7th Annual

UNDERGRADUATE RESEARCH CONFERENCE

A Symposium of Scholarly Works and Creative Projects

April 27, 2018

8:00 AM - 5:00 PM
North Classroom

METROPOLITAN STATE UNIVERSITY℠
OF DENVER
Undergraduate Research Program

UNDERGRADUATE RESEARCH CONFERENCE

A SYMPOSIUM OF SCHOLARLY WORKS AND CREATIVE PROJECTS

SAVE the DATE

8th Annual

UNDERGRADUATE RESEARCH CONFERENCE

A Symposium of Scholarly Works & Creative Projects

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METROPOLITAN STATE UNIVERSITY℠
OF DENVER
Undergraduate Research Program

UNDERGRADUATE RESEARCH CONFERENCE

A Symposium of Scholarly Works and Creative Projects

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7th annual

METROPOLITAN STATE UNIVERSITY℠ OF DENVER

President

Janine DAVIDSON Ph.D.

The work showcased at this year's Undergraduate Research Conference: A Symposium of Scholarly Works and Creative Projects exemplifies the ideals behind MSU Denver's tagline "run your own road."

By choosing MSU Denver, you began a journey to pursue knowledge and ultimately chose a path that led you to explore undergraduate research. By engaging in this scholarly pursuit, you are running your own road and developing the skills you will need to thrive in your future profession or graduate program. My hope is that you will use what you have learned to make a positive impact on our state like so many Roadrunners have done before you.

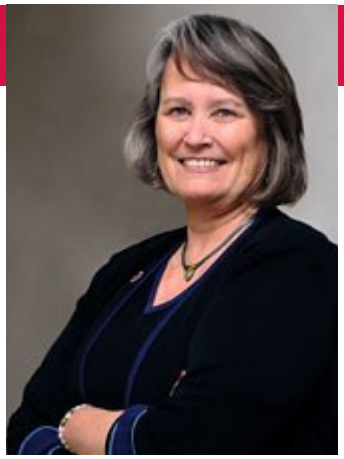
This impressive conference highlights the diversity, breadth of expertise, and transformational power of the undergraduate research program at MSU Denver, and reveals the creativity, innovation, and scholarship that are at the heart of the learning experience here.

Thank you for your continued commitment to our University. I am grateful for each student presenting a research project, each faculty member who mentored students, and each individual in attendance for engaging in discussions about the phenomenal work on display!

I look forward to joining each of you on your educational journey in the coming years, and I charge you to continue to explore ways to apply your knowledge and ultimately "run your own road."

Sincerely,

Janine Davidson, Ph.D.



Provost and Vice President for Academic & Student Affairs

Vicki GOLICH Ph.D.

I welcome you with my greatest enthusiasm to the 7th Annual Metropolitan State University of Denver Undergraduate Research Conference: A Symposium of Scholarly Works and Creative Projects! I remain continually impressed by the incredible diversity and breadth of expertise on our campus, as well as the extraordinary initiative, perseverance, dedication, and accomplishments of our students and faculty. The wide array of presentation topics you will find in the pages of this program speaks to the multiplicity and extensiveness of expertise on campus. MSU Denver is committed to the creation and application of knowledge; by providing opportunities in the classroom, laboratory setting, and in the community, we contribute to our fields of study while providing our students an avenue for success - in the classroom and beyond as they pursue their future professional goals.

Today, we have the opportunity to observe the tremendous efforts of our students and faculty, to learn, and to be inspired by their presentations. Many of us may even be motivated to engage in new research or creative work.

My immense gratitude to Ms. Salina Blea and Dr. Sheryl Zajdowicz from MSU Denver's Undergraduate Research Program for their continued commitment to organizing and ensuring the success of this wonderful event. I also want to thank each of you for your support of this event. Finally, I applaud each and every one of you who participated in and contributed to undergraduate research this year.

Sincerely,

Vicki Golich, Ph.D.

Salina Blea, M.A.
Undergraduate Research Program Coordinator

Sheryl Zajdowicz, Ph.D.
Biology Professor
Faculty Associate for URP

Letter of Welcome from the URP

WELCOME! We are delighted that you have joined us at this year's Undergraduate Research Conference: A Symposium of Scholarly Works and Creative Projects. This conference, which is one of the largest events held at MSU Denver, celebrates students and faculty who are engaged in scholarly and creative undergraduate research studies. The projects you will observe are the result of student-faculty collaborations where students have gained a deeper understanding and experience within their fields. This better prepares them for future endeavors, whether it be employment or application to graduate or professional schools.

We thank each of you for your support of the Undergraduate Research Program. It is through your continued commitment that our program is so successful and recognized by various institutions within the Denver Metro area. Your support has also resulted in our being invited to present at an upcoming Council for Undergraduate Research conference. We are thrilled to be able to share the incredible nature of the scholarly and creative research endeavors at MSU Denver!

The Undergraduate Research Program's mission is to promote, support, and celebrate faculty and student engagement in undergraduate research activities. Toward this end, we not only hold this annual conference, but we also provide grant funding opportunities to help support students' research projects. Additionally, we are excited to share a new course, CPD 390E: Preparation for Undergraduate Research Experience, which we will be offering this fall to better prepare any student who wants to pursue undergraduate research. We hope that you will contact us regarding these opportunities.

Finally, through the Undergraduate Research Program, we have enjoyed watching students journey through the undergraduate research process; from identifying what research means in their discipline, initiating a project, presenting at this conference, graduating from MSU Denver, and ultimately entering into their desired fields, we celebrate each of their achievements. In the following pages, you'll read the success stories and impact that undergraduate research had for a few MSU Denver alumni. To those of you currently engaged in research projects, we hope that you will continue to do so and will let us know what impact it has for you. To those of you who are curious about undergraduate research, we hope that by attending today's conference, you will not only learn about the incredible work performed at MSU Denver, but will also be inspired to pursue a research endeavor in your own field.

Kind regards,

Salina Blea, M.A. and Sheryl Zajdowicz, Ph.D.
Undergraduate Research Program

KEYNOTE

K. RENEE HORTON

Ph.D.

"Finding Your Intersection Between Your Talent and Your Passion"

Dr. K. Renee Horton is an advocate for diversity and inclusion in Science, Technology, Engineering and Mathematics (STEM), and works diligently in the community for STEM education and STEM outreach. Renee believes in changing the face of STEM. She is the founder of Unapologetically Being, Inc. a nonprofit for advocacy and mentoring in STEM. She is a native of Baton Rouge, Louisiana and is a graduate of Louisiana State University with a B.S. in Electrical Engineering with a minor in Math (2002) and a Ph.D. in Material Science with a concentration in Physics from the University of Alabama (2011). In her day job, she serves as the Space Launch System (SLS) Metallic/Weld Engineer at Michoud Assembly Facility (MAF) in New Orleans. In her short time being with NASA, Renee has been awarded six group achievement awards. In 2016, Renee was elected President of the National Society of Black Physicists (NSBP) as the second woman to hold the office. In 2017, she was elevated to Fellow in NSBP, which is the highest honor bestowed upon a member. She has served the physics community abroad as a member of the International Union of Pure and Applied Physics (IUPAP) Women in Physics Working Group and currently serves on several advisory boards dedicated to a more diverse inclusion in physics. In her spare time, Dr. Horton serves as a motivational speaker, mentor and role model for young adults. She is the proud mother of three and grandmother of two.

METROPOLITAN STATE UNIVERSITY℠
OF DENVER
Undergraduate Research Program

Featured

ALUMNI STORIES

Owning HER Education

STORY **RYAN PEARSE** | PHOTO **SALINA BLEA**

Holly Zell
Class of 2015
Psychology

Holly Zell sits at a table overlooking a lively stretch of College Avenue in Fort Collins, an easy stone's throw from downtown and just a few blocks from Colorado State University. Given her youthful appearance and the thick paperback sitting before her on the table—a well-preserved copy of *Diagnostic and Statistical Manual of Mental Disorders: Fifth Edition (DSM 5)*—Holly could easily be mistaken for the quintessential American College Student. Her journey, however, has been far from typical.

Born and raised in Ottawa, Ontario, Holly immigrated to the United States at the age of 24. "I literally moved to this country with three suitcases. I had to throw out the *DSM 4* to keep a copy of *Arguably: Essays by Christopher Hitchens* because my bag was overweight," she says. Holly earned what she jokingly calls a "wacky" three-year degree from Carleton University in Ottawa, before moving to Colorado in 2013.

In addition to being a non-traditional student, Holly is also a first-generation college student. "When I was first attending college, I had never heard the term 'first-generation' before. Looking back, I realize I had to figure everything out from the ground up. First-generation students don't have the benefit of family members with firsthand knowledge, so they have to do a lot more work and have a lot more initiative to become familiar with process and resources," she says. Holly has used this experience to help her younger sister, who is in the process of applying to colleges herself. "I realized how helpful it is to have someone with insider information when going through all of this."

Holly enrolled at Metropolitan State University of Denver shortly after her arrival in the United States. She immediately noticed the differences between MSU Denver and Carleton. A self-proclaimed introvert, Holly mentions the ease with which she was able to get to know her various professors at MSU Denver. She also makes note of the significant change in her mindset, which had evolved from simply wanting to earn a diploma to wanting to take more ownership of her education. "In my first degree, I kind of got into the mentality that you do what you have to do, then you leave and they give you a piece of paper."

During her enrollment at MSU Denver, Holly was hired as a student employee in the Applied Learning Center, which houses the Undergraduate Research Program. Asked about the role the Undergraduate Research Program played in her academic career, Holly speaks with palpable gratitude. "Writing research at the undergraduate level gave me a huge leg up in writing and research skills, even for individual projects." Holly presented her project "The Effects of Expertise on Visual Memory" at the Undergraduate Research Conference in 2015. "Participating in the conference gave me a deeper appreciation of academic work in general. Also, it helps you prepare for more prestigious conferences." Holly was awarded an Undergraduate Research Program mini-grant for her research. This, along with her participation in the URC, helped Holly stand out when she applied for graduate school. "It made me appear much more marketable in a very competitive process."

Holly was accepted into University of Northern Colorado, where she took on an assistantship. The position entailed assisting her director in writing grants. At times, Holly wrote the grants herself. "The experience of writing an application for the URP mini-grant helped me land the assistantship," she says. In the fall of 2017, Holly graduated from UNC with a Masters of Arts in Clinical and Mental Counseling.

When asked what advice she would give to upcoming undergraduate students, Holly pauses for a moment to reflect. "I would say this: if you are willing to commit to it, it will probably be one of the most memorable and most impactful experiences of your undergraduate career." Holly looks out briefly onto College Avenue, before adding, "I don't know that there's any more fundamental learning experience that you can have at the graduate or undergraduate level."

NO GREATER CALLING *than to* SERVE

Sage Freeman-Gonzales
Class of 2017
Marketing

STORY **SALINA BLEA** | PHOTO **ERIC URAN**
BACKGROUND PHOTO **SALINA BLEA**

Upon meeting Sage Freeman-Gonzales, you probably wouldn't guess the hardships he had to overcome to get where he is now. Sage is a well-composed and civic-minded individual. His concern for humanity started in his early years, as he grew up homeless in downtown Denver. Sage and his mother had to take haven in shelters where he saw firsthand the importance of others willing to give. This service-minded attitude would spearhead the next few chapters of Sage's journey.

Sage started out at a community college. Like many first-generation-to-college students, higher education was a strange and difficult environment to navigate. During his first year of college, his attendance was not ideal, and consequently he received a 1.9 GPA. Sage, feeling defeated, ended up dropping out to join the Marine Corps. This is where he discovered a newfound confidence. "They taught me that I could take on more than I ever could," says Sage of his time in the Marines. After his service, Sage found his footing on a path that led to Metropolitan State University of Denver.

At MSU Denver, Sage earned a 4.0 GPA, but knew he needed to do more in order to entice future employers, or perhaps even graduate schools. He also just wanted to help others. He founded both the Denver chapter of the Nu Alpha Kappa fraternity and the Student Veggie Coalition. Sage established the coalition because he wanted to educate people on healthier diets. The coalition would eventually win him an award for "New Student Organization of the Year." This would also spark his research interests. Sage presented at the 6th Annual Undergraduate Research Conference: A Symposium of Scholarly Works and Creative Projects, where he combined his service of helping others and his marketing major to optimal effect. His presentation, "Eating Meat: Have We Been Sold Our Diets through Marketing?" opened the audience's eyes as to how effective advertisement can cajole one's eating habits.

Sage is still very much involved in his research and still educates those around him on healthier eating. He is the Student Engagement Coordinator for Regency Student Housing, which keeps him closely tied to a segment of the MSU Denver's student population. "Research helped to realize what I am passionate about," Sage says. "It is rewarding, exciting, and can open some doors for you that you may never have expected." Sage is currently up for a promotion and plans to pursue graduate school. He knows that whatever path he may take next, he can use his experience from MSU Denver to showcase his many talents.

FROM BEHIND THE DESK TO IN FRONT OF IT

RoseAnn Vik
Class of 2017
Biology

From Jackson Hole, Wyoming to Metropolitan State University of Denver and onward to graduate school, RoseAnn Vik shows her true passion for science on a daily basis. While not watching golf on television with her Pug, Fenway, the biology major spends all of her spare time in the lab. RoseAnn left her family in Wyoming to become a first-generation college graduate. As a homeschooled student who received her GED, RoseAnn is still surprised and grateful for the opportunities that MSU Denver has provided her. Initially, RoseAnn began her college education at the Community College of Denver (CCD) in pursuit of being a radiology technician. She loved her biology class so much that she asked to be a supplemental instructor; it was there that she discovered her true passion. "My main goal is to be a professor," says RoseAnn. After CCD, she transferred to MSU Denver to pursue a biology degree.

