on each states gross domestic product (GDP) and distance to trading states, among other data. This method is generalizable to any set of network data.

206 Mentor-Mentee Match in Organizational Mentoring Programs

ALYSSA MARSHALL

DEPARTMENT: PSYCHOLOGY

Although mentoring programs are common in organizations, little research has addressed the optimal way to pair mentors and mentees. This study addressed that gap by comparing the effects of two types of fit supplementary and complementary fit on mentoring outcomes. Data from 145 pairs showed that both supplementary and complementary fit significantly predicted mentoring relationship quality, which in turn, predicted mentee job performance. By assessing both types of fit, organizations can take steps towards ensuring that employees have high quality mentoring relationships and that mentees will be able to perform their jobs to the best of their abilities.

207 Tuberculosis Surveillance of Captive African Elephants (*Loxodonta Africana*) in Zimbabwe

LAURA MARTIN

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Tuberculosis (TB) is an important disease of humans, livestock, and wildlife, including elephants. The high burden of TB in sub-Saharan Africa presents a risk to elephants, especially those in contact with other wildlife and humans. We investigated TB exposure and potential risk

factors for TB transmission in captive African elephants at ecotourism facilities in Zimbabwe. Six of 35 elephants (17.1%) had TB-specific antibodies. There were associations between seropositive status and facility, time in captivity, and presence of wildlife at food sources. Our results provide information that may reduce risk of TB transmission in elephants and elephant handlers through simple interventions.

208 Circumventing Diffusion in Kinetically-Controlled Solid-State Metathesis Reactions

ANDY MARTINOLICH

DEPARTMENT: CHEMISTRY

We present the observation and control of two different solid state metathesis reaction pathways, which form the transition metal disulfides FeS₂, CoS₂, and NiS₂. The control is derived from the varied preparation of the reaction mixtures. Preparing the reactants in anhydrous conditions the reactions are diffusion limited, as expected for solid state reactions. If the reactants are instead prepared in ambient atmosphere, an amorphous intermediate is formed which directly crystallizes into the targeted product upon annealing, indicating that reactions are nucleation-limited. Controlling formation pathway in solids will allow the design of new materials with desired physical and electronic properties.

209 Assessing Bee Diversity in Urban Areas Using Citizen Science

LISA MASON

DEPARTMENT: BIOAGRICULTURAL SCIENCES
AND PEST MANAGEMENT

Native bees have garnered attention following the challenges facing pollinators including honeybees. This awareness suggests the need for improved stewardship for all pollinators specifically by including citizens in conservation efforts. With over 900 species of bees documented in Colorado, research is needed to understand how urban areas affect bee diversity and abundance. Using citizen science, three public gardens were monitored by researchers and volunteers. This study is collecting baseline data comparing bee diversity in urban gardens versus natural areas, and comparing researcher data versus citizen science data.

210 Decolonizing Transness: The Frames of Transgender Athletes in Sports Illustrated

TAMMY MATTHEWS

DEPARTMENT: JOURNALISM AND MEDIA
COMMUNICATION

This discourse analysis examines depictions of transgender athletes in Sports Illustrated through the lens of queer theory and the interpretive-packages model by Gamson and Modigliani (1989). Four packages emerged: (1) Marginalization, (2) Labeling, (3) Fighting and Fairness and (4) Pride and Affirmation. The results illustrate that discourse has generally become more sensitive to trans issues. The author presents these results with cautious optimism. Blinding affirmation can be equally as superficial as marginalization. The author recommends that sport organizations decolonize antiquated, coercive sex segregation that contributes to gender-based oppression and that media focus on presenting accurate and inclusive representations of transness.

211 Defect Tolerance to Intolerance in Perovskite Semiconductors Cs₂SnI₆ and Cs₂TeI₆

ANNALISE MAUGHAN

DEPARTMENT: CHEMISTRY

Perovskite-based semiconductors offer an inexpensive alternative to current solar materials. Perovskites challenge conventional wisdom in that they exhibit excellent electrical performance despite the presence of crystalline defects. In the perovskite materials Cs₂Sn_{1-x}TeI₆ ($0 < x < 1$), Cs₂SnI₆ is electronically conductive, but substitution of tellurium (Te) for tin (Sn) yields an exponential decrease in conductivity. While Cs₂SnI₆ is tolerant to the presence of defects, Te substitution renders the materials defect intolerant, and therefore insulating. Understanding the origin of defect tolerance in these materials provides a framework from which to design defect-tolerant materials for solar energy applications.

212 Marital Conflict, Autonomic Nervous System Coordination, and Adolescent Externalizing Behavior

CHARLOTTE MCKERNAN

DEPARTMENT: HUMAN DEVELOPMENT AND FAMILY STUDIES

This study investigates whether coordination of the sympathetic (SNS) and parasympathetic (PNS) nervous systems (autonomic nervous sub-systems) moderates the link between marital conflict exposure and adolescent externalizing behavior. Adolescents ($n = 133$, 53% female, 10-17 years old) experienced a standardized stressor while skin conductance (SC; SNS activity) and respiratory sinus arrhythmia (RSA; PNS activity) were measured. Parents reported interparental conflict, were observed during a conflict discussion, and reported adolescent behaviors. Results indicate that SNS and PNS coordination may protect adolescents from experiencing externalizing behaviors in the context of marital conflict. Potential implications for short- and long-term health will be discussed.

213 Spills of Hydraulic Fracturing Chemicals on Agricultural Topsoil

MOLLY MCLAUGHLIN

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

In 2014, 838 oil and gas related spills were reported in Colorado. Spills frequently occur on agricultural land and can impact soil and water quality. This study aims to understand the fate and toxicity of hydraulic fracturing (HF) chemicals when released to the environment. Releases of HF fluid were simulated with batch studies conducted with an agricultural topsoil, three widely used HF chemicals and salt. Results illustrate the necessity of considering mixture interactions among HF fluid chemicals and will improve environmental and health impact assessments for both inadvertent and purposeful releases of oil and gas fluids, such as crop irrigation.

214 The M5.7 Prague, Oklahoma Aftershock Sequence Studied Using Subspace Detection

NICOLE MCMAHON

DEPARTMENT: GEOSCIENCES

The 6 November 2011 M5.7 earthquake near Prague, Oklahoma was the largest earthquake recorded in Oklahoma history at the time and one of the largest to possibly be induced by wastewater disposal. A M4.8 foreshock and the M5.7 mainshock triggered a prolific series of aftershocks. We utilize a methodology known as subspace detection to find and locate more than six times as many earthquakes as had been detected by traditional techniques, and down to magnitudes less than -2. The improved earthquake catalog allows for more detailed mapping of the subsurface and provides insights into the spatio-temporal evolution of the aftershock sequence.

215 Facial Biometrics as Noninvasive Predictors of Piglet Aggression

CATIE MCVEY

DEPARTMENT: ANIMAL SCIENCES

Ethics and economics demand that research trials utilize the smallest number of animals necessary to achieve conclusive and reproducible results, but individual variations in animal temperament are a source of experimental error poorly controlled with conventional behavioral tests. In this study, MatLab image analysis tools were used to noninvasively extract geometric measures of facial structure from 2D images of newborn piglets. These proxy measures proved highly predictive of aggressive behaviors observed in pair encounter tests at weaning. Monte Carlo simulations show that structured sampling schemes using facial biometrics would cut the false positive rate of pen aggression experiments in half.

216 Regulation of Trophoblast Differentiation by LIN28 and AR

ERIN MCWHORTER

DEPARTMENT: BIOMEDICAL SCIENCES

In humans, impaired trophoblast differentiation and invasion into the maternal spiral arteries is an underlying cause associated with placental disease. LIN28 is an RNA-binding protein necessary for maintaining pluripotency in stem cells. Our studies have shown that LIN28 is necessary for appropriate trophoblast cell differentiation. LIN28B can regulate androgen receptor (AR) signaling through its actions on let-7 miRNA in human prostate cancer. This is significant, as patients with placental disorders often have significantly increased circulating serum androgens and increased placental expression of AR. Therefore, it is possible that trophoblast differentiation involves a molecular interaction between LIN28 and...

217 Does Socially Responsible Investing Correlate to Increased Profits?

MALIA MICHEL

DEPARTMENT: HUMAN DIMENSIONS OF
NATURAL RESOURCES

I am analyzing the link between companies who utilize sustainable practices in their business and the positive influence that can have on earnings. Specifically, looking at Bloomberg's Environmental, Social, and Governance (ESG) scores and the companies earning announcements. I am trying to prove the significance of doing good for the planet will positively correlate to an increase in profits. The main question is: Can SRI generate positive societal and environmental results, and create a push towards sustainable development?

218 Unlocking the Potential of Crop Wild Relatives

CHRIS MILLER

DEPARTMENT: BIOLOGY

In order to meet the food demands of a growing population, plant breeders must produce higher yields of crops on lower quality land in harsher environments. Although GMOs are one means of crop improvement, breeding with wild crop relatives offers an excellent alternative. However, desirable traits may be locked away behind breeding barriers which prevent various wild species from mating with crop species. By examining the history and relatedness among populations of wild tomatoes, we can better understand the origins of breeding barriers preventing hybridization of wild species with cultivated tomatoes and eventually raise better tomatoes.

219 Do Sorghum Genotypes Vary in Response to Pre-Flowering Drought Stress?

ESBY MILLER

DEPARTMENT: BIOAGRICULTURAL SCIENCES
AND PEST MANAGEMENT

Above and belowground morphological and physiological traits were characterized for nine sorghum genotypes notable in sorghum molecular breeding under irrigated and pre-flowering drought conditions. Pre-flowering drought tolerance was characterized for each of the genotypes, and traits contributing towards their drought tolerances were assessed at various time points during drought and recovery. Genotypes utilized an array of physiological strategies to combat drought stress, including early reduction in photosynthesis during drought stress or increased photosynthesis during recovery. Morphological trait assessment of leaf area and root length also demonstrated that the ability to quickly recover may be key to pre-flowering drought tolerance.

220 Ebola: A Hot Topic

MEGAN MILLER

DEPARTMENT: MICROBIOLOGY, IMMUNOLOGY
AND PATHOLOGY

Filoviruses are strongly associated with several species of bats as their natural reservoirs. In this study, we determined the replication potential of all filovirus species: Marburg marburgvirus, Tai Forest eb-

olavirus, Reston ebolavirus, Sudan ebolavirus, Zaire ebolavirus, and Bundibugyo ebolavirus. Filovirus replication was supported by all cell lines derived from six old and new world bat species. In addition, we showed that Marburg virus Angola and Ebola virus Makona-WPGC07 efficiently replicated at 37°C, 37°41°C, or 41°C, contrary to the hypothesis that temporal elevation in temperature due to flight affects filovirus replication in bats.

221 Evolution of Drought Tolerance Explored Using Global Drought Frequency Map

GREY MONROE

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Droughts are among the leading causes of crop loss worldwide. Fortunately, by studying natural populations, we can understand the mechanisms by which natural selection has produced plants adapted to drought events. This yields insight into fundamental evolutionary processes and can be applied to improve stress tolerance in crops. Here, I demonstrate the application of a global map of drought frequency that I recently created using satellite collected data to study the evolution of drought tolerance in wild plants. This work increases our understanding of how drought tolerance evolves and identifies genes valuable for breeding improved drought stress tolerance in crops.