Microbiology and undergraduate research is where RoseAnn found impetus in her academic career. "I had to take every opportunity that I could. That's the only reason I am sitting here today," says RoseAnn. One class, pathogenic microbiology taught by Dr. Zajdowicz, is where RoseAnn found her path and was hugely inspired. "Her mentorship and guidance helped me make really big decisions," she says. RoseAnn feels that she has been fortunate to have built relationships with people that took an interest in her and guided her. After asking for a position in the "Z research lab" all semester, she was finally granted the opportunity she wanted. "I tried really hard to make an impression and to show that I could be successful working with her."

RoseAnn began an undergraduate research project and it has come to mean everything to her. It is not uncommon for her to be found in the lab at midnight on a Friday. For her project, she has been working with cranberry extract and evaluating the effect on bacteria. "Not only does undergraduate research give you an opportunity to use/learn techniques, but it also gives you an opportunity to think critically and problem solve," she says.

RoseAnn learned this firsthand when she had a contamination issue in her research that lasted 6 weeks. It was devastating for her to not be able to use her data, but it also served as a valuable learning tool for her. It is important to get a real taste of working in a research lab and realize that not everything works perfectly each time. "The thing I love the most about the undergraduate research experience is that it's yours, you have to own it. You do all the work and know all the ins and outs."

RoseAnn had the opportunity to present her hard work at last year's Undergraduate Research Conference where the Biology department presented her with first place for her poster presentation. Furthermore, she presented in the Fall of 2017 and Spring of 2018 at the Rocky Mountain American Society for Microbiology. True to taking every opportunity, RoseAnn also received a grant from the Undergraduate Research Program in fall of 2017 to continue her research and will present at this year's 7th Annual URC.

RoseAnn graduated in December 2017 and plans to continue her research until the day she leaves Colorado. RoseAnn will make the big move to the University of Massachusetts Amherst to pursue a Ph.D. in microbiology in the Fall of 2018. The school was so impressed with her research and academics that they offered her a nice fellowship to attend their institution. RoseAnn wants other students to follow in her footsteps. "My biggest piece of advice is to take the opportunities that are given to you and do your best with them. It's not enough to just take the opportunity you really need to work hard at it. You are never going to know how big an opportunity is when you are taking it," she says. For now, RoseAnn can be found in the lab. She will be the perky one dressed in a preppy sweater from her collection and one of her 20 pairs of boat shoes with perfectly matched novelty socks.

STORY **MELISSA HOLLAND** | PHOTO **ERIC URAN**

Doubling Up Pays off BIG

Sara Bustos
Class of 2017
Biochemistry

STORY **MELISSA HOLLAND** | PHOTO **ERIC URAN**

Sara Bustos took her academic career to new heights when she completed two difficult internships simultaneously, participating in undergraduate research and securing a full-time job offer in the process.

Sara, originally from Mexico, moved with her husband to Colorado six years ago. She initially started her education at the Community College of Denver and received an Associate of Science. Sara thought her path may lead her to nursing. She quickly discovered that was not the direction for her and pursued biochemistry at MSU Denver. Through the spring of 2017, Sara had been unable to find a lab on campus with an open internship. She knew she needed to find one "for the experience of working on my own research project, to strengthen my resume, and to verify in my mind that this was the career path I wanted to pursue," said Sara.

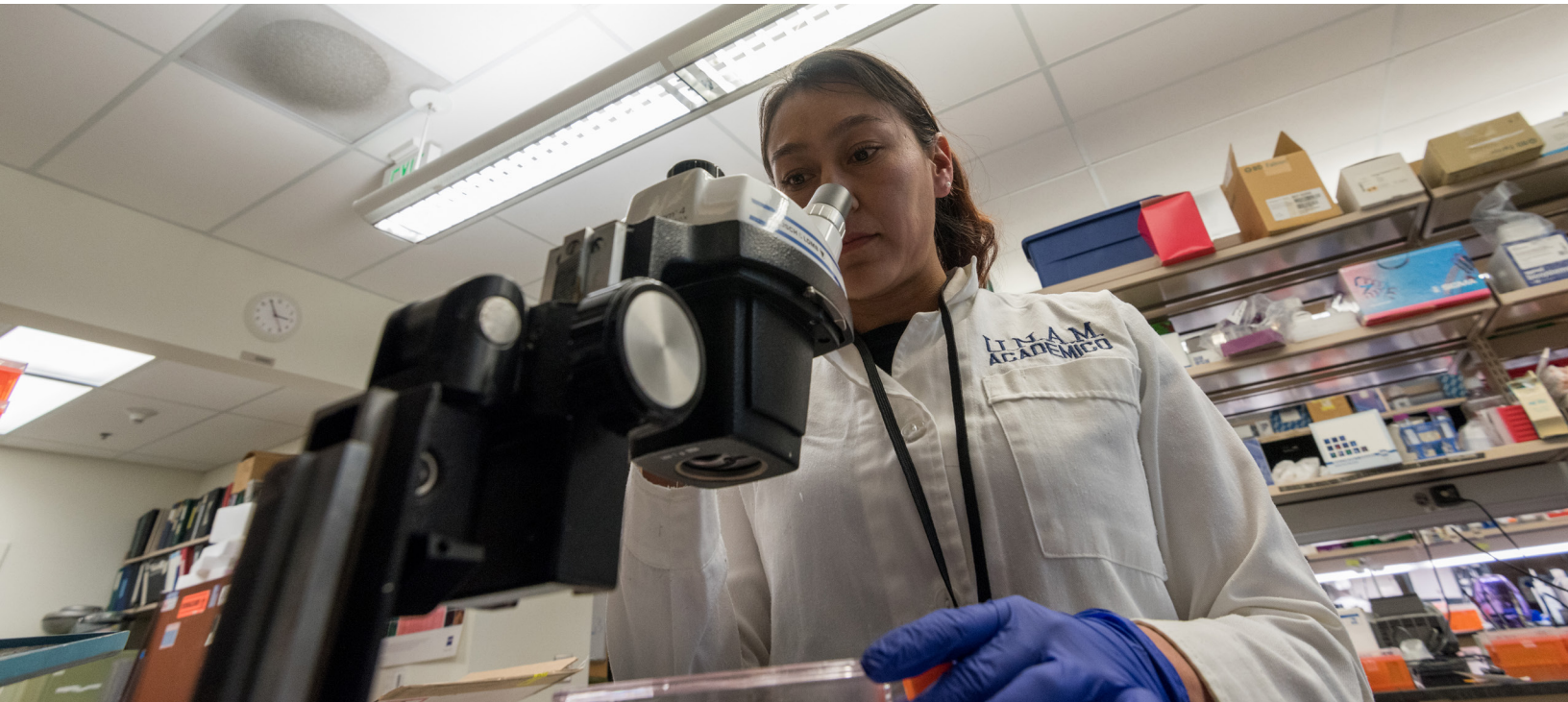
With the summer approaching, something amazing happened to Sara. "I spoke with Dr. Zajdowicz with whom I took immunology lab and would be taking immunology lecture. She agreed to take me on as an intern for the summer," said Sara.

Simultaneously, Dr. Randall Cohrs at UC Anschutz responded to an email Sara had sent out previously. Sara had attended a poster session at the Rocky Mountain Branch of the American Society of Microbiology (RMB-ASM) meeting, where Dr. Cohrs was hosting. Some of his students had presented a poster that impressed Sara. "I received an acceptance email from Dr. Cohrs at the same time Dr. Z had given me an offer," said Sara. She was beyond excited and unsure of which internship she should pursue. At that point, Sara did something unusual and asked permission to complete both internships despite the fact that they were an hour away from one another. Sara worked tirelessly Monday through Friday at Dr. Cohrs's lab and nights and weekends at Dr. Zajdowicz's lab.

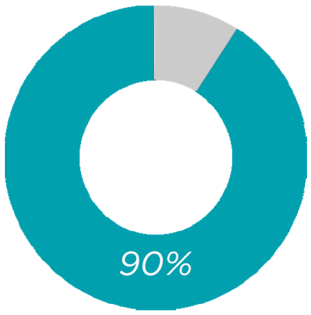
In Dr. Cohrs lab, Sara worked with the Varicella Zoster Virus (VZV) that causes chicken pox in children, goes dormant, and then can reactivate in adults as shingles. Dr. Cohrs lab was very hands on. The students are mentored personally by him, encouraged to foster relationships with one another, and share in his research. She was also introduced to scientists around the globe. Dr. Cohrs wrote a strong letter of recommendation for Sara to become Intern of the Year, while Sara wrote one recommending him for Mentor of the Year. Sara's quick learning skills and relentless work ethic stood out among all the other candidates and Dr. Cohrs went on to win the award.

One of the hallmarks of scientific success is presenting at a scientific conference and Sara crossed that threshold during her internships. Sara presented at the fall 2017 meeting for the RMB-ASM, which was held at the University of Denver. It seemed like an unimaginable task for Sara to talk before an audience of 100 scientists. Dr. Cohrs didn't win Mentor of the Year for no reason, he convinced Sara that she could do it. Sara's shy demeanor was out shown by her hard work and that led Sara to win the RMB ASM Best Undergraduate Oral Presentation Award.

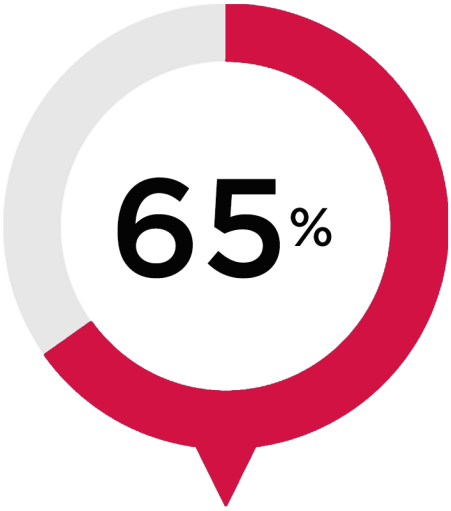
Sara set high goals for herself and did everything she could to accomplish them. Sara graduated in December 2017 and was offered a full time position in Dr. Cohrs lab as a professional research assistant. Due the experience Sara gained through the internship and research experience, Sara gained a competitive edge when applying to the Colorado Medical Laboratory Sciences program offered by MSU Denver. A program which she will begin this summer 2018 to become a certified medical laboratory scientist. She never wants to lose the passion and connection she has in the lab.



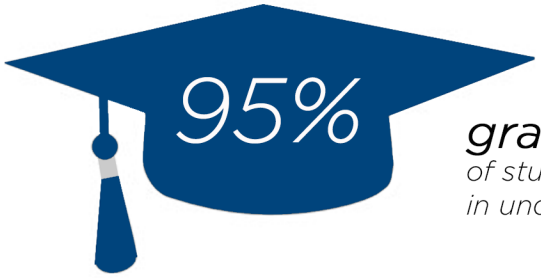
THE STATS



of students found doing research was a meaningful experience



of students are now in graduate school



graduation rate
of students who participate in undergraduate research

Top Five Majors

1. Biology
2. Psychology
3. Mechanical Engineering Technology
4. Humanities/ Social Sciences
5. Chemistry

*includes primary presenters and co-authors from 2015-2017

ACKNOWLEDGEMENTS

We would like to extend our thanks and appreciation to the following offices and individuals for their contributions to the success of the conference.

Applied Learning Center Staff
Auraria Library
Keynote Speaker: Renee Horton, Ph.D.
Photographer: Eric Uran
Session Moderators
Featured story authors: Ryan Pearse, Melissa Holland and Salina Blea
All Volunteers
Education Technology Center
MSU Denver Featured Alumni

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Scheduling/Conference Program: Salina Blea, M.A. and Sheryl Zajdowicz, Ph.D.
Cover Design/Graphics/Program Redesign: Salina Blea, M.A.

CONFERENCE-AT-A-GLANCE

8:15 AM-3:30 PM: Conference Participant Sign-in
North Classroom Building- Atrium
Light refreshments will be provided in the morning

9:00-10:15 AM: **CONFERENCE SESSION I**

Oral Presentations- North Classroom

Room 1311: Humanities/Social Sciences
Room 1313: Humanities/Social Sciences
Room 1314: Natural Sciences
Room 1315: Natural Sciences/Technology/Engineering/Math
Room 1316: Humanities/Social Sciences

Poster Presentations Session I (9:30-10:30 am) – North Classroom Atrium

10:30-11:45 AM: **CONFERENCE SESSION II**

Oral Presentations- North Classroom

Room 1311: Humanities/Social Sciences/Professional Studies
Room 1313: Humanities/Social Sciences
Room 1314: Natural Sciences/Technology/Engineering/Math
Room 1315: Humanities/Social Sciences
Room 1316: Humanities/Social Sciences

Poster Presentations Session II (11:00-12:00pm) – North Classroom Atrium

12:15 PM *Lunch*
Turnhalle, Tivoli Student Union

12:45-1:45 PM Keynote Speaker: Dr. K. Renee Horton
"Finding Your Intersection Between Your Talent and Your Passion"

2:15-3:15 PM: **CONFERENCE SESSION III**

Oral Presentations- North Classroom

Room 1311: Humanities/Social Sciences/Professional Studies
Room 1313: Humanities/Social Sciences
Room 1314: Humanities/Natural Sciences/Technology/Engineering/Math
Room 1315: Humanities/Social Sciences
Room 1316: Humanities/Social Sciences
Room 1402: Film screening of: "The Last Bill" (American Democracy Project)

Poster Presentations Session III (2:15-3:15 pm) – North Classroom Atrium

3:30-4:30 PM: **CONFERENCE SESSION IV**

Poster Presentations Session IV (3:30-4:30 pm) – North Classroom Atrium

ABSTRACTS

PRESENTATION ABSTRACTS

(listed alphabetically by primary presenter's last name)

ABSTRACTS *(listed alphabetically by primary presenter's last name)*

Title: **CITIES OF SPANISH ORIGIN IN THE STATE OF COLORADO**

Presenter: Marilyn Acevedo – Health Care Management
Faculty Mentor: Maria Rey Lopez

Abstract: This research project for the Undergraduate Research Conference of, Metropolitan State University of Denver, will investigate cities/towns in Colorado that are Spanish origin, as well as the history of Colorado. Every state, town, or city, has its own history, and this project is here to present the history of how each of the following places came to be. The purpose of this project is to, provide the audience with a better understanding of the cities and towns of Colorado that fall under Spanish origin. In this research project attention will be paid, among others, to three cities / towns of Spanish origin (Durango, Aurora and Pueblo), an "unincorporated community" (Conejos), three geographical features (Río Blanco, Blanca Peak and Mesa Verde), and the origin of the state of Colorado. The definition of an "unincorporated community" as well as "toponymy", will be researched in this project, to better understand the purpose of this presentation. This presentation will provide a brief background on the history of the state of Colorado, as well as the history that lies between the range of cities that fall under Spanish origin. Knowing the following definitions, will provide the audience with a better understanding of the research incorporated into this project. The final purpose of this study, is to draw some conclusions about the relationships between three cities/ towns of Spanish origin (Durango, Aurora, and Pueblo), an "unincorporated community" (Conejos), three geographical features (Río Blanco, Blanca Peak, and Mesa Verde), and the origin of the state of Colorado.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #13***

Title: **THERMAL TOLERANCE IN CUTTHROAT/ RAINBOW TROUT HYBRIDS**

Primary Presenter: Lynzee Allen – Biology
Coauthors: Austin Haider, Amy Byerly
Faculty Mentor: Douglas Petcoff

Abstract: Colorado River cutthroat trout (*Oncorhynchus clarki pleuriticus*) is a species native to Colorado that has hybridized with the more thermally tolerant non-native species, the rainbow trout (*Oncorhynchus mykiss*). Rainbow trout employ a buffered response against rising water temperatures; the optimal water temperature for cutthroat is around 16°C compared to the rainbow trout which can withstand temperatures around 25°C. This disparity in high temperature tolerance is largely attributed to cellular differences in what is known as the heat shock response. This response is mediated by certain proteins (known as heat shock proteins (HSP)) that are deployed in response to overt changes in temperature, heavy metal exposure, and various other stressors. Certain high alpine bodies of water that have yet to experience a notable temperature shift provide a unique sampling opportunity because the trout in these environments have not been heavily selected for heat tolerance. By performing a controlled heat shock experiment with fish collected from areas like Carter lake - which lies at an elevation of 10,500ft - RNA can subsequently be isolated and the levels of expression measured. This research used q-RT-PCR to quantify the expression of heat shock protein genes (HSP70b and HSP 90bb, compared to expression of Beta-Actin as a standard) and analyze the correlation between gene expression and thermal tolerance. With the data found from this research Colorado Parks and Wildlife will be further informed on how to preserve the native species that helps make Colorado beautiful and diverse. Through a deeper molecular

understanding of these fish, further studies can be pursued on how to best insure the genomic purity and preservation of cutthroat trout.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #9***

Title: **DETERMINATION OF Fe IN BIOLOGICAL SAMPLES USING SECTOR-FIELD VS. QUADRUPOLE ICPMS**

Presenter: Hussein AL-Ogaidi – Chemistry
Faculty Mentors: Emily Ragan and Michael E. Ketterer

Abstract: Inductively coupled plasma mass spectrometry (ICPMS) has become the preferred technique for trace and ultra-trace determination of elemental concentrations in a wide variety of sample matrices. In our studies of Fe uptake and metabolism in insect cells, we evaluate different ICPMS procedures to measure pg – ng quantities of Fe in whole insects and Drosophila melanogaster Sg4 cells; samples are digested and mineralized by heating with HNO3 at 90o C in fluoropolymer containers. The determination of Fe by ICPMS is well-known to be affected by interferences from polyatomic ions; e.g., the species 40Ar16O+ forms in the plasma and directly impacts the most abundant 56Fe isotope. We evaluate two ICPMS approaches for performing reliable low-level Fe determinations: A) quadrupole ICPMS with a collision cell system for attenuation of polyatomic ions; and B) a sector field ICPMS system capable of producing high resolving powers ($m/\Delta m$ ~ 10,000). The latter system is easily capable of physically separating the 56Fe+ peak (55.94 amu) from interfering 40Ar16O+ (55.96 amu), and can generate solution detection limits of ~ 0.01 µg L-1, which is far superior to the ~ 1 µg L-1 detection limits attainable by quadrupole ICPMS with a collision cell in the kinetic energy discrimination mode. We describe the relative merits of using internal standardization with 59Co vs. isotope dilution with a 57Fe-enriched spike solution. Standard operating procedures for the determination of Fe using SF-ICPMS will be discussed.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #6***

Title: **CHILD ABUSE AND NEGLECT**

Presenter: Fatemma Amin – Communication Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research project is to explain and apply the concept of child Abuse and neglect. The studies and scientific research indicate that corporal punishment of children at an early age is related to the trends of violence in adulthood, as if violence was a reaction to what children received from their parents. Studies have also shown that abuse breeds abuse, violence breeds violence, and that a child who is treated brutally and violently as a child seeks revenge in large numbers of violent crimes and that child abuse of children is due to the deprivation of childhood. Early childhood is one of the most important and most important stages of life Human personality and in the composition of its mental, social and psychological. Various theories such as psychoanalytic theory also emphasize the importance of care the child in the early years of life, this theory sees that some disorders, Psychological arising from negative experiences passed by the child, these experiences are characterized as related an emotional impact on his or her psychological development. The individual is exposed to any trauma or maltreatment at any of the five stages of growth identified by Freud and distinguished images of growth psychological and cognitive that appear at each stage, thus lead to the suffering of the individual Mental and mental disorders. There is one proposed research

question: RQ: To what is a rationale for studying child abuse and neglect? The proposed methodology will be some iteration of a general studied methodological approach using the neglect as my primary method of delivery. The expected finding should indicate that a majority (over 98%) of those studied importance of the early years of life the individual, where the formation of the personality of the individual and the formation of habits and tendencies, that the person's behavior and mental and mental disorders that may suffer in the stage of adolescence and rudeness, mostly due to the methods of education wrong and exposed in the first five years of his life. There are two major implications of this work that will be explored in my oral presentation.

Presentation Time/ Location: ***Oral Presentation, Session III 3:00-3:15 PM, NC Room 1314***

Title: **DON'T LET THE BED BUGS BITE?**

Presenter: Danika Anderson and Elise Ambrose – Biology
Faculty Mentor: Faculty Mentor: Sheryl Zajdowicz

Abstract: Bed bugs, *Cimex lectularius*, are of interest lately due to increasing incidence and their resistance to pesticides. Recent reports suggested that bed bugs directly spread Methicillin-Resistant Staphylococcus aureus (MRSA) to humans; however, numerous studies indicate that bed bugs are not vectors. Bed bugs are hematophagous and use a piercing, sucking mechanism to feed, possibly allowing MRSA entry into the wound; however, transmission of MRSA within the human population is not likely due to microbial resistance by *C. lectularius*. While studies have shown that bed bugs are not vectors, there is limited research regarding their mechanisms of resistance. The objective of this study is to evaluate the anatomical structures of *C. lectularius* for antimicrobial properties that prevent transmission of human disease. We predict that *C. lectularius* possesses antimicrobial properties within the digestive tract, cuticle, eggs, and feces of the organism. In this study, we assessed the antimicrobial efficacy of *C. lectularius* cuticles and feces from a dormant colony against a group of 14 species of Gram-positive and Gram-negative bacteria, as well as yeast. Data suggests the excrement of *C. lectularius* has antimicrobial properties against select Gram-positive and Gram-negative organisms. While *C. lectularius* may contain antimicrobial properties within its anatomy to prevent the transmission of human disease from host to host, further investigation is required. Future investigation will evaluate the antimicrobial properties of fresh feces, cuticles, eggs, and various internal anatomical structures from an active colony of *C. lectularius*.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #20***

Title: **BUFFERING COMMUNICATION RELATED STRESS IN COLLEGE STUDENTS: WHY SIMPLY INCREASING THEIR COMMUNICATION SKILLS IS NOT ENOUGH**

Presenter: Bailey Anderson– Human Development
Faculty Mentor: Lisa Badanes

Abstract: Academic-related stress is a known barrier to success in college (Stelnicki et al., 2015). One specific component of academic-related stress involves effective communication both with professors and within the classroom setting. In the current study, we sought to explore the ways in which perceived speech abilities and self-esteem impacted communication-related stress in college students to help buffer students against academic failure. Using 110 Introductory to Psychology students at an urban four-year institution (62% female, average age 24, 63% white) participants completed Rosenberg's (1986)

10-item self-esteem scale, a 27-item academic stress scale (Zajacova et al., 2005), and a four-item speech perception measure asking participants about the frequency of which they experience speech-related difficulties such as stammering or stuttering, and how these difficulties impact their perceived speech effectiveness. Our analysis revealed that women reported significantly higher academic stress than men $t(106) = -2.38$, $p < .05$. We found significant negative associations between communication-related stress and both speech perception and self-esteem, suggesting that participants felt less communication-related academic stress if they felt better about their abilities to speak and had higher self-esteem. Mediation analysis revealed that levels of self-esteem fully mediated the relationship between higher individual perceptions of one's speaking abilities and lower academic stressors around communication-related stress, suggesting that targeting self-esteem levels would be more effective than targeting speech perception to decrease communication-related academic stress.

Presentation Time/ Location: ***Oral Presentation, Session II 11:15-11:30 AM, NC Room 1311***

Title: **CHARACTERIZING BINDING INTERACTIONS AND ELUCIDATING STRUCTURE OF APTAMER-BASED BIOSENSORS**

Presenter: Lindsay Armstrong – Biochemistry
Faculty Mentor: Andrew Bonham

Abstract: Electrochemical biosensors based on the conformational dynamics of DNA aptamers have found success against a wide variety of proteins, toxins, antibodies, and heavy metals. However, the mechanistic underpinnings of the mechanism by which these surface-bound DNA molecules change conformation upon target binding, thus changing the dynamics of an appended redox-active tag and generating a measurable signal, is poorly understood. Our first target for investigation was a previously reported Ricin Chain A binding aptamer biosensor. Here, we have investigated this biosensor using a variety of nucleic acid assays, including PCR-termination via basepair modification, fluorescence anisotropy, gel mobility shift assays, and FRET tagging to determine 3D orientation. These have allowed us to better characterize the basepair interactions involved in binding targets, as well as offer clues to the changing three dimensional folded structures of these biosensors. These results will help inform the field of biosensors and aptamers in general on strategies for future optimization.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #7***

Title: **ROMAN FUNERARY SCULPTURE USES AMAZONOMACHY TO CREATE FEAR OF ANARCHY**

Presenter: Jheenus Azghandi – Art
Faculty Mentor: Summer Trentin

Abstract: The purpose of this research is to understand the use of cultural appropriation and storytelling in Roman funerary sculptures as method by which to assert cultural dominance. In order to commemorate the dead with the dignity and honor they so "deserved", Romans created intricate and detailed work for battle and biographical sarcophagi so as to perpetuate themes of power within day-to-day discourse. Assessing the narrative regarding the battle between the Amazonians and Greeks, now popularly referred to as "Amazonomachy", the importance of myth is explored with in-depth artistic and historical analysis. This narrative is of particular interest within Roman funerary

sculpture because it serves a dual purpose: one being and homage to Roman valor, and the other as an allegory to the battle between the Persians and the Greeks where the Greeks came out victorious. By forcing the Persian Empire into submission through artistic representation, it assumes a level of maleficence as a way in which to maintain order in their society. It is interesting that Amazonomachy is chosen to depict battles like the one between the Persians and the Greeks because the Amazonians were a tribe exclusively made of women and women were deemed subordinate. This analysis speaks to the status of these mythological women, as equal to real men-a possibly revolutionary idea to consider for art of antiquity. Because funerary sculptures were such an integral part of Roman life, these representations would reify devout citizenry and dissuade the populace from erupting into anarchy. Their clever construction of "power in the face of death," makes Roman funerary sculptures a crude but effective category in propagandistic art.

Presentation Time/ Location: ***Oral Presentation, Session I 9:15-9:30 AM, NC Room 1311***

Title: **IMPORTANCE OF UNIQUE SECONDARY STRUCTURES IN GENOMIC RNA1 3' CITE IN BLACKCURRANT REVERSION NEPOVIRUS TRANSLATION**

Primary Presenter: Laura Baquero-Galvis – Biology
Coauthors: Elizabeth Shields, Evan Morrison
Faculty Mentor: Megan Filbin-Wong

Abstract: Translation initiation and regulation commonly involve end-to-end interactions between proteins (initiation factors) bound to a 7-methyl guanosine triphosphate cap at the 5' end, and at a poly(A) tail, at the 3' end of the messenger RNA. This characteristic is also prevalent in many RNA viruses, such as the Blackcurrant Reversion Nepovirus (BRV), which has two bipartite genomic RNAs (RNA1 and RNA2), both of which contain the 3' poly(A) tail but lack the 5' cap. The mechanism implemented by BRV during translation initiation is not clearly defined. In other cap-less, positive-sense RNA plant viruses, structured RNA in the 5' and 3' UTRs bind via proposed RNA-RNA kissing-loop interactions indicating that the recruitment of protein synthesis machinery is directly related to their primary, secondary and higher-order structure. One form of non-canonical (cap-independent) translation involves structured RNA called the cap-independent translation enhancers (CITEs). These components are proposed to bind to initiation factors as a 5'cap-replacement and play an important role in the efficient translation of uncapped RNA genomes. Considering the end-to-end communication and recruitment of translation factors is dependent upon RNA structure, our main goal focuses on determining the secondary and possible tertiary structures of the 3' CITE in the genomic RNAs found in the BRV, specifically RNA1. With this in mind, we have probed our purified RNA with a series of covalent nucleobase, sugar and backbone modifiers in addition to testing the function of a series of structural mutants via reporter assays. We found that the RNA1 CITE structure plays an important role in the process of viral protein synthesis by either facilitating end-to-end interaction with the 5' UTR and/or directly recruiting important translation protein machinery. These findings shed light on structure based mechanisms used for end-to-end communication in noncanonical mRNAs.