222 Mycobacterium Bovis Phenolic Glycolipid as a Biomarker of Bovine Tuberculosis

STEPHANIE MORPHET

DEPARTMENT: UNIVERSITY WIDE – CELL AND
MOLECULAR BIOLOGY

Current immune-based diagnostics for bovine tuberculosis lack species-specificity, as well as the sensitivity needed for diagnostic testing that truly impacts disease transmission. To address this fundamental gap in bovine tuberculosis disease control, we propose the use of a novel pathogen-derived biomarker-based diagnostic, wherein the presence of a species-specific *Mycobacterium bovis* phenolic glycolipid (PGL) excreted in urine is utilized to assess the infection status of an animal. To evaluate the potential of this lipid as a biomarker, we have designed an enrichment strategy and mass spectrometry methods to detect PGL of *M. bovis* in infected cattle urine.

223 How Many U.S. Citizens are at Risk for Heart Disease?

HALEY MOSS

DEPARTMENT: UNIVERSITY WIDE – COLORADO
SCHOOL OF PUBLIC HEALTH

Cardiovascular Disease (CVD) is the number one cause of death worldwide. This study assessed the 10-year atherosclerotic CVD (ASCVD) risk of the U.S. population aged 40-79 years using data from the 2013-2014 NHANES. Using the Pooled Cohort Equations provided by the ACC and AHA, we created risk scores for 961 individuals. Of that number, 20.52% are at a risk 10% for an ASCVD event in the next 10 years. Given the high percentage of our population at risk, preventative steps must be taken to fight against the elevated CVD risk of Americans.

224 Tunable Superomniphobic Surfaces for Sorting Droplets by Surface Tension: Applications

SANLI MOVAFAGHI

DEPARTMENT: MECHANICAL ENGINEERING

Manipulation of droplets on super-liquid-repellent surfaces has received a great deal of attention because droplets exhibit high mobility on these surfaces due to the ultra-low adhesion. In our prior work, we utilized tunable superomniphobic surfaces (i.e., surfaces that are extremely repellent to virtually all liquids) to develop a simple device with precisely tailored solid surface energy domains that, for the first time, can sort droplets by surface tension. In this work, we demonstrate the potential biological (e.g., detecting certain diseases) and environmental (e.g., detecting the level of purity of the fuel) applications for our inexpensive and energy-efficient device.

225 Role of the Organic Cation in Hybrid Organic-Inorganic Perovskite Photovoltaics

EVE MOZUR

DEPARTMENT: CHEMISTRY

Although methylammonium lead halide perovskite ($\text{CH}_3\text{NH}_3\text{PbX}_3$) semiconductors have been at the forefront of solar research for ten years, no consensus has been reached about why these materials conduct so efficiently. A prevalent hypothesis is the presence of an organic cation in an inorganic framework, atypical in semiconductors, enhances conductivity. My project focuses on incrementally replacing the organic molecule with an inorganic cation in the series $(\text{CH}_3\text{NH}_3)_{1-x}\text{Cs}_x\text{PbBr}_3$, where $0 < x < 1$. We can study the properties of these materials as a function of carbon content to determine what role the organic component plays in the conduction pathway, to understand these promising materials.

226 CdTe Photovoltaics for Sustainable Food, Energy and Water Solution

AMIT MUNSHI

DEPARTMENT: MECHANICAL ENGINEERING

By 2030 the world will need 30% more water, 50% more energy and 50% more food driven by global population growth at approximately 80 million people per year. In addition to the consequential future requirements, there are significant factors stressing current food, energy and water (FEW) systems. These including climate instability and changing socioeconomic environments among others. Addressing these challenges requires solutions that are globally applicable, are provided on a massive scale, and are environmentally and economically sustainable. CdTe based PV technology may be effectively used to address these challenges to achieve an improved standard of living across the world.

227 Exploring Pesticide Photolysis and Oxidation Using Real-time, Sensitive Mass Spectrometry

TREY MURSCHELL

DEPARTMENT: CHEMISTRY

Pesticides are used globally in agricultural and residential areas. Pesticides can volatilize from the intended targets and be transported long distances in the atmosphere, undergoing multiple atmospheric

processes including photolysis, oxidation, and gas-particle partitioning, however, these processes are not well understood. Pesticide solutions were volatilized into an Oxidative Flow Reactor, exposed to UV light, OH radicals, and ozone. Gas phase reaction products were detected using a High Resolution Time of Flight Iodide Chemical Ionization Mass Spectrometer. We also present mechanistic pathways for products of structurally similar pesticides as well as potential secondary organic aerosol formation for each pesticide investigated.

228 Correlation of EIT with Pulmonary Function Tests on Patients(CHC)

RASHMI MURTHY

DEPARTMENT: MATHEMATICS

Electrical Impedance Tomography (EIT) is a low cost, portable and radiation free imaging modality that can be used to create low spatial resolution images based on varying electrical properties of biological tissues. An important application of EIT is pulmonary imaging. To diagnose and assess obstructive and restrictive lung disease, physicians use a spirometry output index known as the FEV1/FVC ratio computed from EIT images created with D-bar algorithm post-processed using principal component analysis. Results from patient data at Children's Hospital of Colorado are presented.

229 Analyzing Fossils Using High-Resolution Scanning: Testing the Applicability of Replicas

MATTHEW MUTTART

DEPARTMENT: ANTHROPOLOGY

Analyzing trace marks on bone such as hominin butchery cut marks and mammalian carnivore tooth marks is critical for reconstructing behaviours and ecological contexts of the past. However, access to fossil specimens is limited due to logistical issues. This project utilizes moulding material to create replicas of fossil trace marks and tests their comparative accuracy against the original trace marks. Hyena tooth marked bone and replicas of the same marks were scanned with Colorado State University's Nanovea white-light 3-D confocal profilometer. Data displayed 9 out of 12 measurement metrics between scans of the bone and replicas were statistically indistinguishable.

230 The Lactobacillus Metabolome Contains Bioactive Metabolites That Vary Across Species

NORA JEAN NEALON

DEPARTMENT: VETERINARY MEDICINE AND BIOMEDICAL SCIENCES

Lactobacillus probiotics release bioactive molecules that have multiple therapeutic uses including antimicrobial, immunomodulatory and digestive functions. This study screened the metabolite profiles of supernatant from three metabolically-distinct Lactobacilli and identified metabolites with health-promoting properties. Bioactive metabolites included those unique to a species, as well as many that were differentially-expressed across species. Bacterial metabolomics is a growing area of research, and there is currently a lack of published data on bacterial metabolomes. Characterizing the Lactobacillus metabolome can increase our understanding of the metabolic capacity of these probiotics, and allow us to more effectively target Lactobacillus species to specific therapeutic uses.

231 Early Detection of Osteoarthritis Using Cationic Contrast-Enhanced Computed Tomography

BRAD NELSON

DEPARTMENT: CLINICAL SCIENCES

Osteoarthritis is a debilitating and costly disease. Due to its progressive nature and the limited ability for cartilage to heal, the early detection of osteoarthritis is crucial to a successful outcome. However, current imaging methods are incapable of early detection. Using an equine model of cartilage injury, we have investigated and validated a new cationic contrast-enhanced computed tomography (CCECT) imaging method. The CCECT method accurately predicts the biochemical and mechanical properties of damaged cartilage reminiscent of early osteoarthritis, providing microscopic information through this imaging technique. This method will stimulate the development of new therapeutic strategies to combat this devastating disease.

232 Multi-Criteria Decision Analysis of Optimal Rehabilitation Techniques

SAEED NOZHATI

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

In this study a framework for the prioritization of different retrofitting techniques is proposed. This framework incorporates the demands of both structural engineers and stakeholders using multi-criteria decision analysis. To this end, a structure is retrofitted by various techniques. The structural researchers have focused on the structural performance of each technique. However, it does not satisfy all of the stakeholders' requirements. Other factors, such as the cost of each retrofitting method, downtime and aesthetics are considered in order to define the retrofit strategy able to maximize satisfactions. This framework can be generalized for use in existing structures and future structures.

233 External Motivation May Hinder Weight Loss in Overweight Young Adults

KAYLA NUSS

DEPARTMENT: HEALTH AND EXERCISE SCIENCE

This paper examines the association between the pursuit of weight loss, and internal versus external motivation to lose weight and body mass index among a nationally representative sample 19-year-olds. The data were from wave 4 of the NEXT Generation Study. Included participants were those who reported taking action to lose weight (N = 626). The findings indicate a positive association between weight loss pursuit and external motivation for overweight young adults, but not internal motivation. One explanation for this finding is that externally motivated young adults may be less successful in losing weight; therefore, they may have remained overweight.

234 Natural Gas Conditioning With Membrane Separation Technology

TROY NYGREN

DEPARTMENT: MECHANICAL ENGINEERING

Shale gas from remote wells can experience high concentrations of heavy hydrocarbons such as heptane, hexane, pentane, and butane,

which lowers performance when used as a fuel in reciprocating compressor engines. Using a hydrocarbon permeable polymer membrane natural gas is separated to increase the methane number of the fuel. This allows a skid mounted compressor engine to operate on low quality well gas with less load derate. The membrane module separates feed gas into two streams. One containing higher levels of heavy hydrocarbons which is discarded, and the other containing a higher mol% methane, which is used in the engine.

235 Dissociation as a Mediator Between Childhood Trauma and Psychological Disorders

MATT OBERDORFER

DEPARTMENT: PSYCHOLOGY

The purpose of this research was to examine the link between childhood trauma and dissociation and the link between dissociation and the development of psychological disorders. I selected a wide variety of disorders to examine in order to demonstrate the point that it is likely that dissociation mediates the relationship between childhood trauma and many disorders. From this research, it was possible to draw several conclusions. First, dissociation is an important mediator between childhood trauma and the development of a variety of psychological disorders. Second, dissociation also affects the severity, duration, and treatment efficacy of a range of psychological disorders.

236 10-Year Risk Prediction of Atherosclerotic Cardiovascular Disease in Colorado Firefighters

LIZ OCHOA

DEPARTMENT: UNIVERSITY WIDE – COLORADO SCHOOL OF PUBLIC HEALTH

Research has found that cardiovascular disease (CVD) is the leading cause of mortality in on-duty firefighters. The purpose of this study was to estimate the prevalence of cardiac health and 10-year risk of ASCVD in Colorado male and female firefighters using Pooled Cohort risk equations. Our results indicate that about one in five of the sampled Colorado firefighters have predicted ASCVD risk of 5% and 8% have risk of 10%. The high percentage of predicted ASCVD risk suggests that primary and secondary prevention should be emphasized among firefighters with high risk of ASCVD.

237 Visual Rhetoric in Technical Communication: Exploring Student Comprehension and Retention

PAIGE ODEGARD

DEPARTMENT: JOURNALISM AND MEDIA COMMUNICATION

In order to prepare students for the ever-increasing competitive industry, technical communication is paramount in higher education. Moreover, visual rhetoric is an essential facet of comprehension; however, through empirical research, we have discovered that many technical communication textbooks for engineers and scientists lack visual cues in comparison to survey communication textbooks. We plan to explore the impact that visual rhetoric has on engineering and science students, specifically, if visual cues fortify student retention.

238 Tropospheric Water and Cloud ICE (TWICE) 6U-Class Satellite: Back-End Design

MEHMET OGUT

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

The Tropospheric Water and Cloud ICE (TWICE) instrument is a wide-band millimeter- and sub-millimeter wave radiometer measuring at 15 frequencies from 118 GHz to 670 GHz. The TWICE instrument is designed to provide measurements of upper tropospheric water vapor and ice particle size distribution in clouds on a global basis at a variety of local times. A low power consumption back-end board has been designed to perform analog-to-digital conversion of 16 radiometric signals. A reliable and robust hybrid power regulation and distribution system has been designed using linear and switching regulation circuits, as appropriate to maximize power efficiency.