Presentation Time/ Location: ***Oral Presentation, Session I 9:15-9:30 AM, NC Room 1314***

Title: **NEGOTIATING FACEbook**

Presenter: Melissa Barr – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research is to explore Face Negotiation Theory and the way it relates to social media. Specifically, in the United States. Face Negotiation Theory deals with the concept of Face and how we protect the way that the Other views it. Generally speaking, most Americans form their social media accounts to make themselves look better and generate "likes". Getting a "like" through social media has proven to be a satisfaction it seems that we search for. An example would a female in the millennial cohort picking the one picture that she feels best about and deleting the rest of the more natural looking photographs because, according to societal norms, they do not look good. It has become a social norm to make oneself look better on a social media platform, initially to get more likes. Rather than looking natural and portraying her real self she strives to have a stronger social media platform. There are two proposed questions for this research. RQ1: Do Americans negotiate their Face to generate more satisfaction from social media? RQ2: When does face to face communication and online communication interfere with one's own face? The methodology used will be through online survey and in person survey. The expected findings should indicate that a majority those surveyed would rather receive the instant satisfaction from social media than in a face to face situation and that the instant satisfaction from the online interactions is better than waiting for in person compliments.

Presentation Time/ Location: ***Oral Presentation, Session I 9:45-10:00 AM, NC Room 1311***

Title: **THE EFFECT OF PRODUCT ATTRIBUTES TOWARD PURCHASE INTENT**

Presenter: Beatriz Barrera Ochoa – Marketing
Faculty Mentor: Gregory Black

Abstract: The purpose of this research is intended to test the effect of product informational attributes of globally known products imported to the U.S in intent to purchase. Branding can be so effective that other contributing factors are dismissed. Among the college student demographic; reference groups, brand popularity, brand loyalty, self-image and/or convenience may all play its own niche in the intent to purchase. Does specific information on the domestic disadvantages and international effect of imported goods alter the behavior and preference of renown imported products to American made products? To test this concept, there will be two test groups utilized. Methodically, there will be a test solely measuring attitudes towards imported products versus domestic products solely referring to the brand image and no other external factors. There will be three product categories used for comparison that range in elasticity. In addition, the same group will be given a second test after 1 full day with information on country of manufacturing, domestic disadvantages, and company advantages from outsourcing that will measure purchase intent as well and its effect. This is intended to be constructed as a before-after control design test; meaning group one will be analyzed in relation to consumer attitudes of the product before and after the treatment of information. The second group will solely be measured on attitudes without information on product.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #9***

Title: **Auditory Analysis of Mosquito Mating Behaviors and Satyrization Resistance in *Aedes aegypti* and *Aedes albopictus***

Presenter: Katharine Baughn – Biology
Faculty Mentor: Robert Hancock

Abstract: Mosquito wing frequency is a well-known signaling mechanism between mating mosquitoes. Males that attempt mating will slow their wing movements to a rate which females can match or harmonize with. Flight tones and the time it takes for modulation to occur has been indicated as a method of fitness selection by females (Arthur, et al. 2014). The complexity of this ecological interaction is not well understood, and explanations are based on conjecture rather than behavioral studies. The aim of this study is to focus on obtaining both qualitative and quantitative behavioral data which can be used to determine evidence of the mechanism being used by female *Aedes aegypti* mosquitoes to resist mating attempts by males of a competing species, *Aedes albopictus*. Data collected will consist of recorded wingbeat frequencies combined with epigamic visual cues of individual mosquitoes as well as mating pairs. Methods being developed include ultra-sensitive audio recording equipment in an anechoic chamber, high-speed cameras, classical ethogram behavioral charts, and sound and video processing software. Differences in wing frequencies between *Ae. aegypti* males and *Ae. albopictus* males may be the determining behavioral difference that indicates to an *Ae. aegypti* female that she must resist insemination attempts so that the species can thrive. Data demonstrating behaviors that interfere with successful insemination will be an important ecological step towards vector control as well as pioneering documentation of interspecific aerial mating and wingbeat frequencies. Any novel visually based observations of behaviors co-occurring with wingbeat frequencies or failed mating attempts will serve as an area for future study.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #10***

Title: **CRITICAL RNA STRUCTURES INVOLVED IN TRANSLATION INITIATION MECHANISM BETWEEN 3' CITE AND 5' UTR OF RNA2 OF BLACKCURRANT REVERSION NEPOVIRUS (BRV)**

Primary Presenter: Scott-Wesley Bean – Chemistry
Coauthors: Laura D. Baquero Galvis, Evan J. Morrison
Faculty Mentor: Megan Filbin-Wong

Abstract: Canonical eukaryotic translation initiation is enhanced by interactions between the 5' 7-methylguanosine cap (m7G) and the 3' poly(A) tail of a single mRNA molecule, which exist on opposite ends of the mRNA molecule in the untranslated regions (UTRs). Viruses, however, hijack translation components using non-canonical methods; typically differing in the structure of their 5' and/or 3' UTRs. Blackcurrant reversion nepovirus (BRV), a virus that infects the blackcurrant plant, has a genome consisting of two positive-sense RNAs (RNA1 and RNA2). Neither RNA has a 5' m7G cap, yet they both have a poly(A) tail. Beyond this, both RNAs are unique in sequence, and they likely utilize a different translation initiation mechanism. RNA structures within a specific site of the 3' UTRs of RNA1 and RNA2 called the cap-independent translation enhancers (3' CITEs), are hypothesized to interact with the 5' UTRs. These structural interactions facilitate the recruitment of essential initiation factors needed for translation, but the exact mechanism is not well understood. This study seeks to elucidate the specific secondary structures of the RNA2 3' CITE that are necessary for the success of its translation initiation. Through the use of an RNA reporter construct that consists of the luciferase gene flanked by the 3' CITE and 5' UTR of RNA2, as well as in silico modeling of folded RNA2, structures involved in translation initiation have been pinpointed. Generation of mutants which disrupted specific stem and loop structures of the RNA2 3' CITE resulted in changes in the quantity of luciferase protein made, subsequently indicating critical RNA structures needed for translation. The structure-function relationship of the BRV RNA2 3' CITE will lead to a clearer understanding of how BRV can be controlled to prevent Blackcurrant Reversion Disease (BRD) and shed light on vital processes that govern this unique class

of nepoviruses.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #4***

Title: **SYNCRETISING OF AFRO-BRAZILIAN RELIGIONS**

Presenter: Emily Bernard – English
Faculty Mentor: Roger Green

Abstract: Within Brazilian society, there is an undercurrent of racial separation implemented through the syncretising of Afro-Brazilian religious practices by white Brazilians. Here, we will discuss various current day examples of syncretising in Brazilian society that enforce othering of darker races in Brazil. To achieve this, prevalent Afro-Brazilian religious practices' historical imagery from periods of Brazilian slavery will be compared to present day Brazilian imagery. This will identify any alterations that have been made. Often, this comparison reveals various levels of Catholic influences from white slave owners inflicted upon Afro-Brazilian religions, resulting in present-day syncretising of white Brazilians through these religions.

Presentation Time/ Location: ***Oral Presentation, Session I 9:30-9:45 AM, NC Room 1313***

Title: **FLUORESCENCE QUENCHING OF BIOCHEMICAL SPECTROSCOPIC PROBES**

Primary Presenter: Bryce Berthold – Chemistry
Coauthor: Luis Torres
Faculty Mentor: Joshua Martin

Abstract: We report fluorescence quenching studies of non-natural amino acids by biochemically relevant anions. 2-cyanophenylalanine and 3-cyanophenylalanine have been shown to be spectroscopic probes that can be used to investigate local solvent environments and peptide-protein interactions. Following ultra-violet excitation, both of these intrinsic reporters offer sufficient sensitivity to changes in hydration via variation in emission intensity. Additionally, a change in the position of the nitrile group on the aromatic ring of phenylalanine results in notable differences in fluorescence quenching by anionic species. These differences in spectroscopic activity of each fluorophore can be used to probe peptides or proteins in selective excitation and Forester Resonance Energy Transfer experiment.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #12***

Title: **FLUORESCENCE QUENCHING OF BIOCHEMICAL SPECTROSCOPIC PROBES**

Primary Presenter: Julia Blackmon – Biochemistry
Coauthors: Dania El-Batal, Michael Tuckband
Faculty Mentor: Ethan Tsai

Abstract: Materials that exhibit optically isotropic phases below the isotropic threshold are relatively rare in thermotropic calamitic liquid crystals, and even more uncommon in bent-core liquid crystal systems. In thermotropic bent-core systems, highly contrived conditions are required to achieve optical isotropy, requiring that the phase be bicontinuous or even tricontinuous. We report that such a metastable optically isotropic phase exists for W622,

a material consisting of a bent core and perfluoroether tails. The mesophase structure is far more complex than originally hypothesized, and is still not well understood. Polarized light microscopy (PLM), differential scanning calorimetry (DSC), and X-ray diffraction were used to confirm and characterize the existence of this metastable phase nicknamed the Dark Phase.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #16***

Title: **DISGUST SENSITIVITY AND ANTI-OBESITY ATTITUDES: THE ROLE OF GENDER AS A MODERATOR**

Primary Presenter: Olivia Breedin – Psychology
Coauthor: Leora Whiteaker
Faculty Mentors: Maureen Flynn and Aaron Richmond

Abstract: Stigma towards obese individuals leads to discrimination (Puhl & Heuer, 2009). Men tend to have more negative attitudes towards obese individuals than women (Magallares & Morales, 2013). One possible predictor of stigma towards obese individuals is disgust sensitivity. Previous research found that among women, higher levels pathogen disgust predict stronger anti-obesity attitudes and higher levels of sexual disgust predict lower anti-obesity attitudes (Lieberman, Tybur, & Latner, 2012). The same was not true for men. Another study found that men with higher levels of pathogen disgust prefer women with lower weight facial cues (Fisher, Fincher, Hahn, DeBruine, & Jones, 2013). The aim of this study is to replicate Lieberman and colleagues' (2012) on gender, disgust sensitivity and anti-obesity attitudes. We hypothesize that high levels of pathogen disgust will positively correlate with weight stigma. We also predict that men will have stronger anti-obesity attitudes than women. Lastly, we will examine whether gender moderates the relationship between the three types of disgust sensitivity and anti-obesity attitudes. Participants completed a series of assessments that measured demographics (including height and weight to calculate body mass index), disgust sensitivity, and anti-obesity attitudes. Approximately 62 undergraduate students have completed the study so far but we are still collecting data. We will use Pearson correlation to examine the relationships between the types of disgust sensitivity and anti-obesity attitudes. We will also use a hierarchical regression to examine whether the gender and disgust sensitivity interactions predict anti-obesity attitudes. Limitations and implications will be discussed.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #14***

Title: **DANGEROUS HITCHHIKERS: THE SEARCH FOR INVASIVE MOSQUITOES**

Primary Presenter: Courtney Brown – Biology
Coauthors: Elizabeth Lynch, Kenya Arroya
Faculty Mentor: Robert Hancock

Abstract: Over the past several years, Zika fever, a disease caused by a flavivirus, has been of great concern to public health. Zika is vectored within the continental United States by two mosquito species: *Aedes aegypti* and *Aedes albopictus*. These lowland tropical mosquitoes chiefly live along the Gulf Coast and in Florida, but *A. aegypti* has been found three times in Colorado. Since there is a potential for these mosquitoes to establish in Colorado, and therefore a chance for Zika to become endemic, it is imperative to determine if and where there are breeding populations within the state. These mosquitoes prefer to lay eggs within containers and have a special affinity for used tires. In Florida,

where there are large numbers of both used tires and *A. aegypti*, tires are often recycled and used for retreads. Since the mosquito eggs are resistant to desiccation, there have been scenarios where they also get caught up in the tire and get deposited away from the original lay site when the retread blows. The still viable eggs are then able to hatch in a new state. A statewide survey was carried out to determine if a breeding population of *A. aegypti* has been established in Colorado. Industry standard oviposition cups were placed at ten-day intervals throughout the state, including sites historically positive for the species, for two months to attract gravid females, collected, and then examined for the presence of mosquito eggs. Ultimately, out of 264 traps, no eggs of any mosquito species were found. This determines that no breeding population of *A. aegypti* or *A. albopictus* exists in Colorado; however, this is limited to only gravid female mosquitoes.