239 Survey Estimators of Ordered Domain Means

CRISTIAN OLIVA AVILES

DEPARTMENT: STATISTICS

Estimates of population characteristics such as domain means are often expected to follow qualitative assumptions. Domain estimation can be considerably improved when the correct shape restrictions are considered along with the sampling design of surveys. However, assuming incorrect restrictions could lead to biased estimators. We develop diagnostic methods that measure departures from the shape assumptions.

240 Predicting Adjustment to College: The Role of Protective Factors

NICOLE OLIVAS

DEPARTMENT: PSYCHOLOGY

The present study evaluated the adjustment process to the stress inherent in the first semester transition to college and assessed the protective factors that serve to enhance one's likelihood of successful adaptation (i.e., resilience) to the college environment. In addition, the present study aimed to further understand whether a difference exists in the prevalence of certain protective factors between men and women in successful college adjustment.

241 The Effect of Body Positive Images on Body Appreciation

HAILEY OTIS

DEPARTMENT: COMMUNICATION STUDIES

This study used a pre- and post-test experimental design to observe whether or not body positive images have an effect on college-age women's (N = 28) level of Body Appreciation. Research has established the harmful effects of thin-ideal imagery as well as the more positive effects that images of healthy weight to overweight models have on body image. However, not much attention has been paid to the possibilities

of body positive imagery or other images that might promote positive body image. Though there were no significant results for the main research question, many other interesting correlational relationships emerged and are discussed.

242 Electronic Study of Fe(II) Podands With Insights Into Spin Switching

TARIK OZUMERZIFON

DEPARTMENT: CHEMISTRY

Spin state switching can offer a facile means of analyte detection. Fe(II) systems are of high interest given the vast difference in physical properties between the low and high spin states. While we have demonstrated that a chemical reaction (e.g., desilylation) can be performed on the ligand scaffold of an Fe(II) podand while maintaining its structural integrity, weakening the ligand field enough to achieve a spin state switch has remained a challenge. A thorough electronic analysis of substitution in the 5-position of our iminopyridines has indicated that weakening the ligand field could be accomplished through successive S-oxidation.

243 Understanding Nitrogen Adsorption to Aid in Greenhouse-Gas Reduction

ARNOLD PAECKLAR

DEPARTMENT: CHEMISTRY

Nitrogen adsorption in porous materials plays an important role in heterogeneous catalysis as well as the removal of greenhouse gases in industrial processes. To improve the efficiency of these applications, understanding of the fundamental procedures of gas adsorption is necessary. A steady-state transient kinetic analysis (SSITKA) instrument was implemented at a neutron beamline at the Spallation Neutron Source. This enables neutron total-scattering experiments to provide information on the chemical structure of adsorbed nitrogen molecules in zeolite X at room temperature with kinetic information. The cross-correlation can uncover currently inaccessible information about the adsorption process.

244 Behavioral Intervention as an Adjunct Therapy for Symptom Reduction

LARA PANTLIN

DEPARTMENT: PSYCHOLOGY

Time perception extends beyond day to day functioning and is thought to be associated with thinking and accurately interpreting stimuli in the environment. Thus one underlying difference between some clinical populations, like those with schizophrenia and neurotypical individuals may lie in the ability to accurately perceive time. If MMN amplitudes increase after the behavioral intervention, this may be related to changes in the underlying neural substrates that maintain roles in time perception. If behavioral interventions can produce electrophysiological effects, then perhaps these interventions can be applied as supplementary therapies to reduce symptoms of disorders with temporal disturbances.

245 The Role of mRNA Dynamics in C. Elegans Embryogenesis

DYLAN PARKER

DEPARTMENT: 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.

246 Influences of Edge Settlements on Lions in the Masai Mara

JENNA PARKER

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Throughout sub-Saharan Africa, it is believed that conflict with humans along the edges of protected areas represents the greatest threat to large, wide-ranging carnivores that use those areas. We investigated whether this may be the primary cause of the drastic decline of African lions in the Masai Mara National Reserve. In 2011, we identified lions in two areas of the Reserve, one undisturbed and the other flanked by settlements. We then resampled the areas in 2012, at which time we resighted some of the same lions in the undisturbed area, but did not resight any in the disturbed area.

247 Marijuana: Legalization and Individual Factors Relation to Use

JAMIE PARNES

DEPARTMENT: PSYCHOLOGY

In 2014, recreational marijuana became legal in Colorado. There are potential health risks related to marijuana dependence, particularly in adolescent users. Sensation seeking facets, risk seeking and experience seeking, influence marijuana use. Marijuana use among bisexuals is higher than use among other sexual orientations. Several hypotheses were made. First, marijuana use would increase in students after legalization. Next, risk and experience seeking would uniquely moderate use. Third, sexual orientation would have a quadratic relation with use. Finally, non-residents marijuana use was examined. Results indicated legalization, experience and risk seeking, sexual orientation, and resident status all related to marijuana use.

248 First Generation College Students: Predicting GPA and Retention

MOLLY PARSONS

DEPARTMENT: PSYCHOLOGY

This study sought to better understand what factors predict academic success and retention. Specifically, this study investigated the impact

of demographic variables, prior academic preparation, and psychosocial factors on cumulative first year GPA and retention in first generation students and continuing generation students. High school GPA most strongly predicted college GPA for all students. Grit, adjustment, gender, college major, and ethnicity were also significantly related to GPA. Retention was predicted by financial concern, institutional commitment, Pell eligibility and high school GPA. Differences between first generation and continuing generation students as well as implications for higher education are discussed.

249 Convective Aggregation in Simulations of the Tropical Atmosphere

CASEY PATRIZIO

DEPARTMENT: ATMOSPHERIC SCIENCE

The sensitivity of convective aggregation to domain size is investigated in idealized simulations of the tropical atmosphere. Simulations were performed with square domains of widths 768 km, 1536 km, and 3072 km. All simulations evolve to a single statistically steady convective cluster surrounded by a broader region of dry, subsiding air. Results suggest that the equilibrium state has a nonlinear dependence on domain size. Furthermore, the state of the atmosphere in the largest domain simulation seems to be most consistent with results from previous studies of tropical convection.

250 Early Detection of Diseases in Dairy Cattle Using Monitoring Devices

SUSHIL PAUDYAL

DEPARTMENT: ANIMAL SCIENCES

Diseases in dairy cattle can be detected using monitoring devices in the early stage before farmers are able to identify them. Milk components and disease state of 198 cows were studied for 60 days. Indices were used to compare with the previous observation in the same cow or compared with the pen mates and the alarms were created whenever deviation was greater than the cutoff. Sensitivity and specificity calculations suggested that both fat to protein ratio and fat to lactose ratio can be used as predictors of disease conditions and are effective in predicting different diseases at different strengths.

251 Development of a Polymer Scaffold for Ligament Replacement

HANNAH PAULY

DEPARTMENT: SCHOOL OF BIOMEDICAL
ENGINEERING

The field of tissue engineering strives to create scaffolds which, in combination with cells and signaling molecules, can replace damaged biological tissue while guiding the body to generate new tissue. Ligaments are orthopedic tissues which connect bones and guide movement. Tears of ligaments are a common occurrence and can have painful consequences. The ability to replace a damaged ligament with a tissue engineered construct could revolutionize the field of orthopedic surgery and relieve the suffering of a large group of individuals.

252 Solving Radiographic Controversies at Thoroughbred Horse Sales

FRANCES PEAT

DEPARTMENT: CLINICAL SCIENCES

This study investigates Sesamoiditis, Insertional Suspensory Desmopathy, and Medial Femoral Condyle Lucencies in young thoroughbreds, by combining radiographic and ultrasonographic information at the time of sale with follow-up data. Researchers will define what is an acceptable level of radiographic change within the normal population of sales horses. Researchers will also determine what degree of radiographic change carries an increased risk of clinical disease or a detrimental effect on future racing performance. Knowledge gained from this research will boost industry-wide confidence in bloodstock sales and in the veterinarian's role in the management and care of the thoroughbred horse.

253 pH Dependent Membrane Uptake of a Common Weak Acid Preservative

BEN PETERS

DEPARTMENT: CHEMISTRY

Weak acid preservatives are commonly used to prevent the growth of microorganisms within acidic foods. It is well understood that the acidity of food is important for uptake of this type of preservative into cells, but this does not bring into account the differences in structure for different preservatives. Many preservatives are small and hydrophilic, but benzoic acid has a bulky hydrophobic group that likely anchor the less effective anion to a cells membrane. Here we explore the interactions of benzoic acid and benzoate with model membranes to determine why benzoate does not affect cells as well as benzoic acid.

254 Holding Tension Between Shame and Pride: Fat Identity Theory

KODI PHELPS

DEPARTMENT: SCHOOL OF EDUCATION

While much scientific literature focuses on the ideas of stigma, health effects, and societal beauty standards, there is little research that attempts to develop a social identity model for those who identify as bigger bodied. As body positive movements continue to gain momentum and the conversation becomes more mainstream, it is time for this gap in academia to be remedied. This paper uses disability theory, sexual identity theory, and queer theory to create a fat identity theory while synthesizing information from existing literature on how fatphobic culture contributes to this identity development.

255 Psychiatric Dispositions and Perceptions in Heavy Metal Communities

EVAN POLZER

DEPARTMENT: ANTHROPOLOGY

While public perceptions of mental illness have shifted recently, stigma and prejudice still exist and present issues in providing care for those most in need. Depression, anxiety, and antisocial behaviors are

suspected within metal music subcultures and an examination of cultural perceptions of psychiatric options is vital in understanding their appropriateness and utility in this context. Through various anthropologic efforts, results have shown a negative perception of both psychotherapy and psychopharmaceuticals within metal music subcultures. Psychiatric efforts in the future call for more personalized, non-medical solutions for individuals suffering from various mental ailments, necessitating more individualized and appropriate care.

256 Codesign Optimization of Compiler and Hardware Parameters for Energy Savings

NIRMAL PRAJAPATI

DEPARTMENT: COMPUTER SCIENCE

The topic of this research is motivated by the amount of energy consumed by machines. Energy consumption has increased to a point where all countries are looking for alternate energy sources. One of the ways to save energy would be to bring down the energy consumed by machines. This research proposes a model that facilitates the design and analysis of architectures. Given an area budget, we model hardware and compiler behavior. The model proposes solutions that save application processing time in turn saving energy.

257 Low Cost Lock-In-Amplifier for Optical Imaging Purpose

SWARNA PRAMANIK

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

A lock-in amplifier is an essential piece of equipment in any optics lab. These enable advanced microscopy techniques like pump-probe, photothermal, fluorescence lifetime. Laser-Scanning Microscopy Imaging experiment involves conversion of the current signal from the Photo-Multiplier Tube (PMT) into voltage signal using expensive high end Lock-In-Amplifier (Stanford Research System Amplifier). High cost (> \$5000) prohibits use in teaching labs. The inline architecture of the Lock-In-Amplifier is migrated to an FPGA (Field Programmable Gate Array) board possessing the same functionality as before but reducing the cost by a factor of 10 to 50.

258 The Predictive Ability of Emotion Dysregulation on Risky Sexual Behavior

RYAN RAHM-KNIGGE

DEPARTMENT: PSYCHOLOGY

Researchers have theorized a predictive relationship between negative affect and risky sexual behavior despite limited empirical support for this relationship (Crepaz and Marks, 2001). Participants in the current study were 3,145 undergraduate students ages 18 to 40. Structural equation modeling was used to examine the predictive ability of emotion dysregulation, measured by the Difficulties with Emotion Regulation Scale, on risky sex, measured by a number of sexual behaviors over the past 12 months. Our findings demonstrate that emotion dysregulation predicts risky sex, contributing to the limited exploration of emotion dysregulation and risky sexual behavior.