Presentation Time/ Location: ***Oral Presentation, Session I 9:30-9:45 AM, NC Room 1314***

Title: **SPECIALIZED LEARNING**

Primary Presenter: Jodie Buczak – Psychology
Coauthor: Lyndsie Zinicola
Faculty Mentors: Nicolette Giasolli and Lisa Badanes

Abstract: The research presented will address the problem with stereotypes of students with learning disabilities, gifted students and public school ages children who do not cross the academic threshold for services. The problems that occur in students' cognitive development when they are incorrectly labeled academically and receive the incorrect interventions or none at all. When students present behaviors developmental delays when compared to their peers, it reveals a need to stimulate parts of the brain responsible for the slowed capabilities. The benefits of designing a student specialized program to stimulate cortex growth in areas that are lagging. Students in gifted programs can also present deficits in some areas and many times they do not fit the prototype that educators have of children who qualify for accelerated learners. The research will also present how the terms Special Ed and gifted set student up for failure. When a student's test results indicate that they are performing above or below average students in their school, they qualify for In Individual Education Programs (IEPs), which is a legal obligation for the faculty to provide appropriate services for that student. The implications for not meeting academic parameters for receiving interventions will be addressed and how schools react when they are not held accountable for meeting student needs. All school aged children can benefit from specialized learning plans to develop well rounded brain develop during the students' sensitive periods of cognitive development. The tern specialized learning prevents students from actively separating themselves from academic stigma labels. Consequences of avoiding academic resources in college in an attempt to leave their childhood designation behind. Students make use of what they know about themselves from test and resources that are most effective for college and career success.

Presentation Time/ Location: ***Oral Presentation, Session II 11:15-11:30 AM, NC Room 1313***

Title: **NOMADIC SATELLITE ARRAY PLATFORM**

Primary Presenter: Nicholas Buller – Mechanical Engineering Technology
Coauthors: Joshua Harris, Tanner Saylor, Boregard Licalzi, Kevin Lujan
Faculty Mentor: Devi Kalla

Abstract: The Nomadic Satellite Array Platform (NSAP) is a collaborative design effort between

Metropolitan State University of Denver's Mechanical Engineering Senior Design student team (Team NSAP) and ViaSat, Inc. – a leading global broadband, satellite communications, and technology company. The primary objective of the NSAP is to enable 'on-the-go' use of ViaSat's Exede broadband internet service which is delivered via Ka-band microwave satellite signal on up/downlink. The Exede array is traditionally a fixed/permanent mount at a customer premise to achieve an 'always-on' internet service. The NSAP concept enables the Exede hardware to be mounted to the NSAP for temporary remote-sensing, signal acquisition use-cases such as: camping, hiking, disaster/recover zone efforts, on-demand internet broadcast/access needs and more. Additional to the main objective of enabling nomadic use-cases of Exede internet services; Team NSAP set out to achieve several design features while keeping a reasonable consumer price-point in mind. Nomadic or mobile arrays are not a new concept, however most known platforms are typically not consumer-grade design. At one extreme, ultra-light/mobile platforms have excessive trade-off to rigidity, durability, and stability. Conversely, mil-spec platforms are held to stringent tolerances, standards, and typically not suited for civilian-consumer use. This results in a high cost point. The NSAP employs use of lightweight materials and simplistic design to strike balance in key aspects such as: weight reduction while maintaining stability, simple design lends itself to ease of use and lower production costs all contributing to an acceptable end-user price point. The NSAP is a 'modular' design, such that additional features may be added. As a base unit, the NSAP requires the customer adjust the NSAP and/or the Exede mounting hardware to acquire signal. Additionally, compatible 'auto-pointing' mechanisms may be integrated to the NSAP to enable automated signal acquisition as well as other components to mitigate excessive power draw.

Presentation Time/ Location: ***Oral Presentation, Session II 10:45-11:00 AM, NC Room 1314***

Title: **PARASOCIAL RELATIONSHIPS**

Presenter: Cierra Campbell – Communications Studies
Faculty Mentor: William Monsour

Abstract: The main purpose for this research project is to explain and effectively apply what "parasocial relationships" are and why they apply to pretty much everyone (Horton & Wohl, 1956). The most common parasocial relationships with the average person seem to be with celebrities and the social media that they use. Parasocial relationships occur when an individual feels as if they have a personal relationship with that celebrity because of the social media posts that the celebrity posts. The particular celebrity/celebrities I am choosing to focus on is the Karadashian family. The reason being, is because no matter if you like the family or not or are a fan of the family or not, they are always being talked about and always posting on social media websites such as Instagram. Though this family may not have any "talent" it is guaranteed that you do know what is currently going on with the family or a specific member of the family, whether your source may be a typical news website or the specific Instagram account. RQ1: Do Instagram users feel that they "know" or feel connected with the celebrities that they follow? If so, describe how they feel connected to the celebrity? The methodology that will be used for this research will be general surveys as well as scholarly research articles on parasocial relationships. The expected findings are that more than half of those who took the survey will feel like they are connected with a member of the Kardashian family.

Presentation Time/ Location: ***Oral Presentation, Session III 2:15-2:30 PM, NC Room 1316***

Title: **A TIME SERIES ANALYSIS APPROACH TO ESTIMATING E. COLI LEVELS IN BEAR CREEK WATERSHED: IMPLICATIONS FOR FURTHER STUDY.**

Primary Presenter: Christopher Campbell – Mathematics
Coauthors: Ahern Nelson, Keenan O'Brian
Faculty Mentor: Elizabeth Ribble

Abstract: The Bear Creek Watershed runs through Jefferson, Denver, and Arapahoe counties and is a popular recreation area. Some activities, such as swimming and fishing, expose activity-goers to the water and may increase risk for disease. Since 2013, Groundwork Denver and Metropolitan State University of Denver have been analyzing water samples from Bear Creek for E. Coli, a proxy for human fecal contamination in the water. After reviewing the previous modelling attempts by MSU Denver undergraduate statistics students, a number of shortcomings were identified. These shortcomings are discussed and a new modelling approach based on time series is suggested. In addition, confounds, data anomalies, and validity of some of the predictors are addressed with some suggestions for the implementation of the data collection in the future.

Presentation Time/ Location: ***Oral Presentation, Session I 9:00-9:15 AM, NC Room 1315***

Title: **SALIVARY α-AMYLASE AS A BIOMARKER FOR MENTAL DISORDERS IN HIGH-RISK UNIVERSITY POPULATIONS**

Presenter: Jorge Chalit – Chemistry
Faculty Mentors: Lisa Badanes and Megan Filbin-Wong

Abstract: College is a stressful time. College students are at an increased risk for depression, with prevalence rates of 30.6% (Ibrahim et al. 2013). Given the link between stressful life events and depression, it is of no surprise that college students are among the most stressed. However, less is understood about how exposure to early life stress (ELS), combined with current life stress (CLS), can create risk for college students. One important mechanism in this relationship is the sympathetic nervous system (SNS), which may be dysregulated in depressed individuals as evidenced by variations in salivary α-amylase (sAA) (Rohleder et al., 2004). The current study aims to investigate the relationship between ELS, CLS, and SNS activity and depression. In an ongoing study, we currently have 30 participants, with an average age of 23 years (range 18-57), 64% white, and 63% female. We used the Center for Epidemiological Studies Depression scale (Radloff 1977) as a self-report measure of depression. We measured ELS using the 10-item Adverse Childhood Experience Scale (Felitti et al., 1998). Rates indicate whether they experienced a range of early adverse events including abuse and household dysfunction before age 18. CLS was measured using a 26-item checklist of stressful life events in the past 6 months. The stress paradigm was a modified version of the Trier Social Stress Test (Kirschbaum et al., 1998). Saliva samples were taken across the paradigm to measure sAA. Results will focus on variations in ELS, CLS and SNS activity predicting current levels of depression.

Presentation Time/ Location: ***Oral Presentation, Session II 11:30-11:45 AM, NC Room 1314***

Title: **SALIVARY α-AMYLASE AS A BIOMARKER FOR SYMPATHETIC NERVOUS SYSTEM DYSFUNCTION IN STRESS-RELATED MENTAL DISORDERS**

Presenter: Jorge Chalit – Chemistry
Faculty Mentors: Lisa Badanes and Megan Filbin-Wong

Abstract: Salivary α-amylase (sAA) is a well-known protein enzyme that hydrolyses α-(1,4) glycosidic bonds in large polysaccharides. sAA is secreted by parotid gland epithelial cells (Chopra & Xue-Hu 1993), which are innervated by the autonomic nervous system, and sympathetic stimulation increases protein secretion (Holmberg & Hoffman 2014). Since the sympathetic nervous system is linked to stress and depression, it is possible that secreted sAA may serve as a marker for depressive and stress-related mental disorders. To measure the degree to which sAA is linked to stress, we employed a modified Trier Social Stress Test (Kirschbaum et al., 1998) and collected saliva samples to measure enzymatic activity. Salivary α-amylase activity was measured using a colorimetric assay, whereby the amount of free p-nitrophenol in solution is proportional to the amount of ethylidene-4-nitrophenyl-α-D-maltoheptaoside hydrolyzed by sAA. We have found that there is a correlation between stress and the amount of secreted sAA, which aligns with what has been found by other groups (Nater et al., 2005, Rohleder et al., 2004, Nater et al., 2006). Current results show differences of 10-20 U/mL of α-amylase activity between collection time before the stressor and after the stressor. Analysis of the survey data shows that the samples with larger differences in enzymatic activity between collection times came from participants with high anxiety or depressive symptoms. Thus far, our results indicate that sAA may indeed be a biomarker for stress-related mental disorders.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #19***

Title: **PROBING THE MORPHOLOGY OF SINGLE-WALLED CARBON NANOTUBE FILMS FOR IMPROVED THERMOELECTRIC EFFICIENCY**

Presenter: Yeng Chang – Physics
Faculty Mentor: Azure Avery

Abstract: Single-walled carbon nanotubes (SWCNT) have inherent thermal and electrical transport properties which can be useful in prospective technologies including optical and electrical applications as well as thermoelectric energy conversion. In our research, we study the morphology of SWCNT films using atomic force microscopy which allows us to probe and image films of SWCNTs. Detailed analysis of these images help us determine the film thickness and bundle width of the SWCNT films which may affect their thermal and electrical transport properties. A deeper understanding of these transport properties will further development of more efficient SWCNT composite films for thermoelectric applications.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #17***

Title: ***ESCHERICHIA COLI* IN BEAR CREEK: A (PARTIAL) SUCCESS STORY**

Primary Presenter: Christin Cichosz – Environmental Science
Coauthors: Stephen Aderholdt, Ian Babson, Rachel Hansgen
Faculty Mentor: Rebecca Ferrell

Abstract: Bear Creek runs more than 8 miles through urban areas in the Denver metropolitan area, from Bear Creek Lake to its confluence with the South Platte River. The area is highly used for recreation purposes, but some areas of the creek have been listed by the US Environmental Protection Agency (EPA) on its 303(d) list due to high levels of *Escherichia coli*. A collaboration between the EPA, the nonprofit agency Groundwork Denver and Metropolitan State University has been monitoring *E. coli* levels in Bear Creek since 2015. Analysis of these data identified sites of “peak” levels of *E. coli* in the creek, and these

were further investigated, resulting in repair to a leaking sewer line and ultimately removal of that region of the creek, in the town of Lakewood, from the 303(d) list. Continued sampling year-round is revealing additional patterns to *E. coli* contamination in Bear Creek, providing data that will have continuing regulatory impact.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #15***

Title: **HISTORIC FLOODPLAIN LAND COVER CHANGE ON THE SOUTH PLATTE RIVER IN LOGAN COUNTY, COLORADO, USA**

Primary Presenter: Matt Clark – Geospatial Sciences
Coauthor: James Winegar
Faculty Mentor: Gabrielle Katz

Abstract: The South Platte River's flood regime was substantially altered during the 20th century. The active channel (including sand bars, and multiple channel threads) of the South Platte River has experienced a fluctuation in coverage due to water management and variation in annual flow. Little research has been done on how these changes affect the growth and long-term dynamics of broad-leafed cottonwood (*Populus deltoides*) forests on the river. This project compared changes in active channel area and forest cover along a 30-km section of the South Platte River in Logan County, CO. Using georeferenced satellite images from 2006 and 2015, and aerial photos from 1998, polygons of landcover were digitized using ArcMap. The landcover types consisted of Active Channel, Agriculture, Forest, Developed, Off Channel Open Water, Riparian Herbaceous and Shrub. The area of coverage was calculated using statistics in ArcMap, and the results were compared to the total area digitized. The active channel in 1998 covered 7.8%, in 2006 covered 6.41% and in 2015 covered 9.13% of the total area digitized. The size of the active channel decreased by 17.83% from 1998 to 2006, following a period of relatively low river flow, and increased by 42.32% from 2006 to 2015 following a large flood of 2013. The forest in 1998 covered 21.9%, in 2006 covered 26.31% and in 2015 covered 22.64% of the total area digitized. The size of the forest increased by 20.15% from 1998 to 2006 and decreased by 13.94% from 2006 to 2015. There appears to be an inverse relationship between the area of the channel and the area of the forest. Additional research will address changes in floodplain landcover over greater temporal and spatial scales.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #15***

Title: **URBAN VS. RURAL SQUIRREL AND BIRD POPULATIONS**

Primary Presenter: Lauren Clouse – Biology
Coauthor: Nicole Garriott
Faculty Mentor: Christopher Cooley

Abstract: Urbanization leads to habitat fragmentation for native wildlife, which may affect species abundance and diversity. Fragmented urban habitats have less natural vegetation and less predators, but more food is available from humans. Continuous rural habitats have more areas to hide and nest, but animals are required to forage more, which puts them at a higher risk of predation. In this study, we observed populations of squirrels and birds in both urban and rural settings to compare abundance and diversity. The two urban sites were located in downtown Denver and included Auraria Campus, which is a very fragmented habitat, and City Park, which is also fragmented but contains more continuous vegetation. The two rural sites were hiking trails located in Boulder and included the

National Center for Atmospheric Research (NCAR) Ramble Trail and the North Fork Shanahan Trail. We walked a half mile at each site on six separate days and noted all squirrels and birds that were seen and heard.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #5***

Title: **EVALUATION OF FOOD FOR THOUGHT PROGRAM SERVICES**

Primary Presenter: Christy Coggins – Human Nutrition
Coauthors: Rebecca Boenig, Caitlin Floyd, Justine Howse, Meghan Cully, Cayla Jablonski, Catie Van Horn
Faculty Mentor: Melissa Masters

Abstract: Background: In 2015, food insecurity affected 16.6% of US households. Colorado is the third fastest growing state for childhood hunger. Negative social, academic, and health outcomes are linked to food insecurity in school-aged children.