259 Can Biochar Soil Amendments Improve Agricultural Water Use Efficiency?

MATT RAMLOW

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Increased drought frequency, changing precipitation patterns, and growing municipal demand for water in the arid western U.S. requires more efficient agricultural water management. Biochar soil amendments are one technology proven to improve water retention in soils but no studies have modeled biochar's impact on the hydrologic water balance of agricultural systems. We monitored the effects of biochar on soil moisture levels in a maize field trial with three different irrigation regimes. This field data was used to parameterize the HYDRUS 1D soil water model for biochar amendments and examine the soil hydrologic budget across the field treatments and alternative simulations.

260 Inter-Individual Variation in Nutritional Requirement Influences Food Sharing and Sociality

ABBIE READE

DEPARTMENT: BIOLOGY

Obtaining adequate nutrition is a fundamental contributor to fitness in all animals. In a social group, individuals differing in their own nutritional needs may contribute unequally to the nutritional resources acquired by the group, thereby setting up a potential conflict between individual and group level fitness. Using the honeybee colony as a model, we investigated this question by measuring the energetic requirement of different individuals and the amount of food they share with the colony. Our results elucidate the role of nutritional constraints in group living and how these may have contributed to the evolution of eusocial behavior.

261 Maternal Birthing Position: Does Western Medicine Have It Wrong?

JULIA REEDY

DEPARTMENT: ANTHROPOLOGY

In the United States and the Westernized world, the practice of childbirth has been medicalized and standardized as a means of facilitating birthing practices in hospitals. Horizontal birthing positions are the most commonly utilized in hospitals globally; however, these may not be the most beneficial birthing positions. Through this research, I argue the physiological benefits of an upright birthing position (standing, sitting, squatting, or kneeling). These benefits are shown through an analysis of the skeletal structure and evolution of the human pelvis as well as comparisons of birthing positions between non-human primates and small scale societies with western culture.

262 Environmental Barriers Impact on Healthy Choices in the Low-Income Population

LAUREN RHOADES

DEPARTMENT: FOOD SCIENCE AND HUMAN NUTRITION

Many programs target knowledge and behavioral skills to encourage low-income individuals to make healthier dietary and physical activi-

ty choices, but few address environmental barriers such as the lack of available healthy foods or transportation options. The Expanded Food and Nutrition Education Program (EFNEP) leaders in Colorado and Washington started a project to address these barriers by adding environmental change activities to existing curricula. The first step was conducting 10 telephone focus groups with 50 EFNEP educators in 10 different states. These focus groups provided valuable anecdotal evidence on existing barriers and ideas for solutions to address those barriers.

263 Impacts of ADHD on Students' Growth Mindset and Educational Longevity

EMILY RICE

DEPARTMENT: ENGLISH

An apparent increase in attention deficit hyperactivity disorder, as well as an increase in the implementation of growth mindset in schools has brought forth the importance of identifying, promoting, and creating a positive and proactive classroom environment for students regardless of learning disorders. This study seeks to answer two questions; 1) what are the effects and outcomes of the diagnosis and disorder of an adolescent's growth mindset, educational longevity, and learned life-skills? And 2) how are teachers, parents, and students collaborating to assist in the student's future beyond high school graduation?

264 A Non-Native Tree Impacts Riparian Food Web Dynamics

HANNAH RIEDL

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

Non-native species invasions are a leading threat to biodiversity and ecosystem function loss globally, and this is especially true for riparian ecosystems. Non-native plants have the potential to alter riparian food webs by influencing the flux of biomass across the aquatic interface. We evaluated the impacts of an introduced shrub, *Robinia neomexicana*, on insect communities in the Piceance basin of northwest Colorado. Initial results suggest reduced abundances of terrestrial insects and reduced leaf litter decomposition rates in invaded stream reaches. Upcoming work with stable isotope analyses of fecal samples will determine if this plant is altering insectivorous avian diets.

265 Characterization of Cyclic-Nucleotide Phosphodiesterases Expressed in Decapod Crustacean Molting Gland

NADA RIFAI

DEPARTMENT: BIOLOGY

Cyclic nucleotide signaling intermediates the suppression of the crustacean molting gland (Y-organ or YO) by molt-inhibiting hormone (MIH). Phosphodiesterases (PDEs) hydrolyze the phosphodiester bond in cAMP and cGMP to AMP and GMP, respectively, thus modulate the YO response to be insensitive to MIH. Contigs encoding nine PDEs (1, 2, 3, 4, 5, 7, 8, 9, and 11) were identified in the *Gecarcinus lateralis* YO transcriptome. RNA-Seq data using eXpress showed that PDEs are regulated posttranscriptionally. Various PDE inhibitors were used to characterize the PDEs regulating ecdysteroid secretion in the *Carcinus maenas* YO. PDE1 and PDE5/11 are the candidates for cyclic nucleotide regulation.

266 Designing OPV and OLED Electron Acceptors for a Brighter Future

KERRY RIPPY

DEPARTMENT: CHEMISTRY

In the search for clean, renewable energy technologies, development of organic semiconductors is an exciting topic. Commercialization of devices like organic photovoltaics (OPVs) and organic LED (OLED) displays could not only provide alternatives to inorganic devices, but open up a host of new applications. For example, these devices could be made into windows, or integrated into fabrics. Unlike traditional semiconductors, organic semiconductors rely on molecular electron acceptors and donors, which facilitate charge separation and conduction. However, low stability and low charge mobility plagues electron acceptor materials. Therefore, this research focuses on designing, synthesizing and testing new electron acceptors.

267 One Health Approach for Global Surveillance of Antimicrobial Resistant Bacteria

ADRIANA ROMERO

DEPARTMENT: UNIVERSITY WIDE – COLORADO SCHOOL OF PUBLIC HEALTH

An interdisciplinary team's research strategy stems from ongoing collaborations between Colorado State University, the University of North Carolina and the University of Nicaragua-Leon to study Antimicrobial Resistance (AMR). Similarities across sites have wide reaching implications and validation of current methods. In Colorado, analysis of Extended Spectrum Beta-Lactamase (ESBL) showed a 2.58% positive detection of total bacteria in influent compared to 0.03% positive detection in effluent. Additionally, these same environmental samples revealed 3.01% and 0.584% *Klebsiella pneumoniae* Carbapenemase (KPC). By comparison, in North Carolina the levels for ESBL were 13.90% and 2.6% and for KPC 2.50% and 1.7% respectively.

268 Dryland Cropping Intensification Affects Soil Carbon and Annualized Grain Yield

STEVE ROSENZWEIG

DEPARTMENT: SOIL AND CROP SCIENCES

Cropping system intensification has the potential to increase food production and soil carbon (C), which are key metrics of profitability and soil health. I evaluated soil C and 6-year yield histories from 52 dryland no-till fields representing each level of cropping intensity across the evapotranspiration (ET) gradient from southeastern Colorado to northwestern Nebraska. Annualized grain yield increased with cropping intensity regardless of ET or soil texture. Soil C increased with cropping system intensification, but the effect was dependent on ET zone and texture. This suggests cropping system intensification is a robust practice for enhancing annualized grain yield and soil C.

269 Engineering "X-Zipper"

RHEA KAY ROWE

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

Biological systems utilize non-covalent interactions as a means to maintain their higher order structure. Hydrogen bonds (H-bonds) are

noted as one of the most important non-covalent interactions defining 3D conformations of macromolecules. However, it has recently been established that, halogen bonds (X-bonds) are comparable in nature to H-bonds. In this study, X-bonds will be introduced into a model coiled-coil protein system to create a novel X-Zipper, in which X-bonds will be the defining interaction assembling the heteromeric coiled-coil. This study will show the usefulness of X-bonds oligomerizing higher order structures, and aiding more specific binding modes.

270 Barriers and Strategies for Disaster Risk Reduction in Earthquake-Prone Cities

STACIA RYDER

DEPARTMENT: SOCIOLOGY

This poster provides an overview of (1) barriers to disaster risk reduction (DRR) and (2) strategies for reducing disaster risk in 11 earthquake-prone cities including Antakya and Istanbul, Turkey; Bandung and Padang, Indonesia; Chinha and Lima, Peru; Christchurch, New Zealand; Delhi and Guwahati, India; San Francisco, USA; and Thimphu, Bhutan. The goal is to provide information about the different barriers to implementing DRR and to describe the tools and resources that practitioners and organizations in these 11 cities have access to. The poster offers practical advice to help guide the development of risk reduction tools for use in earthquake-prone cities worldwide.

271 Gaming the Classroom: Gamification Techniques and Student Performance

DIANA SANCHEZ

DEPARTMENT: PSYCHOLOGY

Gamification is gaining attention across industries, which has led to a call for research regarding the contexts where gamification has a meaningful impact. This study provides empirical evidence for the impact of gamification in the classroom. Gamification was applied to an in-class quiz where gamified quizzes were compared to traditional quizzes. Results showed that gamification has a meaningful initial impact on learning and other potential long lasting moderating benefits such as enhancing the positive impact of the testing effect but only after a period of time.

272 Aerobic Post-Processing of Digestate from a Multi-Stage Anaerobic Digester

JULIE SANDEFUR

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

By combining anaerobic digestion and composting methods, two valuable by-products are generated, methane and fertilizer, by a process able to handle high solids material. A laboratory-scale study was conducted to simulate aerobic curing of high solids cow manure in a trickle flow leachate bed reactor after anaerobic digestion from a multi-stage anaerobic digester. Analysis of the leachate and solid material were performed after each phase: anaerobic, aerobic, and curing. Both the total and volatile solids reduction was significant and the quality of the matured compost met or exceeded required specifications.

273 Exercise Expectations and Physical Activity in Pre-Type II Diabetics

ASHLEY SANDERS

DEPARTMENT: HEALTH AND EXERCISE SCIENCE

Purpose: Examine associations between physical activity (PA) and exercise expectations (EE) in pre-type 2 diabetics (PT2D). Methods: Participants (M age = 60, 86.7% female) self-reported EE and PA. Independent t-tests and Pearson's chi-square analyzed differences in EE between participants with low versus high PA levels. Results: No differences between high and low PA participants for positive [$t(18) = .68, p = .51$] or negative EE [$t(18) = -.03, p = .98$]. Low PA participants were more likely to report that Exercise will cost too much money [$X^2(2) = 6.7, p = .035$]. Future Direction: In low active individuals, cost should be addressed as a potential barrier to exercise.

274 Evaluation of Behavior Change Components of Denver's Weatherization Assistance Program

PERLA SANDOVAL

DEPARTMENT: PSYCHOLOGY

The project, a collaboration with Energy Resource Center (ERC) of Denver and the Governor's Colorado Energy Office, applies social psychology theory to pinpoint effective behavior change strategies for energy use reduction. This project will evaluate the behavior change elements of the Weatherization Assistance Program (WAP) offered through ERC. This is a precursor to increasing the behavioral components offered already, specifically, customer engagement and promotion of energy saving behavior. This evaluation has five phases: 1) review of written materials, 2) interviews with staff, 3) analysis of energy data, 4) surveys mailed to ERC clients and 5) in-home interviews with ERC clients.

275 Adverse Childhood Experiences, Maternal Stress, and Emotional Availability

HANNAH SAUNDERS

DEPARTMENT: HUMAN DEVELOPMENT AND FAMILY STUDIES

American Indian-Alaska Native families and challenges are at a heightened risk for childhood trauma and chronic stress relative to their non-Native peers. This study examined interrelations among caregivers' adverse childhood experiences (ACEs), caregivers' concurrent stress and mental health, the emotional quality of caregiver-child relationships, and child social-emotional functioning. Results supported the possibility of intergenerational effects of childhood trauma, highlighting the importance of addressing adverse childhood experiences in both research and clinical settings.

276 Cropping System Effects on Wind Erosion Potential

CASSANDRA SCHNARR

DEPARTMENT: SOIL AND CROP SCIENCES

Wind erosion of soil is a destructive process impacting crop productivity and human health and safety. The effects that cropping system intensity has upon erodibility have not been well studied. We collect-

ed soil samples from a cropping systems experiment maintained since 1985 at three locations across eastern Colorado. We measured the long-term effects of three dryland no-till crop rotation systems of differing intensities on soil carbon and soil aggregate strength. While the choice of increased cropping system intensity has many benefits to producers, it may not improve soil properties sufficiently to improve resistance to wind erodibility.

277 Teaching Native America: Developing a Local History Education Trunk

ARIEL SCHNEE

DEPARTMENT: HISTORY

Native American history is often overlooked in small local history museums in the West. The Little Thompson Valley Pioneer Museum recognized this issue in their tours and developed a unit in a box consisting of three lesson plans. The educational trunk fills a gap in the historical narrative while meeting Colorado state academic standards and applying current educational theory. The trunk uses interactive activities and artifacts to challenge young elementary students (2nd to 3rd grade) to think in sophisticated ways about Colorado's indigenous people from prehistory to Western settlement.

278 Parent Behavior and Executive Function in Children With Down Syndrome

EMILY SCHWORER

DEPARTMENT: HUMAN DEVELOPMENT AND FAMILY STUDIES

Associations between parenting behaviors and child executive function (EF) performance have been reported previously in typically developing (TD) children (Hammond et al., 2012). The current study focuses on this relation between parenting and EF in Down syndrome (DS). This relationship is of particular interest because EF is an area of challenge for individuals with DS (Daunhauer and Fidler, 2011). The current study examines parent behaviors during a challenging problem-solving task in DS and TD dyads and their association with everyday EF skills in the child. Results indicate a relationship between parent teaching behaviors during the problem-solving task and EF skills.

279 The Influence of Art on Communicating Science and Technology

STEPHANIE SCOTT

DEPARTMENT: JOURNALISM AND MEDIA COMMUNICATION

This project examines whether art can help audiences understand complex health technologies and complicated health issues. Visual representations in media have the ability to transport a viewer through an abstract narrative; through the use of neuro-imaging, this project analyzes whether an abstract representation of interactions conducted while utilizing these communication systems, can serve as an effective tool for creating influence among various audiences. This work measures the impact of an aesthetic and whether exhibits can be meaningful towards influencing attitudes, awareness, and reducing overall stigma and anxiety towards (BCI) technologies, and the complicated neurological conditions users of these systems face.

280 Wearable Guidance System for Visually Impaired

KARTHIK SELVAM

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

The most difficult task that visually challenged face is finding the obstacles in their path. Though they use white cane, it makes them stand out in a crowd in a negative way. Any approaching dangerous obstacles cannot be felt with the limited cane. There arises a need for guidance system that does not look odd and is handy. The scope of the project is to provide guidance to the visually challenged by means of obstacle detection. This eliminates the usage of canes. The wearable acts as a guidance system to the visually challenged.

281 Detecting Self-Regulated Learning Behaviors in Calculus I

BEN SENCINDIVER

DEPARTMENT: MATHEMATICS

Calculus is a gateway STEM course, which commonly contributes to the loss of students in the STEM pipeline. The persistence of this problem is partially supported by the inability to identify (predict) students who will struggle so that appropriate intervention can occur. Learning behaviors (in person and online) play a key role in identification. This project marries learning analytics, self-regulated learning (SRL), and prerequisite content in attempts to identify at-risk students in Calculus I. I will discuss digital objects designed to capture meaningful and actionable data around learning. Results will relate student learning behaviors to SRL and academic performance.

282 Cinnamon Teal Breeding and Population Ecology

CASEY SETASH

DEPARTMENT: FISH, WILDLIFE, AND CONSERVATION BIOLOGY

Cinnamon teal (*Anas cyanoptera*) are an iconic species of the west and breed in higher densities in Colorado than nearly any other state. We are in the process of investigating how environmental and temporal factors affect nest success of cinnamon teal on Monte Vista National Wildlife Refuge. In 2015 and 2016, we found 40 and 39 cinnamon teal nests with nest success rates of 8.5% and 17.2%, respectively. These results have implications for habitat management and flooding regimes on National Wildlife Refuges. This research project is ongoing and more nests will be monitored over the 2017 breeding season.

283 “countyweather”: An R Package for Creating Weather Time Series Datasets

RACHEL SEVERSON

DEPARTMENT: ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

While it is possible to pull weather data from individual weather stations in R, aggregating this data on a larger spatial level can be a challenging and tedious process. Here, we created an R package called countyweather to access and aggregate NOAA weather data into time

series datasets at the U.S. county level. This package can be used to produce daily or hourly time series datasets for user-specified sets of counties, variables, and dates. This functionality should be particularly useful in the context of environmental epidemiology impact studies, in which outcome measures are often spatially aggregated on the county level.

284 TitaniQ on CREC Mylonites: Implications for Laramide Extension in Arizona

NIKKI SEYMOUR

DEPARTMENT: GEOSCIENCES

TitaniQ analyses on 14 samples were used to determine the temperature of mylonitization in metamorphic core complexes of the Colorado River Extensional Corridor (CREC). High [Ti] values (~6-13.5 ppm), recorded in Late Cretaceous leucogranites from the structurally lower parts of the mylonitic footwall, correspond to ~410-590°C and indicate deformation occurred under upper greenschist to amphibolite-facies conditions. Samples near the detachment fault yielded dispersed [Ti] (0.5-7 ppm; ~300-450°C). Existing 40Ar/39Ar ages indicate the mylonitic footwall cooled to 325-500°C in the latest Cretaceous to Eocene, pointing to two pulses of CREC extension initial amphibolite-facies Laramide extension and later greenschist-facies Miocene extension.

285 A Chinese Mining Community and Its Future

YAN SHAN

DEPARTMENT: SOCIOLOGY

Resource depletion is a complex problem for natural resource-based communities since it intertwines with several aspects such as social, economic, and environmental issues. Adopting multiple methods to collect both quantitative and qualitative data, the research will mainly explore three questions: 1) the historical meaning of mining communities for social stratification; 2) the current transformation difficulties of the mining communities; 3) the company responsibility for the mining community. The results are hoped to enrich the theoretical and social understanding of the mining community, disclose the specific mechanism of transformation for the community, and discuss the responsibilities for community sustainable development.

286 Investigating a Novel Regulator of Stress Granules in Yeast

JENIFER SHATTUCK

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

Eukaryotic cells respond to cellular stresses by inhibiting important cellular processes, resulting in the accumulation of RNA-protein assemblies, termed stress granules, in the cytoplasm of cells. One outstanding question in the field is how cells regulate the assembly and disassembly of these granules. Importantly, defects in regulation may lead to the pathological inclusions that have been associated with several neurodegenerative diseases and some cancers. Here we provide preliminary evidence of a novel regulator involved in the disassembly of these granules.

287 CFD Simulation of Cyanobacteria Light Histories in Bench-Scale Raceway Ponds

CHEN SHEN

DEPARTMENT: CHEMICAL AND BIOLOGICAL ENGINEERING

Nowadays, raceway ponds are the most convenient way to cultivate microalgae. Simulating the fluid motion and understanding the instantaneous light history of microalgae in raceway pond are essential to engineer microorganisms that will thrive and produce high yields in commercial scale systems at reduced cost. Here, a three-dimensional, multiphase CFD simulation has been carried out coupled with DPM model and LES to study the hydrodynamic characteristics of the raceway pond, the behavior of microalgae motion in different regions, and the light intensity history of microalgae, which can be used to scale up/down the raceway pond system.

288 Synaptotagmin 2 Mutation Results in a Presynaptic Congenital Myasthenic Syndrome

MALLORY SHIELDS

DEPARTMENT: BIOMEDICAL SCIENCES

During chemical transmission, the function of synaptic proteins must be coordinated to efficiently release neurotransmitter. Defects can have devastating impacts on neuronal communication, leading to disease. Synaptotagmin, the Ca^{2+} sensor for fast, synchronized neurotransmitter release, has recently been implicated in a human neuropathy. In one family, a proline residue within synaptotagmin is replaced by a leucine. Here we examine the in vivo effects of this mutation using *Drosophila*. These mutants display behavioral deficits similar to the human patients, as well as several electrophysiological deficits. These results support a causative role for this synaptotagmin point mutation in disease etiology.

289 Identifying Mitotic Defects in Cancer Cells

HAZHEEN SHIRNEKHI

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

A hallmark of most cancers, including cervical cancer caused by HPV, is a condition known as aneuploidy, which results from an unequal partitioning of the genomic material during mitosis. As aneuploidy is a consequence of erroneous mitotic cell division, we are interested in understanding what mitotic pathways become deregulated in cancer cells. Using HPV as a model, we find a subset of these cancer cells exhibit increased erroneous attachments during mitosis. These errors are often not corrected, resulting in aneuploidy. We attribute this failure to correct erroneous attachments to these cells having a defective mitotic checkpoint.

290 Effects of Mitochondrial Inhibition on Physiology and Metabolism of Wheat

NATE SINDT

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

Recent studies have demonstrated that application of mitochondrial inhibitor fungicides can increase crop yield and biomass in the absence of fungal disease pressure. However, the mechanism by which mito-

chondrial inhibition (MI) leads to increased grain and biomass yields is not well-characterized. Here, we investigated the phenotypic, physiological, and metabolic effects of MI on two varieties of wheat in the greenhouse. Our data support that MI influences metabolism and plant physiology, and that the effects are variety-specific. These data provide new insights into the cross-talk between energy and nitrogen metabolism which could inform long-term strategies for increasing grain and biomass yield.

291 Determining Relative Weights of Contextual Factors for Highway Rehabilitation Projects

AKANKSHA SINHA

DEPARTMENT: CONSTRUCTION MANAGEMENT

Recent research shows that it is important to consider a more holistic approach for preparing risk management strategies for complex highway reconstruction projects. This research builds on the SHRP R-10 study which identifies the 5DPM approach and develops a structured framework using Analytical Hierarchy Process which is a multi-criteria decision making tool to rank the contextual factors in their order of importance. This will benefit the State DOTs in developing a robust risk management strategy for such complex projects. Although two projects from CDOT will be used to analyze the results, the framework can be used by any DOT.

292 Walnut Inoculations to Explore Geosmithia Morbida Virulence and Concomitant Relationships

RACHAEL SITZ

DEPARTMENT: BIOAGRICULTURAL SCIENCES AND PEST MANAGEMENT

Geosmithia morbida is well documented as the causal agent of thousand cankers disease of black walnut trees. However, it is not well-understood how *G. morbida* strains differ in virulence and how their interactions with co-occurring pathogens contribute to disease severity. In this study, we systematically investigated virulence of genetically distinct *G. morbida* strains. Overall, we found varying degrees of virulence, although differences were not related to genetic groupings. Furthermore, the pathogen *Fusarium solani* is also commonly isolated from thousand canker-diseased trees, but its disease contribution is unknown. This research shows co-inoculation with these pathogens does not yield a synergistic response.

293 Impact of Familial Concern on American Indian Adolescent Substance Use

JOEY SMITH

DEPARTMENT: PSYCHOLOGY

American Indian adolescents are at an increased risk for substance use and related problems. Previous research has indicated that American Indian families are more likely to be permissive or supportive of substance use due to extensive environmental influences. American Indian families are also likely to employ parenting styles which emphasize modeling and the importance of extended family values. There have been no studies to date on concurrent substance use within this population. With the current state of substance use in American Indian adolescents, it is imperative that research be undertaken to understand factors related to this currently unknown construct.