Objective: The goal of this study was to determine the effectiveness of the Food for Thought program.

Design: Participants (n=124) included parents and/or guardians of children participating in the Food for Thought Program. Data was collected via a voluntary survey distributed to participants at three Denver Elementary schools during parent-teacher conferences. Surveys were available in Spanish and English. The Institutional Review Board approved this study.

Statistical Analysis: Data was analyzed using IBM SPSS. Descriptive statistics and variance were obtained. Qualitative data was examined to look for trends.

Results: 75% of participants in the Food for Thought program reported that they use most or all of the food they receive from the food bags. Of the food that is not used, 78% was given to a friend or family member. 70.2% of participants were satisfied with Food for Thought services. 89% of participants did not have issues receiving the food bags. Fruits, vegetables, and dried beans were most requested items.

Conclusion: This study showed that participants are satisfied with the program. Food for Thought should be used as a model to fight food insecurity. Research supports that school based in-kind food assistance programs are effective in targeting food insecurity within children. Further studies should examine the specific impact Food for Thought has on food insecurity in lower income families in the Denver metro area.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #16***

Title: **SOCIAL MEDIA AND ANXIETY IN YOUNG PEOPLE**

Presenter: Brandon Cook – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research project is to explain the phenomenon of social media and its relevance to the rise of anxiety and depression in young people in America. According to recent research studies of social media and its effects on anxiety and depression, multiple platforms and time spent on social platforms are cited as some

of the main reasons for the increase in this phenomenon (Barret,2016). Social Media has created needs in our lives that have never been present before, such as the need to be constantly informed of what others are doing in their lives, and now with social media, people are more ingrained in each other's lives than ever before, and that affects how we view ourselves. This can affect a number of things such as self-confidence, self-worth, it can increase how much pressure we put on ourselves and effect our day-to-day lives in a negative fashion. Research Question: To what extent, if any, does social media contribute to anxiety in young people in the U.S. The proposed methodology will be utilizing scholarly texts, as well as survey methods to find evidence and statistics that show the trend in rising anxiety in the population. The expected findings are that Social Media has greatly contributed to the rising levels of anxiety in young people across the country and there are proven ways to reverse the trend.

Presentation Time/ Location: ***Oral Presentation, Session III 2:15-2:30 PM, NC Room 1315***

Title: **FRESHWATER INVERTEBRATES AND HUMAN DEBRIS**

Presenter: Steven R. Crandall – Biology
Faculty Mentor: Christopher Cooley

Abstract: Fresh water invertebrate richness and evenness has been correlated with the health of bodies of water. Anthropogenic inputs into watersheds can have both beneficial and adverse impacts on aquatic ecosystems. We will be collecting data to quantifiably determine if invertebrates in freshwater streams use inorganic, human debris, as a source of establishment in addition to organic material. Our hypothesis is that the invertebrates that inhabit the stream will have equal distribution between the inorganic human debris and the organic material. Invertebrate samples will be taken from West Toll Gate Creek in Horseshoe Park, Aurora. Two meter quadrants will be sampled every 100 m in the shaded parts of the creek to eliminate variables. Temperature and GPS will be taken at each sample site and the type of inorganic human debris collected will be noted but not returned to the water. We will also sample invertebrates within each quadrat using 60 second kick sampling into D-ring nets. Comparison of species richness and evenness will be accomplished using PAST (v 3.04).

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #7***

Title: **JANN HAWORTH: SMASHING THE PATRIARCHY ONE SOFT SCULPTURE AT A TIME**

Presenter: L. Eleonora Cross – Art
Faculty Mentor: Deanne Pytlinski

Abstract: Ever since Linda Nochlin's seminal essay asked Why Have There Been No Great Women Artists? feminist scholars have undertaken the daunting task of re-positioning history's forgotten women artists. Among them is Jann Haworth born in 1942 in Hollywood, California, whose early career emerged in the "swinging London" of the 1960s. There she encountered tutors like Reg Butler, who stated that he was certain that "the vitality of many female students derives from frustrated maternity" The fact that she was an American woman working in Britain creating soft sculptures, using materials that were often coded as feminine, doubly marginalized her work in the art historical record. My research closely examines the structures that contributed to her marginalization and works to re-position her within an expanded history of Pop Art.

Presentation Time/ Location: **Oral Presentation, Session I 9:30-9:45 AM, NC Room 1311**

Title: **THE IMPACT OF SOCIAL MEDIA ON ADOLESCENTS' OVERALL INTERPERSONAL COMMUNICATION**

Presenter: Emma Crozier – Communications Studies
Faculty Mentor: William Monsour

Abstract: As social media continues to be more and more present in adolescents' lives, it is important to see the effect that it has on their interpersonal communication. We use interpersonal communication to build, maintain, and even end relationships with romantic partners, family members, friends, coworkers, and acquaintances. (McCornack, 2015 p. 5). The purpose of this research is to better understand the effect that social media has on adolescents' interpersonal communication. This form of communication can have both negative and positive impacts on a relationship. This topic will help to better understand the way communication and interpersonal relationships will evolve and change over the next couple of years due to the use of social media (Snapchat and Instagram) While there has been a great deal of research on this topic, this will enhance the understanding of the next generation's means of communication. RQ1: To what degree, if any, are teens' face-to-face communication skills lacking due to social media? RQ2: Are teens more comfortable talking on a mobile phone than in person? And, if so, why? In an effort to get the best results, the research methodologies used will be interviews and surveys. These interviews will be to only those who choose to participate, and their information will be kept private. Over 500 people will be interviewed. The surveys will be sent to random high schools across the Colorado aiming to get over 5,000 survey results (with permission). The expected finding is that, teens are more comfortable talking on their mobile phones rather than face-to-face communication due to the use of social media. The way this research will be executed will be explained in my oral presentation.

Presentation Time/ Location: ***Oral Presentation, Session I 10:00-10:15 AM, NC Room 1311***

Title: **SYNTHESIS OF LIQUID CRYSTALS MANIFESTING TWIST AND SPLAY: BIPHENYL-GALLATE TAIL SUBSTITUTIONS ON THE BENT CORE**

Primary Presenter: Maxwell Dalton – Biology
Coauthor: Kayla Rojas
Faculty Mentor: Helene Ver Eecke

Abstract: Within the human body microbial cells outnumber human cells at a minimum ratio of 10:1, with the greatest diversity and quantity residing within the gut. Scientific evaluation of the gut microbiome can be performed relatively easily by examining microbes passed within excrement, therefore eliminating direct patient sampling. Nine excrements were aseptically sampled that came from students, alumni, and the professor of an undergraduate research lab, each with differing life style variants. Total DNA was extracted and 16S rDNA amplicon sequencing was accomplished using Ion Torrent Personal Genome Machine next generation technology. With bioinformatic analysis the relative percentages of bacterial genera within the excrements were tabulated. The gut microbiome has previously been shown to be influenced by diet and other life-style and environmental factors. The microbial composition of the gut has been shown to be paramount to a person's phenotype as the microbes interact with Paneth cells, the immune system, and the gut/brain axis.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #16***

Title: **AN INVESTIGATION OF AVIAN DIVERSITY IN A CHANGING RIPARIAN ZONE**

Primary Presenter: Gabriel Davis – Biology
Coauthor: Amy Dehring, Rani Lamberty
Faculty Mentor: Erin Bissell

Abstract: The Chatfield Reservoir Reallocation Project is designed to increase the reservoir's water capacity during years of high water availability. The surrounding park is also a popular destination for seasonal migrant and resident bird species, which may be impacted by changes in the riparian zone due to project plans for major modifications to the cottonwood forest community. The goal of our study was to compare bird species diversity between legacy cottonwood forest and younger cottonwood forest stands in the South Platte and Bear Creek riparian zones in advance of the proposed changes. We performed point counts at focal cottonwood trees or stands from approximately 7am - 10am during spring and fall migrations of 2017. In addition to bird surveys, data were collected for vegetative variables likely to impact bird use, tree diameter at breast height (DBH), canopy cover, nearest neighbor species type, and tree density. We hypothesize that differences in vegetation may contribute to differences in bird species diversity between old growth legacy trees and young stands in the riparian cottonwood forest.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 – 12:00 PM), Poster #4***

Title: **DRUNK MONKS? THE ROLE OF ALCOHOL IN MEDIEVAL MONASTIC LIFE AND CULTURE**

Presenter: Dominic Di Franco – History
Faculty Mentor: Kimberly Klimek

Abstract: During the Middle Ages, monastic communities were established all over Western Europe. Members of these self-sufficient enclaves vowed to live lives of prayer, meditation, fasting and alms giving, none of which are generally used in the same sentence as the words "alcoholic beverages". However, these also played a major role in monastic society.

This apparent incongruity has inspired me to explore the topic of alcohol and monks by answering the questions: what role did alcohol play in monastic life and culture?; how and why did alcohol production and consumption become a core part of monasteries?; was there a tangible relationship between the nourishment of the soul (religion) and the body (wine/beer)? My paper argues that by the end of the Middle Ages alcohol played a major role in monastic life.

An analysis of the topic is important because it sheds light on a less-considered aspect of monastic life. The approach underlying my argument is cultural history which here includes the analysis of historical (monastic order histories), hagiographical (St. Martin of Tours), iconographic (manuscript illumination), literary (Boccaccio, Rablais), and biblical (Old and New Testament) sources, which all fit into the larger historiography of Medieval monasticism. Secondary documentation will include published studies of the aforementioned sources. Tracing the development of the production and use of alcohol in monasteries over time, will reveal how and why alcohol moved from the periphery to the core of monastic life.

Presentation Time/ Location: ***Oral Presentation, Session I 9:45-10:00 AM, NC Room 1313***

Title: **SYNTHESIS OF SOLKETAL FROM CRUDE GLYCEROL**

Primary Presenter: Joseph Didelot – Chemistry
Coauthor: Emily Millward
Faculty Mentors: Michael Jacobs and Shamim Ahsan

Abstract: Production of biodiesel results in substantial amounts of glycerol by-product. This excess of glycerol can provide the feedstock for the synthesis of the high-grade oxygenated fuel additive solketal. Solketal is formed from glycerol via a ketalization reaction with acetone and a catalyst. The reactants and catalyst (tin chloride) are combined, stirred, and heated to 60° C for a duration of 2 hours that yields a solketal product. Solketal formation was confirmed by GC-MS. In addition, heat of combustion studies were determined by bomb calorimetry. The ketalization method proved to be an inexpensive way to produce a desirable fuel additive while utilizing waste from biodiesel production.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 – 12:00 PM), Poster #15***

Title: **THE RELATIONSHIP BETWEEN GENETIC MONOGAMY AND PARENTAL INVESTMENT IN CONVICT CICHLIDS, *AMATITLANIA SIQUIA***

Primary Presenter: William Dokai – Biology
Coauthor: Ashleigh Nakata
Faculty Mentor: Jennifer Gagliardi-Seeley

Abstract: Convict cichlids, *Amatitlania siquia*, are a freshwater Neotropical fish species, which exhibit bi-parental care of their offspring. Until recently it was believed that the species was genetically monogamous. A recent study comparing the genetics of all offspring in a brood found that a portion of the population is socially monogamous. However, this previous research did not compare the genetics of parents to the offspring, to determine if it is one or both sexes engaging in extra-pair mating. Our research is focused on further exploring the mating system of these fish, to examine which of the parent fish is engaging in extra-pair mating. Based on previous research regarding male parental care in this species, we hypothesized that any mixed broods would be the result of male fish engaging in extra-pair mating. We also hypothesized that parental care behavior would be negatively correlated with fish exhibiting social monogamy. Convict cichlids were observed in the wild, during their breeding season in Lomas Barbudal biological reserve, Costa Rica. Pairs of cichlids with offspring (fry) were observed and each event of parental care behavior, such as brood defense and food provisioning, was recorded. After behavior was recorded the entire brood of fry, and both parents were captured, and a minimal tissue sample was collected for genetic analysis of fry parentage. Results are pending the genetic analysis of tissue samples collected in the field, to examine the parentage of fry and the relationship between social monogamy and parental care behavior.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #16***

Title: **AN OBSERVATIONAL COMPARATIVE ANALYSIS FOOD SERVICE PROVIDERS IN MEXICO AND UNITED STATES**

Presenter: Kori Dover – Nutrition
Faculty Mentor: Jackson Lamb

Abstract: Based on laws of existing Health Department regulations in Denver Colorado, our research

team set out to see if the same regulations are in place in restaurants in Mexico. Our research team observed restaurants in Oaxaca Mexico. The resulting paper outlines the discrepancies in Food Service regulations between the two cities. Using the city of Denver Department of Public Health and environment food service regulations as a guideline, our team observed several restaurants in Oaxaca Mexico and found critical food violations if they were to follow other regulations in Denver.