294 1, 2, Buckle Vi's Shoe: Orthopedic Sock for Clubfoot Treatment

LEAH STONE

DEPARTMENT: JOURNALISM AND MEDIA
COMMUNICATION

Clubfoot is the number one birth defect in the world affecting 1 in 1,000 births. Previously, a child born with clubfoot meant a lifetime of disability or operations. Today, a child born in developed countries receives an innovative clubfoot treatment – the Ponseti Method. Through a series of casting, Achilles tendon release, and specific orthotic bracing – a child can run without a trace of deformity. Our goal is to help ensure the success of the Ponseti treatment through our specialized bamboo orthopedic socks. We believe comfortable babies and less stressed parents equals continued boot wear and treatment success.

295 Exploring Identity and Public Trust in U.S. State Wildlife Agencies

LEEANN SULLIVAN

DEPARTMENT: HUMAN DIMENSIONS OF
NATURAL RESOURCES

State wildlife agencies in the U.S. are increasingly challenged with representing the interests of a broad range of constituents, many of whom do not share the hunting and use values that the agencies traditions are rooted in. Previous research indicates that the gap in values between those who manage wildlife and the publics they serve may be impacting residents' trust in agencies decision-making abilities. Our ongoing research explores public and agency values across all U.S. states and compares the resulting value congruence to metrics on public trust and support for current governance processes.

296 C. elegans Secondary Small RNAs Require Primary Small RNA Methylation

JOSH SVENDSEN

DEPARTMENT: UNIVERSITY WIDE – CELL AND
MOLECULAR BIOLOGY

RNA interference (RNAi) is a process by which small RNAs regulate diverse cellular processes. During RNAi, *C. elegans* employs primary small RNAs to route mRNAs into its silencing machinery and trigger the production of secondary small RNAs, which amplify the silencing signal and conduct genome surveillance. Specific populations of primary small RNAs must be methylated 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 methylated small RNAs and outline efforts to investigate the primary small RNA turnover pathway.

297 Magnetic Dilution of Highly Frustrated Iron Phosphate Oxide

MICHAEL TARNE

DEPARTMENT: CHEMISTRY

Fe₃PO₇ (iron phosphate oxide) is a magnetic material that is highly frustrated due to both competing interactions and geometric frustration. Iron was replaced with diamagnetic gallium to form the solid solu-

tion series Fe_{3-x}Ga_xPO₇. These compounds were studied with magnetic susceptibility and neutron powder diffraction; the resultant phase diagram suggests an increase in frustration at low values of x before transitioning to a state with no long-range magnetic order above x = 0.5. The magnetic properties are the result of several effects including chemical pressure and increasing distance between magnetic cations.

298 Kir Channels Contribute to Vasodilation With Increased Muscle Fiber Recruitment

JANEE TERWOORD

DEPARTMENT: HEALTH AND EXERCISE SCIENCE

This study tested whether inwardly-rectifying potassium (Kir) channels contribute to vasodilation with increased muscle fiber recruitment (MFR) in humans. Hemodynamic responses to 1) an increase in exercise intensity and 2) work-matched exercise protocols designed to evoke two levels of MFR were evaluated at baseline and following inhibition of Kir channels by BaCl₂. The vasodilatory response to increased exercise intensity was diminished by ~45% with BaCl₂, and BaCl₂ abolished the difference in blood flow between the high and low MFR conditions. Thus, activation of Kir channels initiates vasodilation that serves to match blood flow to muscle fiber recruitment.

299 Influence of Muscle Mass and Training Specificity on Hypoxic Exercise

JEREMY THEISEN

DEPARTMENT: HEALTH AND EXERCISE SCIENCE

Low oxygen (hypoxic) environments impair endurance exercise performance. However, this impairment is not universal across endurance events. This study will determine the influence of active muscle mass and training specificity on exercise performance in hypoxia. Endurance trained cyclists and rowers will complete maximal exercise, constant workload exercise and time trials in normoxia and hypoxia on cycle and rowing ergometers. Outcomes include maximal oxygen uptake, blood pressure, heart rate, blood oxygenation, perceived exertion and time trial performance. Data collection is currently in progress. We predict the greatest hypoxia mediated performance decrements will be during rowing, and in cyclists while rowing.

300 Synthetic Functionalization of Cobalt Tris-bipyridine Complexes for Solar Cell Applications

JOSH THOMAS

DEPARTMENT: CHEMISTRY

A number of coordination complexes were assembled based on the synthetic functionalization of a base cobalt tris-2,2'-bipyridine complex. These complexes were then evaluated based on their performance in a number of categories crucial to their function as charge transfer mediators in dye sensitized solar cells. It was found that the substitution of an electron withdrawing ethyl ester group onto the 5,5' positions of the bipyridine ligands yielded a higher positive potential than the other synthesized complexes and enabled quicker diffusion through electrolyte solution than similar complexes with the same substitution on the more commonly studied 4,4' positions.

301 More Than a Bad Hair Day: A Critical Rhetorical Analysis

HAYLEY THOMPSON

DEPARTMENT: JOURNALISM AND MEDIA
COMMUNICATION

I explore the containment of Blackness in the popular culture text Scandal. Eurocentric cues for beauty, autonomy, and professionalism discipline Blackness and serve to reinforce hegemonic values. Although Scandal operates within a racial neoliberal framework that downplays race, hair style functions as an ethnic signifier to the audience and is thus a key component of the visual rhetoric under observation. I assert that Scandal contains Blackness in a racial neoliberal framework by associating Afrocentric hair styles with undesirable or problematic situations. The Eurocentering of Black characters reinforces hegemonic discourse that rewards Whiteness while continuing to disadvantage perceived Others.

302 A Gardening Feasibility Study on Physical Activity and Sedentary Behavior

ELIZABETH THOMSON

DEPARTMENT: HEALTH AND EXERCISE SCIENCE

Gardening increases physical activity (PA) as measured by questionnaires. Accelerometers offer an objective measurement of PA. The purpose of this study was to investigate the feasibility of using accelerometers to measure PA during gardening. This randomized control trial (six non-gardeners, five gardeners) had two measurement periods (T1 and T2). For each period, participants wore an ActivPAL accelerometer for six days and time spent sitting, standing and walking at two cadences was estimated. Although no significant differences for time spent sitting, standing or walking was detected between groups, using accelerometry to measure PA during gardening is a feasible study design.

303 Novel Roles for Spn1 in Genome Maintenance and Replication

ALISON THURSTON

DEPARTMENT: BIOCHEMISTRY AND
MOLECULAR BIOLOGY

Alteration to the DNA sequence is a necessary process for cell adaptation. Regulation of this process is essential as the excessive alteration or alteration of an important sequence can cause or exacerbate a disease state. DNA is associated with histone proteins (chromatin), which allows for compaction into the nucleus while still allowing access for cellular processes. We have found that a chromatin-binding factor, Spn1, is involved maintaining a healthy level of DNA alteration. Further understanding of how a cell maintains a healthy level of DNA alteration can identify new targets for therapeutics that can prevent and repair harmful DNA damage.

304 Climate Change Considerations in National Forest Decision-Making: Challenges and Opportunities

THOMAS TIMBERLAKE

DEPARTMENT: FOREST AND RANGELAND
STEWARDSHIP

In charge of 193 million acres of forestlands and grasslands throughout the U.S., the U.S. Forest Service faces a significant challenge in preparing its lands for the ecological impacts of climate change. Like other agencies, the Forest Service develops land management plans outlining how it intends to manage for various activities ranging from recreation to the provisioning of water, in light of public expectations and challenges like climate change. This presentation presents findings from interviews with Forest Service staff and supporting research that address the challenge of considering climate change in land management planning.

305 A Mechanistic Approach to Solid-State Metathesis

PAUL TODD

DEPARTMENT: CHEMISTRY

The quest for rational design in solid-state chemistry is hindered by our mechanistic understanding and control in preparing extended solids. High-temperatures are needed to overcome solid-state diffusion, driving the reaction to a thermodynamic equilibrium and reducing kinetic control over product formation. Herein, we present a low-temperature preparation of the semiconductor FeS₂ using solid-state metathesis. Incorporation of the weak Lewis acid Ph₃SiOH reduces kinetic barriers. Changing the Ph₃Si-X bond (X = Cl, S, OH) promotes different reactivity in the preparation of FeS₂, suggesting the identity of the molecular additive promotes a different reaction pathway.

306 Environments Conducive to Moist Convection in the Maritime Continent

BEN TOMS

DEPARTMENT: ATMOSPHERIC SCIENCE

Deep convection is a critical component of the hydrological cycle and radiative energy budget within the Maritime Continent. We aim to quantify the importance of specific environmental variables on singular deep convective cells within the Maritime Continent using an in-depth evaluation of a basin-scale simulation. The Regional Atmospheric Modeling System (RAMS), an open-source cloud-resolving model with an integrated bin-emulating double-moment microphysics scheme, was used to simulate a transient convective envelope centered over the northern portions of the Maritime Continent. This presentation will highlight the relative importance of each environmental variable in the generation and aggregation of deep convective cells.

307 Ultra-High Temperature Ceramic Heat Exchanger Produced via Spark Plasma Sintering

VINCENT TORRES

DEPARTMENT: MECHANICAL ENGINEERING

Monolithic aluminum oxide plate-fin heat exchanger with an aspect ratio (AR) of fin height to fin thickness of 3:1 has been achieved. The final AR desired is 10:1. Final sintered density desired is > 97% of theoretical density. Powder preparation is closely examined to improve final sintered density.

308 Hurricane Observations Using Long-Range Lightning Detection Networks

BEN TRABING

DEPARTMENT: ATMOSPHERIC SCIENCE

Detailed case studies of the lightning activity of five tropical cyclones (TCs) that underwent rapid intensification (RI) were conducted within the domains of two unique ground-based long-range lightning detection networks. This analysis provides novel details on the distribution of lightning within specific TC regions to highlight specific phenomena that statistical studies cannot resolve. Results show that RI typically follows a period of enhanced lightning in the eyewall when coinciding with low amounts of deep-layer shear. Bursts of lightning were related to rapid eyewall structural changes observed in satellite imagery. This suggests that eyewall lightning bursts provide unique information for forecasting.

309 Science, Camera, Action!: Climate Change Education for Action Through Photovoice

CARLIE TROTT

DEPARTMENT: PSYCHOLOGY

Few studies have examined how youth think about and take action on climate change, and far fewer have sought to facilitate their engagement using participatory methods. This collaborative, multi-site study bridged interactive climate change education with youth-designed climate action using photovoice methodology in a 16-week after-school program called Science, Camera, Action!. The program engaged 55 youth (ages 10-12) across three Boys and Girls Clubs in Northern Colorado. Survey and focus group methods were utilized to better understand how youth make sense of climate change, and to evaluate program impacts on youths' climate change-relevant knowledge, attitudes, and behaviors.

310 Campus Values: Mission Statements, Admission Tours, and Autonomous Assessment Nexus

MICHELLE TRUEBLOOD

DEPARTMENT: SCHOOL OF EDUCATION

Given what is known about the importance of admission tours and campus environment on student perceptions of universities, researchers sought to explore alignment of these critical components with university mission statements throughout various institutions in the United States. Data collected through publicly accessible information, researcher participation in official tours, and independent campus as-

sessments was separated by collection method, admission tours or independent research – and categorized into themes. This data was then compared to each school's Mission Statement. Results suggests general alignment with mission; however, many values communicated via admission tours and campus ecology were not represented in the mission statement.

311 Is Ethane a Useful Tracer of Anthropogenic Methane Emissions?

ZITELY TZOMPA SOSA

DEPARTMENT: ATMOSPHERIC SCIENCE

Since 2009, the Northern Hemisphere showed a statistically-significant increase of ethane. It is hypothesized that this change is driven by the recent massive growth of shale gas exploitation in North America. However, state-of-the-science chemical transport models are currently unable to reproduce the hemispheric burden of ethane. To resolve this, we develop and implement an updated global natural gas emission inventory of ethane into the GEOS-Chem model. The model is able to reproduce a global suite of observations, with the exception of U.S. oil and natural gas basins. Additionally, we estimate contributions of anthropogenic ethane to ozone and PAN mixing ratios.

312 Groundwater Estimates From Different GRACE Products and Hydrological Model Outputs

MUHAMMAD UKASHA

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

Groundwater, a critical component of water resources system in semi-arid to arid regions, is poorly monitored. GRACE satellite mission observes water storage anomalies, which in conjunction with auxiliary hydrological information is being used to estimate groundwater storage variations. In this study we explored the sensitivity of groundwater depletion rates in Central Valley, California to different available GRACE products and to the spatial scales of auxiliary information (i.e. soil moisture and snow water storage) obtained through hydrological modeling. Results indicate that groundwater estimates are sensitive to GRACE products but are insensitive to spatial scale of soil moisture and snow water.

313 Super Repel: A Flexible Film That Repels All Liquids

HAMED VAHABI

DEPARTMENT: MECHANICAL ENGINEERING

Fabrication of most superomniphobic surfaces requires complex process conditions or specialized and expensive equipment or skilled personnel. In order to circumvent these issues and make them end-user friendly, we developed the free-standing, flexible superomniphobic films. These films can be stored and delivered to the end-users, who can readily attach them to virtually any surface (even irregular shapes) and impart superomniphobicity. The hierarchical structure, the re-entrant texture and the low solid surface energy render our films super-repellent for a wide variety of liquids. We demonstrate that our free-standing, flexible, super-repellent films have a wide spectrum of applications in industries.

314 Rearing Density and Habitat Quality Mediate How Crowding Influences Dispersal

MEGAN VAHSEN

DEPARTMENT: UNIVERSITY WIDE – ECOLOGY

When populations colonize in a novel environment, their density can strongly shape how far individuals spread. However, the relative importance of the direct effect (i.e., crowding) versus indirect effect (i.e., resource depletion) of density on dispersal remains less well understood. We tease apart whether differences in dispersal are due to crowding, resource depletion, or an interaction between the two. We also question whether differences in rearing density influence the relative importance of these two driving factors. Using *T. castaneum* beetles, we investigate the importance of rearing density, dispersal density, and habitat quality in predicting population spread across a linear landscape.

315 The Synergy within Diamond-Like Carbon PECVD Systems: Diagnostics and Characterization

TARA VAN SURKSUM

DEPARTMENT: CHEMISTRY

Diamond-like carbon (DLC) films have numerous potential applications because of their promising mechanical and electronic properties. Plasma-enhanced chemical vapor deposition (PECVD) is widely used to produce DLC films from hydrocarbon precursors. To date, however, little is known about the underlying molecular-level chemistry involved in DLC film processing. In particular, energy partitioning within plasmas used to produce DLC films is not well understood. Through spectroscopic techniques, the present work focuses on investigating the fundamental chemistry of hydrocarbon plasmas used in DLC film processing as a means to understand and ultimately control film fabrication.

316 Satellite Remote Sensing to Estimate Consumptive Water Use for Agriculture

AMANDEEP VASHISHT

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

The Western Slope of Colorado is drained by Colorado River and its tributaries, which are facing increased pressure on their water resources due to prolonged droughts and increasing demands. The quantification of precise amount of water consumed by agricultural crops, or, consumptive use, is crucial for water sharing under temporary water sharing arrangements like water banks. Remote Sensing is considered as the most feasible method to determine spatial actual crop water use over large areas. This technology is assessed and new water resource information potentially available to a Western Colorado water bank is developed.

317 Precision Polymer Synthesis Method for Advanced Functional Polymers

FER VIDAL PENA

DEPARTMENT: CHEMISTRY

This is a report on the use of several chiral single-site ansa-metallocenium catalysts to achieve the simultaneous control over the chemo-

selectivity, stereoselectivity and livingness of the polymerization reaction of polar divinyl monomers. This level of control allowed precise tailoring of polymer microstructures and molecular weight. Besides, these highly stereoregular polymers can be converted into functional materials via thiol-ene click chemistry and photocuring, or via stereo-complexation with isotactic PMMA and fullerene C60 to achieve robust crosslinked stereocomplexes and inclusion complexes respectively.

318 Investigation of the Genetics Basis of Hybrid Vigor in Yeast

NADIA VIEIRA SAMPAIO

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

Hybrid vigor is the phenomenon in which highly heterozygous organisms display increased vigor in comparison to their homozygous parents. Despite economic relevance, the genetic basis of the hybrids superior phenotypes is poorly understood, primarily due to the genomic complexity of the organisms traditionally investigated. To overcome this, we built a collection of 78 inbred yeast strains derived from a highly heterozygous strain used for bioethanol production. We identified inbred strains with the most inferior growth vigor and compared their genomes, which revealed several regions that potentially underlie the hybrid vigor phenotype in yeast.

319 An Information Theoretic Approach to Seismic Signal Detection

CHARLIE VOLLMER

DEPARTMENT: STATISTICS

We detail a general framework for detecting seismic signal arrival time picks along with their associated uncertainty. Using STA/LTA threshold algorithm we can identify an Onset Search Window to further refine to a precise Arrival Time Pick. Time Series statistical models are fit through an iterative algorithm to maximize the likelihood of the Arrival Time Pick estimate. The models can then be sampled through a Monte Carlo scheme to produce a full a posteriori estimate of uncertainty of Arrival Time of the signal.

320 Locating Genomic Damage Through Appeasing DNA Flexibility by DNA Glycosylases

KEVIN VOTAW

DEPARTMENT: CHEMISTRY

We propose a mechanism by which DNA glycosylases, a subset of enzymes responsible for repairing genomic damage, are able to locate DNA damage. By utilizing two molecular dynamics simulation of a unique glycosylase, AlkD, bound to damaged and undamaged DNA, the ability of the enzyme to sense specific DNA flexibility is revealed. The damaged DNA remains in a bent, kinked state in simulation, while the undamaged DNA returns to the canonical B-DNA geometry while within AlkD. In stabilizing certain localized changes in the sugar backbone, the presence of DNA damage is differentiated.

321 Characterization of an Archaeal Transcription Termination Factor

JULIE WALKER

DEPARTMENT: BIOCHEMISTRY AND MOLECULAR BIOLOGY

RNA polymerase (RNAP) is an essential enzyme that employs transcription in all living organisms. The transcription cycle is composed of three stages: initiation, elongation, and termination. Conserved transcription factors regulate RNAP at each stage of transcription. Transcription factors involved in initiation and elongation have been identified in each Domain, however, transcription termination factor(s) have only been identified in Bacteria and Eukarya. Transcription termination factors have been proposed to be encoded in archaeal genomes, but to date, no archaeal termination factors have been described. Presented are supportive experimental results for factor-dependent transcription termination in the archaeal organism *Thermococcus kodakarensis*.

322 Pump-Probe Microscope for Transient Absorption Imaging of Cytochromes

ERKANG WANG

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

Dr. Wilson's group at Colorado State University has built a pump-probe microscopy to observe cytochrome specifically. The pump-probe microscopy measures the transient absorption of cytochrome c, instead of using emitting light from fluorescence labels. Two major advantages of transient absorption measurement are fluorescence labeling free and the ability to distinguish redox and oxidized states of cytochrome. Fluorescence labeling free decreases the possible toxicity that might be induced by previous detection methods. And distinguishing ability enables us to access more information about respiration reaction of the tested cell.

323 Zika Virus Infection Detection Using an Electrochemical Paper-Based Analytical Device

LEI WANG

DEPARTMENT: SCHOOL OF BIOMEDICAL ENGINEERING

An epidemic exploded Zika virus (ZIKV) infection with estimations of over one million infections in Brazil alone. While ZIKV infections are generally mild, recently they have been associated with an alarmingly high rate of microcephaly in newborns. Currently, there is still no commercial vaccines or diagnostic assays available. Emerging ZIKV infectious creates a strong need for a low-cost, point-of-care (POC) diagnostic platform that would enable rapid and sensitive Zika virus infection detection. In our study, a ZIKV immunity electrochemical Paper-based analytical devices (ePADs), inexpensive electrochemical sensor technologies designed for point-of-use applications, has been developed for the early ZIKV infection detection.

324 Tersa Inc.

CHARLIE WARDEN

DEPARTMENT: COLLEGE OF BUSINESS

Tersa Inc. is on a mission to create sustainable innovation that enhances consumers' daily functions, fostering a more efficient, practical

and sustainable lifestyle. Tersa Inc. has identified textile care as an industry that fails to offer a product or service that meets current consumer trends. We are developing a product that offers the consumer an in-home, user friendly supplement to machine washing, hand-held steaming, and out-of-house dry cleaning. The Tersa Home is a wall mounted machine that encloses high-temperature steam to kill bacteria, de-odorize, de-wrinkle, add fragrance and dry any textile in under ten minutes.

325 Tiger Conservation in an Agricultural Landscape in Northern India

REKHA WARRIER

DEPARTMENT: UNIVERSITY WIDE - ECOLOGY

This study aims to understand the drivers of tiger habitat use within agricultural areas of the Central Terai Landscape (CTL) in northern India. Between December 2015 and August 2016 we collected data on tiger presence by interviewing resident farmers within an agricultural area separating two tiger reserves in the region. Areas within the study site were also simultaneously sampled using camera traps and tiger pug-mark surveys. These three sources of data on tiger presence were combined using occupancy models to determine tiger habitat use patterns. Results from this study are helping guide a landscape scale tiger conservation strategy.

326 Volatile Organic Compound Concentrations in Northern Colorado and Future Impacts

DEREK WEBER

DEPARTMENT: ATMOSPHERIC SCIENCE

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

327 Combating Climate Change With Google Street View Cars

ZACH WELLER

DEPARTMENT: STATISTICS

It is estimated that approximately 25% of the manmade global warming we're experiencing today is caused by methane emissions. Methane is the primary component of natural gas. In several parts of the United States, pipeline infrastructure used to deliver natural gas is degraded and prone to leakage. In this work, we analyze air methane concentration data collected by Google Street View vehicles. We develop a statistical model to estimate the total number of methane sources, the unobserved magnitude of detected sources, and the volume of total methane output in a city.

328 Rethinking Oncogenes: The LIN28-Let-7-HMGA2 Axis Drives Placental Development

RACHEL WEST

DEPARTMENT: BIOMEDICAL SCIENCES

There is a delicate balance between cell proliferation and cell differentiation in early placental development. Many oncogenes are essential in the maintenance of that balance. Inappropriate cell differentiation can lead to an insufficient amount of cells in the placenta. This cellular insufficiency can lead to placental insufficiency, causing placental pathologies including preeclampsia and intrauterine growth restriction. This proposal will focus primarily on the oncogenes that make up the LIN28-let-7-HMGA2 axis.

329 Improving Basic Mechanics Knowledge and Modeling of Skeletal Muscle

BEN WHEATLEY

DEPARTMENT: MECHANICAL ENGINEERING

Skeletal muscle comprises roughly 40% of human body weight and is necessary for both normal movement and survival. Muscle diseases, such as Duchenne and Becker type Muscular Dystrophy, are highly debilitating and often lead to death by the age of 25. A better understanding of how muscle behaves, under both active (force generating) and passive (stretching, compressing) conditions can greatly impact the ability to diagnose and treat these diseases. This work provides a novel approach to evaluate and model skeletal muscle, with the end goal of developing the most intricate and accurate simulation of individual skeletal muscle to date.