Regulations used in this research include;
OSHA regulations protecting workers.
Proper sanitizer chemicals and soaps.
Temperature of exposed food
Time and temperature abuse of food.
Using a safe water supply.
Proper hot water temperature.
Proper sewage egress.
Proper exhaust.
Proper make-up air unit.
Having sufficient Refrigeration.
Observing rodent control s
Sanitized ice supply.
Accessible hand washing sinks. Pressurized water.

The resulting research is an eye opener. It details the lack of regulations in countries outside of the United States. This research should serve as an advisory to tourists and students.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30-4:30 PM), Poster #20***

Title: **AVIAN RESPONSE TO VEGETATIVE REGROWTH IN THE WAKE OF A GRASSLAND FIRE**

Primary Presenter: Kayla Drake – Biology
Coauthor: Heather Pernell
Faculty Mentors: Erin Bissell and Christy Carello

Abstract: Fire is a natural and necessary part of the ecological cycle that can dramatically transform a landscape, altering the vegetation, habitat, and food resources for local avian communities. Ruderals, such as cheatgrass, establish themselves quickly after a disturbance, outcompete desirable native plant species, and consequently have a negative impact on vegetative composition. On August 2nd, 2016 a lightning strike ignited a wildfire on South Table Mountain in Golden, Colorado, burning approximately 12 hectares of grassland. Between November 2016 and April 2017, 8 fires had been set to Green Mountain in Lakewood, Colorado, that burned over 124.4 hectares.

We used South Table Mountain and Green Mountain as experimental sites to observe and document differences in avian species composition, abundance, and behavior between burned and unburned grassland areas. We also conducted vegetation surveys, comparing native and non-native plant species in the burned and unburned areas. We hypothesized that while, our research had previously shown burned habitat is favored by avian communities, non-native vegetation, such as cheatgrass has a negative impact on avian habitat use. Observations were conducted weekly in June through October 2017 on South Table and Green Mountain. We had a total of four observational sites: one burned grassland site and one unburned control grassland site on each mountain. Ten-minute

point counts were conducted at each observation site to assess avian activity in response to vegetative regrowth following fire.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #1***

Title: **UNWANTED SEXUAL ADVANCES FRAMED: THE CREATION OF RAPE CULTURE IN THE UNITED STATES**

Presenter: Kayleigh Draper – Communications Studies
Faculty Mentor: William Monsour

Abstract: Sexual harassment and assault have been highly present in the United States over the last few years with a rise in victims coming forward to testify against their attackers. Recently, the most popular cases have been large organizations such as television, sports, and college campuses. The media coverage regarding unwanted sexual advances is believed to have contributed to an epidemic of sexual assault that is known as “rape culture”. The research regarding unwanted sexual advances will investigate two research questions. First, what are the communication behaviors regarding gender and sexuality that can be seen in the United States that normalize rape? Second, how does Media’s communication regarding sexual assault contribute to rape culture? The proposed methodology will include a survey administered among several college campuses asking closed-ended questions to students and faculty. My expected findings from this research are that Media sensualizes sexual assault and makes light of the situation while redirecting blame.

Presentation Time/ Location: ***Oral Presentation, Session III 2:30-2:45 PM, NC Room 1315***

Title: **PERSPECTIVES ON NEUROATYPICALITY, AND PROPOSITIONS REGARDING NEURODIVERSITY IN COMPOSITION STUDIES**

Presenter: Samuel J. Dymerski – English
Faculty Mentor: Roger Green

Abstract: While western civilization over time has purportedly made great strides regarding the treatment of neurodiversity and neurodivergent groups, the manner in which these populations are perceived unfortunately leaves much to be desired. Not only has the difficult and miserable history of this diversity been obfuscated by time and neglect, but still today, these individuals may face a profound dearth of expression, attention, and audience at the behest of their own disability. One particular area which lacks aid and allocation, is the field of composition, where rhetors may find the communication and locution of their own cognitive processes stifled by an inability to perform to the currently extolled rhetorical standards.

In this article, I hope to approach a coherent and interdisciplinary synthesis of perspectives regarding neuroatypical expression in the sphere of composition, considering the innumerate history of neurodivergent treatment, and applying methods of counterstory and active reflection to the way in which these individuals are socially perceived.
In addition to this examination, I urge propositions as to how the framework of composition studies can better reform to fit the needs and expressions of neuroatypical rhetors, including the incorporation of creative writing elements and multimodal integration, and challenges toward the traditional assumptions of clarity. While much work remains to be done, it is my hope that these suggestions begin to restructure the field in a way which the neuroatypical can more easily access, contribute to, and benefit from in turn.

Presentation Time/ Location: ***Oral Presentation, Session II 11:30-11:45 AM, NC Room 1315***

Title: **DIETARY PREFERENCES OF JAPANESE BEETLES (POPILLIA JAPONICA) IN THE DENVER METRO AREA REVEALED BY STABLE ISOTOPE ANALYSIS**

Presenter: Bradley Eidsvoog – Biology
Faculty Mentor: Jason Kolts

Abstract: Japanese beetles were first recorded in the U.S. in 1916 after accidentally being introduced near Riverton, NJ. They appear to be polyphagous, skeletonizing the foliage and eating the buds of over 300 species of plants, although little is known about the true feeding preferences for this species. Japanese beetles have become an invasive pest in many areas, causing significant damage to standing vegetation. Japanese beetles are social eaters; they release pheromones which attract more conspecifics to the same location, typically devastating the plant. Japanese beetles are thought to have arrived in Colorado in the early 1990's and have spread throughout much of the Front Range. In this study, we are utilizing analysis of the stable isotope of carbon (δ13C) to elucidate the dietary preferences of Japanese beetles in the Denver metro area. Because herbivores tend to resemble the δ13C of their diet, and different plants often vary greatly in δ13C, analyzing δ13C of both plant and consumer should indicate the preferred plant taxa for these beetles, regardless of which plant they were collected on. We collected samples of beetles and the plants they were consuming from a variety of locations throughout metro Denver for δ13C analysis. We are initially processing a subset of beetles and leaf/flower tissues collected from four different species of plants, from a variety of locations. Data from these initial samples will give us an understanding of the variation within and among plant species, their correlation with Japanese beetles, and how to proceed with future sampling and analysis.

Presentation Time/
Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #11***

Title: **POTENTIAL CRYPTIC POLYPLOID SPECIATION EVENT IN GEUM ROSSII**

Presenter: Kelda Elliott – Biology
Faculty Mentor: Christopher Meloche

Abstract: While populations of the alpine avens, *Geum rossii*, may be morphologically identical, previous genetic research of this specie suggests that the population is not genetically homogenous. It is likely that populations consist of individuals of varying ploidy levels. As this reproductively isolates these individuals, this cryptic polyploidization event would mark the establishment of a new specie. It is further hypothesized that this has not been a sole evolutionary event, but several, and that populations may consist of individuals of several ploidy levels. This research aims to determine the ploidy levels present in several populations through the use of chromosome root smashes to count chromosomes, and quantitative fluorescence microscopy to measure amounts of DNA present in the individuals of these populations. Were there to be differences in ploidy levels, and therefore species, it would suggest that the potential for hybridization with its relatives is considerably increased. This is of particular interest as global climate change threatens the existence of the tundra and the ability to hybridize with montaigne relatives could preserve this plants genome. Future research into the distribution of the different genome types among populations, of environmental influences in the distribution of population types, and of the mechanisms involved in this process, also has potential to widen the breadth of knowledge that exists pertaining to plant polyploidization.

Presentation Time/
Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #2***

Title: **ORGANIC FARMING SYSTEMS**

Primary Presenter: Perric Falcon – Aviation and Aerospace
Coauthor: Isiah Grayck
Faculty Mentors: David Demalteris and Jackson Lamb

Abstract: Organic farming systems produce yields that average 10-20% less than conventional agriculture, they are more profitable and environmentally friendly organic farming delivers equally or more nutritious foods that contain less or no pesticide residues, and provide greater social benefits than their conventional counterparts (Reganold, John).
Problem: Waste, non-sustainable agriculture, toxins and contaminants, destruction of natural soils and usable farmland as our population continues to increase. With our current agricultural methods and practices and our population increasing to 9 Billion by 2050, we can no longer viably produce enough food to support our population. Agriculture is the cause of the problem, and also the casualty.

Solutions: #1) Transforming waste (compostable materials) into viable soil amendment that can reclaim and rejuvenate damaged, degrading, or highly erodible soils into food producing areas, and creating a business model that incentivizes responsible waste disposal. “Uberizing” compost pick up in the Denver Metro Area for restaurants is one example of this. #2) Combining new technologies such as NDVI (normalized difference vegetation index) imaging to measure soil health and moisture content with organic farming techniques, thus increasing yields while improving the health of the soil.
#3) Building colonies of wild bees will be another aspect of our project which will increase the amount of pollination for the crops as well as give a home to (ideally hundreds of thousands of) endangered animals.

Conclusion: By establishing a research farm, we can have a location and infrastructure to prove all of our solutions in a more tangible way. We are essentially the flagship model for what a sustainable agriculture enterprise looks like, and in the future, we can elaborate on the venue side of things if necessary because we believe this is a key component in transforming public opinion of organic farming and what it offers by getting them to enjoy yoga, or a lunch on top of a mountain or in a field surrounded by what organic agriculture can achieve.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #1***

Title: **PROS AND CONS OF ONLINE RELATIONSHIPS**

Primary Presenter: Evelyn Fiadonu – Sociology
Coauthors: Dacciana Brown, Jennifer Roberston
Faculty Mentor: William Huddy

Abstract: In this paper we will be discussing the good and bad sides of online dating. Our goal is to go in depth on how misleading communication over technology can be. We would also like to tackle the issue on how being so connected to the internet causes people to miss out on the value that is gained from face to face interactions with romantic partners. However, it is understandable that people turn to online dating because it allows them to meet with people who they wouldn’t cross paths otherwise and it allows them to form deeper connection with others. This is made possible through online dating apps because they bring together people who they deem to be compatible. The research that we will be conducting will attempt to answer whether the online dating scene has brought people closer, or if it has distanced our social interaction with one another. This paper will also

attempt to dissect the specific ways online communication can be misleading and discuss the taboo of catfishing and the motives behind people participate in it.

Presentation Time/ Location: ***Oral Presentation, Session III 2:45-3:00 PM, NC Room 1316***

Title: **COMMUNICATION APPREHENSION**

Presenter: George Fields – Communications Studies
Faculty Mentor: William Monsour

Abstract: The natural predisposition to avoid social interaction is a result of unwillingness to communicate. This can be for a number of reasons some may be different for others or apply more accurately. I am going to look at this from two different perspectives to try and find out why we are wired this way. First, I am going to use an interpersonal lens focusing on why we would want to avoid another person we are familiar with using uncertainty reduction. Second, I want to look at this through an interpersonal lens and look at why you don't want to talk to someone pertaining to your own shortcoming or insecurities about the interaction. My first research question is "Does environment affect uncertainty?". My other question is "Does communication apprehension affect most people ?" This can be studied by conducting observations as well as interviews of individuals. I expect to find that the environment does affect the level of uncertainty in how an interaction will pan out. I also expect to find that most people feel uneasy engaging in unfamiliar social interactions.

Presentation Time/ Location: ***Oral Presentation, Session III 2:15-2:30 PM, NC Room 1313***

Title: **OPTIMAL GUT COLONIZATION STUNTED IN ADOPTED NEONATES**

Presenter: Tiffany Fliegel – Integrative Health Care
Faculty Mentor: Jeffrey Helton

Abstract: Gut bacterial populations in bottle-fed infants placed with adoptive parents after birth are less healthy and beneficial to the infant than those of infants in homes with their biological parents. The microbiota of newborns are unique in that they grow from a being that has been alive for months yet is a nearly sterile environment when it exits the mother's womb. Both diet and paternal biome populations are known factors in populating and feeding the gut microbiome. This paper seeks to find a positive correlation between negative factors such as stress and anxiety from the process of leaving the biological mother and the speed and degree growth of the bacterial colonies along the digestive tract. Two groups patients will give have fecal samples over the course of the first few months of life for comparison. If this research was conducted and hypothesis supported, a profitable outcome would include administering certain beneficial bacteria to assist the holistic health of each infant in stressful transition situations.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #5***

Title: **PARTICIPATION IN YOGA STUDY DECREASES STRESS AND DEPRESSION SCORES FOR INCARCERATED WOMEN**

Primary Presenter: Dimpna Flores – Psychology
Coauthor: Traci Lundstrom
Faculty Mentors: Cynthia Erickson and Courtney Rocheleau

Abstract: Yoga has been used to provide stress reduction in many settings. The current study examines the effects of a brief, intensive yoga intervention within a population of incarcerated women. This study was conducted over two phases of data collection (n= 16, Mage= 41, SD= 2.3). Using a randomized cross-over design, the yoga group attended 5 daily yoga classes, and the waitlist group attended 5 daily group meetings. Assessments were taken at 3 different intervals. Several self-report assessments were obtained; this presentation will focus on the Beck's Depression Inventory-2 [BDI2] and Perceived Stress Scale [PSS]. Across all participants, there was a significant linear decrease in BDI2 scores, $F(1, 14)= 19.24$, $p= .001$, and PSS scores, $F(1, 14)= 146.48$, $p > .001$, over time. However, group differences were not significant ($p > .05$). Further, length of incarceration was negatively associated with change in stress ($r = -.65$, $p = .03$), but not depression ($r = -21$, $p =.54$). Due to the transient nature of the jail institution, it is important to examine all possible benefits of interventions that can be provided on a short term basis. This study looks closely at several measures in response to a 5-day intervention. While there were a number of limitations of the study, these results support the conclusion that participation in the yoga study had a positive effect on participants' stress and depression scores regardless of the manipulation. This suggests that autonomy and opportunities to build community may be beneficial elements of jail-based programming.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #14***

Title: **EXAMINING THE LINKS BETWEEN EARLY CHILDHOOD ABUSE AND DISSOCIATIVE SYMPTOMS: THE IMPORTANCE OF MINDFULNESS AWARENESS**

Presenter: Breanna Flores – Psychology
Faculty Mentor: Lisa Badanes

Abstract: Early childhood abuse is linked with posttraumatic stress disorder (PTSD) symptoms, specifically dissociation (Widom, 1999). One compelling intervention for dissociation is mindfulness. Mindfulness interventions aim to decrease pathological symptoms by increasing both awareness and acceptance. The goal of the present study was to extend the research linking awareness and dissociation by examining levels of awareness in individuals with histories of childhood abuse and neglect.