330 Antecedents and Sources of Calling in the United States

MICAH WHITE

DEPARTMENT: PSYCHOLOGY

While calling (as it applies to the work role) has been studied in terms of its consequences, less is known about antecedents and sources of calling. The present study used qualitative responses from the Portraits of American Life study (PALS), a nationally-representative sample, to explore reported influences of calling. Responses were coded using Emergent Qualitative Document Analysis. These responses were used to answer two questions: (1) what do adults in the United States cite as the main influences of their calling and (2) do these influences differ based on individuals endorsed source (internal, external, or both)?

331 A Sticky Situation: Confinement Effects on Glucose Solutions

BEN WIEBENGA-SANFORD

DEPARTMENT: CHEMISTRY

Glucose and other carbohydrates are vital biomolecules, acting as important signaling molecules, and molecular stabilizers that aid in protein formation and act as vital cryoprotectants, allowing creatures such as the phenomenally durable water bear to survive being fully frozen. Reverse micelles, nanoscopic water pool stabilized by surfactant

molecules, serve as a model system representative of living cells and organelles. Powerful NMR techniques have allowed us to examine the behavior of glucose in confined environments and elucidate the nature of their behavior.

332 Chemotherapeutic Impact on Human Breast Cancer Xenograft Slices From Mice

STACY WILLET

DEPARTMENT: SCHOOL OF BIOMEDICAL ENGINEERING

Breast cancers consist of cellular heterogeneity that stem from different host/tissue environments and interactions. To provide a more accurate microenvironment for tumor cells, we implanted human breast cancer cells in mice to develop xenograft tumors that incorporate host cells. To validate the slice paradigm, we treated slices with two chemotherapeutics that act as mitotic inhibitors, docetaxel and vincristine. Tumor cell responses in slices with live video fluorescence microscopy were significantly different after 24h treatment compared to vehicle. Video microscopy may provide a unique window on to metastatic cell behavior(s) and clinically predictive chemotherapeutic assessments for future personalized cancer treatment options.

333 A Policy-Capturing Study of Preferences for Differing Training Cues

COLIN WILLIS

DEPARTMENT: PSYCHOLOGY

This study modeled how training factors training content, training method, trainee tenure, and group learning influenced ratings of training utility before training occurred and whether motivation to learn, stress, age, or prior experience created group differences in ratings. Results were modeled at two levels: training method and interactions between method, tenure, groups, and content significantly predicted ratings within subjects; neither stress nor age were related to ratings between subjects, but motivation to learn and prior training experiences both positively predicted ratings. Results indicate that trainees make sophisticated judgments about future training, which the literature has yet to capture.

334 Developing Advanced Polymeric Membranes for Carbon Capture and Sequestration

ALYSSA WINTER

DEPARTMENT: CHEMISTRY

In 2015 the federal government passed the Clean Power Plan legislation which requires existing power plants across the country to reduce their carbon dioxide emissions significantly by the year 2030. Thus, the need for cheap, effective, and efficient membranes to separate carbon dioxide from the waste gas stream has risen sharply. My work has focused on developing effective gas separation membranes from the ground up: polymer synthesis, membrane fabrication, building instrumentation, and finally membrane testing. As such, we have the capability to fine tune our polymers at every step of the process to maximize performance.

335 From Mitochondrial Fluctuations to Biomechanical Properties of Stem Cells

WENLONG XU

DEPARTMENT: CHEMICAL AND BIOLOGICAL ENGINEERING

The active mechanical properties of the cellular cytoskeleton are important in a number of significant cellular processes, and are altered in cancer. We extensively explored a novel way to measure the active mechanical properties using mitochondrial fluctuations in a non-invasive manner. We found that mitochondrial fluctuations are mainly driven by active fluctuations of cytoskeleton. We also found significant differences in mitochondrial fluctuations between less invasive and more invasive cancer cells. We also observed heterogeneity in mitochondria from both cellular and intracellular sources. Our findings not only contribute to better understanding on intracellular mechanics, but also hold potential therapeutic importances.

336 Excess Death Attributable to Outdoor PM_{2.5} in Beijing, China

MEILIN YAN

DEPARTMENT: ENVIRONMENTAL AND RADIOLOGICAL HEALTH SCIENCES

Some China-based studies suggested non-linear association between PM and death, which remains poorly characterized, though potentially important for health impact assessment for air pollution policies. We investigated non-linearity in the concentration-response association between PM and death in Beijing, China, by using daily data between 2009-2012. We also estimated excess death based on specification of this concentration-response shape. We found some evidence that the concentration-response curve for PM_{2.5} levels off at the high concentrations for respiratory death, but no strong evidence for all-cause and circulatory death. Health impact assessments can be sensitive to model specification of the shape of the curve.

337 Integrated Circuit for Electrochemical Impedance Spectroscopy in Biomedical Applications

LANG YANG

DEPARTMENT: ELECTRICAL AND COMPUTER ENGINEERING

It has been reported that disease found in early stage has better opportunity to be cured. Currently, however, such inspections are impossible to be frequent as most of the diagnosis need to be launched in hospital. The concept of point-of-care device is emerging to overcome the fact of limited medical expertise and a requirement of laboratory equipment to allow people to track their health status in a weekly or daily routine. This work developed an integrated system that's measuring electrochemical signal from bio-molecules and to build a handheld device aimed at household point-of-care diagnosis or immediate diagnosis in doctor's office.

338 Simulation Model for Foot-and-Mouth Disease (FMD) Spread in Endemic Countries

USMAN ZAHEER

DEPARTMENT: CLINICAL SCIENCES

Persistence of FMD in endemic countries pose a constant threat to FMD-free countries. The Animal Disease Spread Model (ADSM) is currently used to estimate the spread and conduct risk assessments for FMD, in FMD-free countries. It cannot, however, simulate FMD spread and the impact of mitigation strategies in endemic countries. Our aim is to adapt the ADSM by including FMD endemicity parameters for endemic countries. Different scenarios will be run to compare the effect of various parameters on FMD spread. This adapted ADSM will enable better understanding of the effects of various mitigation strategies on FMD control in endemic countries.

339 Multifunctional Surfaces for Blood Contacting Medical Devices

YANYI ZANG

DEPARTMENT: SCHOOL OF BIOMEDICAL ENGINEERING

Traditional stent implantation causes in-stent restenosis and thrombosis due to the adverse interactions between the stent surfaces and the tissues. In this study, we will develop titania nanotube arrays (NT) on titanium surface and modify these surfaces with NO-releasing polysaccharide-base polyelectrolyte multilayers (PEMs). Preliminary results indicate successful fabrication of NTs and ultra-thin NO-releasing PEMs on NTs. Platelet studies revealed significantly lower adhesion and activation on these surfaces. The successful completion of the preliminary work provided motivation for further investigation into understanding of the relationship between surface properties and biological responses for blood-contacting medical devices.

340 Stability of a Toxic mRNA in Type I Myotonic Dystrophy

ANNIE ZHANG

DEPARTMENT: UNIVERSITY WIDE - CELL AND MOLECULAR BIOLOGY

Myotonic Dystrophy 1 (DM1) is a multisystemic inherited disease caused by expanded CTG repeats within the 3'UTR of the DMPK (dystrophin myotonia protein kinase) gene. The encoded mutant RNAs are toxic to the cell. Here we describe a new regulatable cell culture model to study decay of CUG-repeat containing RNA. We are currently investigating the pathways and factors influencing turnover of the transcript. A better understanding of the decay mechanisms mutant DMPK mRNA may lead us to additional therapeutics for DM1, as well as providing valuable information to explain how current pre-clinical therapies affect metabolism of DMPK mRNA.

341 Biologically Inspired Robot Control Based on Featureless Time-to-Contact Estimation

HAIJIE ZHANG

DEPARTMENT: MECHANICAL ENGINEERING

Time-to-contact, a biologically inspired concept, can be directly estimated from image sequences using a vision sensor. Thus it is widely applied for various robotic applications such as docking, chasing, landing, and navigation. In our project, we adopt a featureless direct method which is more time-efficient and accurate to estimate time-to-contact. Based on the estimation results, we control the braking process of mobile robot. Moreover, we implement this estimation method by considering angular velocities. Recently we come up with a new 3D trajectory planning strategy based on time-to-contact and proved its feasibility with simulation and experiments.

342 Innovations to Enhance Hydraulic Efficiency for Small Drinking Water Systems

YISHU ZHANG

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

The focus of this study is to provide a summary of the application of computational fluid dynamics (CFD) simulations to gain insights into the flow dynamics of disinfection contact tanks that are used for treatment of drinking water. Different tanks configurations that are often used by small systems were tested to assess their residence time distributions using both tracer experiments and CFD simulations. A variety of modifications and new systems that were developed as part of this study will be presented to highlight how CFD simulations were employed to explore innovative scenarios for improving the hydraulic efficiency of such systems.

343 Dynamics of Environmental Flows Over Obstacles

JIAN ZHOU

DEPARTMENT: CIVIL AND ENVIRONMENTAL ENGINEERING

Turbulent mixing and transport in environmental flows past obstacles such as mountains, buildings, vegetation and engineering facilities has been the subject of numerous studies. In this project, both computational fluid dynamics (CFD) and experimental measurements are employed to provide a fundamental understanding of the dynamics of environmental flows interacting with solid and/or porous obstacles. Starting from the basic open channel hydraulics and unsteady vortex shedding, we study the end effects of obstacle suspension as well as the group effect of obstacle clustering. This is followed by a detailed discussion of flow-obstacle interaction with density stratification.

344 Toward Sun-Powered Cyanofuels

ALLI ZIMONT

DEPARTMENT: UNIVERSITY WIDE – CELL AND MOLECULAR BIOLOGY

Cyanobacteria, also known as blue-green algae, use photosynthesis to produce valuable chemicals, such as fuels, flavors, and pharmaceuticals. They capture atmospheric carbon dioxide in this process, and thus present an environmentally sustainable alternative to fossil fuels. Many groups have engineered cyanobacteria in the laboratory setting, and demonstrated the potential of this bioproduction chassis. However, to maximize the potential and viability of cyanofuels, effort needs to be directed toward successful engineering in industrially relevant conditions, such as the natural light-dark cycles of the sun. Our research focuses on metabolic engineering cyanobacteria to produce valuable chemicals in these light-dark cycles.



GRADUATE STUDENT SHOWCASE

Celebrating Research and Creativity

November 15, 2016

Lory Student Center, Grand Ballroom

9:30 a.m. to 12:30 p.m. Poster Presentations, Artwork, and Performances

9:30 a.m. to 11:30 a.m. **GREEN** Presenters

10:30 a.m. to 12:30 p.m. **GOLD** Presenters

Odd numbered abstracts are in the **GREEN** presenting group.

Even numbered abstracts are in the **GOLD** presenting group.

10:00 a.m. to 11:40 a.m. Performing Arts

12:30 p.m. to 2:00 p.m. Lunch on Your Own

2:00 p.m. to 4:30 p.m. Professional Development Workshops for Graduate Students

2:00 p.m. 386 LSC Tools for Graduate Student Success: Using
On-Campus Resources to Your Advantage

2:30 p.m. 382 LSC Marketing Yourself: Improving Your Chances
of Getting the Job

3:00 p.m. 376-78 LSC Meet the GSC: Open Panel and Social

3:30 p.m. 386 LSC Working Life Into Your Work-Life Balance

4:00 p.m. 382 LSC Becoming an Effective GTA

Presented by the Graduate Student Council

4:30 p.m. to 6:00 p.m. Awards Recognition Reception

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