Using 110 Introductory to Psychology students at an urban four-year institution (62% female, average age 24, 63% white) participants completed a series of questionnaires designed to address our study aims. Early childhood abuse was measured using The Adverse Childhood Experiences Scale. Dissociation symptoms was assessed using the 40-item trauma symptom checklist (TSC-40). Mindfulness-awareness was measured using the Philadelphia mindfulness scale.

To test our hypotheses that early childhood abuse would be related to higher levels of dissociation, we ran a Pearson's correlation and found a significant positive relationship between childhood abuse and dissociation symptoms in adulthood, $r = .36$, $p> .001$. We found similar associations between dissociation and levels of awareness, $r = .21$, $p >.05$. We ran a linear regression to examine whether levels of association moderated the relationship between early childhood abuse and dissociation. An interaction term was also included in this model. The model explained 21% of the variance in dissociation with abuse, awareness and our interaction term all significant predictors of dissociation. Results indicate the extent early childhood abuse contributes to dissociation in adulthood depends on current levels of awareness. Our discussion focuses on the importance of awareness training for individuals with histories of childhood abuse and explains how when used ineffectively can contribute to dissociation.

Reference:Widom, C.S. (1999). Posttraumatic stress disorder in abused and neglected children grown up. American Journal of Psychiatry, 156(8), 1223-1229. doi: 10.1176/ajp.156.8.1223

Presentation Time/ Location: ***Oral Presentation, Session II 11:30-11:45 AM, NC Room 1313***

Title: **SOCIAL MEDIA AND ADOLESCENT RELATIONSHIPS**

Presenter: Emily Foster – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research project is to explain and apply the concept of social media and the way it alters adolescents' expectations of reality as it relates to relationships. Social media has become a huge factor in adolescents' lives starting at younger and younger ages over the years. Social media has become heavily engrained in our daily lives and is constantly being utilized, in one way or another. The amount of time humans spend on social media has continued to increase and develop into greater advancements within social media applications. Many of these applications advertise and reflect on people, life, and relationships that we make out to be perfect, when in reality may not be true. One proposed research question is what is the ideal relationship portrayed through social media to young adolescents and what effects does it have on their own relationships? The proposed methodology will be the use of ethnography. I will describe this concept and view on social media and the effects it has on adolescents from my viewpoint as a cultural insider, as well as interviewing a participant and observing their use of social media and role it plays in their life. The expected findings should indicate that social media portrays a false representation of relationships among young adolescents and distorts their reality.

Presentation Time/ Location: ***Oral Presentation, Session III 2:30-2:45 PM, NC Room 1313***

Title: **GLOBAL MASCARAED**

Presenter: Michelle Franco – Art
Faculty Mentor: Sandra Lane

Abstract: Global Mascaraed is a way to take the facts of climate change and take them into a more creative aspect. This will engage the viewer by letting them see that they, along with the rest of the world, are a part of the problem and the solution. This socially engaged artwork will hopefully inspire the viewer to make changes in their life that are both beneficial for themselves and for the planet equally. The method I am using to illustrate this is by making masks that individually speak about specific subjects on what is happening globally with climate change. Each mask will represent a different topic on climate change. These masks will be hanging from a steel rod frame with transparent string that intertwine each other. The strings are all linked together because even though each topic of climate change may be vastly different, that all come together as part of our planet. The stings will be at an average eye level facing away from the wall so that there is enough space for people to walk behind the mask and look through it and capture the audience's attention through its frontal view. In front of the masks there will be mirrors with inscriptions of statistics on how people are impacting our planet and how each person can fix it. The viewer will have to look through the mask in order to read what is inscribed in the mirror to help the viewer understand that each person can make a difference and that each person individually is part of the problem as well as the small individual solution. The expected

result is that the audience will leave with an open mind and realize that climate change is not a joke. That they will leave inspired and perhaps make changes in their life that will help everyone in the long term.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15-3:15 pm), Poster #21***

Title: **AWARENESS OF AVAILABLE NUTRITION RELATED EXTRACURRICULAR ACTIVITIES AMONG MSU DENVER HUMAN NUTRITION DIETETIC STUDENTS**

Primary Presenter: Carolyn Frazee – Human Nutrition
Coauthors: Tracee Hume, Kate Ballard, Marla Lengwin, Nicole Shinefield, Lara Strachan, Hope Woods
Faculty Mentor: Melissa Masters

Abstract: BACKGROUND: In 2016, the dietetic internship match rate was 47%. To be a competitive candidate, nutrition-related extracurricular activities are essential. However, little information exists on the awareness Human Nutrition-Dietetic (HND) students have regarding nutrition-related extracurricular activities.

OBJECTIVE: To evaluate awareness among Human Nutrition Dietetic (HND) majors of available nutrition-related extracurricular activities and their confidence level in their dietetic internship application or resume.

DESIGN: IRB approval for the study was obtained. MSU Denver HND students were recruited to participate in an anonymous survey administered via Qualtrics software. The survey ran from October 9 to October 22, 2017.

STATISTICAL ANALYSES: Statistical analysis was performed using Qualtrics, IBM SPSS Statistics and Microsoft Excel. Data analysis included frequencies, inferential statistics and cross tabulation. Significant outcomes were set to p>05.

RESULTS: The top three sources of extracurricular information were professors, classmates and the Auraria Campus Student Dietetic Association (ACSDA) Facebook page. Juniors and seniors were more likely to be aware of and participate in the ACSDA (p=0.01). Fifty-five percent of students were moderately confident their resume would stand out. Students' confidence level increased with work experience. However, only 47.8% felt confident translating experience to an internship application.

CONCLUSION: This analysis suggests the further along students are in the HND program, the more likely they are to be aware of and have nutrition-related extracurricular experience. However, confidence level was not associated with graduation date but with work experience. Future research is needed to address opportunities to increase participation in extracurricular activities earlier in the HND program.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #13***

Title: **Tfap2a SPLICE VARIANT EXPRESSION IN DEVELOPING ZEBRAFISH**

Primary Presenter: Cassie Frazer – Biology
Coauthor: Ashley Raykovitz
Faculty Mentor: Vida Melvin

The *tfap2a* gene encodes a transcription factor, AP-2α, which is important in the development of the neural crest. The neural crest (NC) is a migratory multipotent cell population that forms in a developing embryo. Loss of *tfap2a* results in loss of NC derivatives such as facial cartilage, pigment cells, and some neuronal cell-types. Tfap2a has 7 exons and is alternatively spliced. Three splice isoforms vary at exon 1, variants 1a, 1b, and 1c, and are conserved across vertebrates, including mice, zebrafish, and human. In this study we are examining the expression of the three splice variants to understand their role during zebrafish development. Using variant specific primers in RT-PCR, we have found that all variants are expressed during early stages of zebrafish development and that 1a and 1c appear to be present in greater amounts than 1b. Quantitative real time RT-PCR (qRT-PCR) will be used to confirm our RT-PCR data and compare the relative amount of each variant that is expressed over the same developmental time course. These studies are the first to compare the expression of these three *tfap2a* splice variants during zebrafish development.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #3***

Title: **SOCIAL MEDIA AS SOCIAL SUPPORT AMONG TEENS**

Presenter: Amanda Garcia – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research project is to explain and apply the concept of social media as social support among teens. Today, we see more teens than ever before on social media. This social media is Facebook, Instagram, Twitter, Snapchat, etc. These teens are posting so much on their social media from outfits of the day to their emotional personal opinions. This can cause a huge problem when it comes to communication and teens. They are becoming so soaked into their technology and social media that it makes it harder for them to talk to a person face to face. For example: we see teens at a shopping mall with their friends where they would be hanging out, talking, and enjoying their time with their friends but instead we see these teens making no eye contact on their social media the whole time. This is growing into a problem when it comes to physical communication. There is one proposed research questions: RQ1: To what extent do teens look to social media for social support? The proposed methodology would include interviews and qualitative data analysis. These methods will help determine which teens (ages, gender, background) use social and to what extent do they post. The expected findings should indicate that most teens no matter the age, gender, or background use social media as their main emotional support. There will be at least two major implications that will be explored in my oral presentation.

Presentation Time/ Location: ***Oral Presentation, Session III 2:15-2:30 PM, NC Room 1311***

Title: **ADDITIVE MANUFACTURING AND ADVANCED COMPOSITES INTEGRATED WHEEL**

Primary Presenter: Josiah Goodley – Mechanical Engineering Technology
Coauthors: Austin Price, Diana Vacio Guevara, Garrett Crowl, Lucas Videtich
Faculty Mentor: Devi Kalla

Abstract: When engineering efficient wheel designs it is paramount that weight reduction, corrosion resistance, reduced manufacturing cost, and high strength are taken into consideration and need to be designed accordingly. However, light weight structures with complex inner features are hard to fabricate using conventional manufacturing methods. Using advanced manufacturing processes to design and fabricate a small-scale wheel prototype that

incorporates these fundamental features will allow them to be improved upon them. The ability to print complex inner structures directly without the need of a mold gives additive manufacturing an edge over conventional manufacturing. Combining the ability of additive manufacturing to variably adjust the infill of the product, allowing for customization, and the capability of high strength-to-weight ratios of advanced composites, should lead to a wheel with improved performance. Carbon fiber wheels that are currently on the market require a considerable amount of time to create and are excessively costly. This project aims to reduce the cost and time to manufacture a wheel with improved or comparable properties utilizing advanced manufacturing techniques. The main goal of this project is to create multiple scale model prototypes of an automotive wheel through additive manufacturing with overlaid composite materials and to research the effectiveness of these two materials combined under load. After the investigation of this project, the predicted outcome is that the overall result will reduce the cost, weight, and material usage; while increasing corrosion resistance and strength-to-weight ratio that already exist. Currently, there are no direct examples or research of combining additive manufacturing and advanced composites for wheel manufacturing. This project will utilize compression and rotational testing to create data that has not been previously acquired with these combined methods. This data will be beneficial to understand the fundamental properties of these combined materials and allow for further research in this emerging field.

Presentation Time/ Location: ***Oral Presentation, Session II 11:00-11:15 AM, NC Room 1314***

Title: **PRESERVICE TEACHERS AS AGENTS OF CHANGE IN THE COMMUNITY RESEARCH IN MULTICULTURAL EDUCATION**

Primary Presenter: Claudia Graham – English
Coauthors: Megan Stevens, Dillon Zamora, Jessica Day
Faculty Mentor: Janelle Johnson

Abstract: This session is designed to share research by preservice teachers from all disciplines on inequities in education. Each student chose a topic they were passionate about and connected it to both theories learned in class and to their clinical field experiences in local schools. We selected and researched an inequity; its sociocultural and sociohistorical roots; described its current local context; developed an action plan; and reflected on the process of taking on this project. We each also produced a public service announcement to raise awareness of the issue at the heart of the inequity.

Presentation Time/ Location: ***Oral Presentation, Session III 3:00-3:15 PM, NC Room 1316***

Title: **EVALUATING CREDIBILITY IN A DIGITAL WORLD: HOW WELL CAN STUDENTS IDENTIFY FAKE NEWS?**

Presenter: Tayler E. Hanson – Psychology
Faculty Mentor: Maureen Flynn

Abstract: Today, multiple technology platforms exist which provide access to a robust amount of information to millions of people around the world. However, much of this information lacks traditional standards of verification and credibility, and it has now become the responsibility of those using this online information to accurately assess the content being accessed (Haas & Wearden, 2003). Students aged 18-24 use online information more than any other age group in America (Hargittai, Fullerton, Menchen-Trevino, & Thomas, 2010). Thus, it is necessary that college students have the skills needed to make accurate assessments

about the credibility of online media.

The current study sought to explore whether the following factors predict the accurate assessment of an online web-site: motivational reasoning, motivation for accuracy with evaluating online media, digital-skills, and exposure to the importance of evaluating online media within the classroom. The sample consisted of 122 undergraduate students enrolled in Introductory Psychology courses. Students completed several self-report measures as well as an online evaluation task in which participants were asked to answer questions about the credibility of an online webpage. Results of the study showed that the average score on the online evaluation task was 27% (SD = 30.47). Furthermore, 38% of the sample earned a 0% on the task. Age emerged as the only significant predictor of scores on the credibility assessment task. Limitations of the current study as well as areas of improvement for future research will be discussed.

Presentation Time/ Location: ***Oral Presentation, Session III 2:45-3:00 PM, NC Room 1311***

Title: **DETECTION OF ARSON ACCELERANTS USING PLOT-CRYO ADSORPTION**

Presenter: Daniella Hernandez – Chemistry
Faculty Mentor: April Hill

Abstract: When a sample is very small or very complex, headspace sampling can be used to analyze any volatile components in the sample. In cases of suspected arson, for example, trace accelerant residue must be detected in complicated matrices, such as carpet fibers. This project is focused on the optimization of a new technique for headspace sampling, called porous-layer open-tubular cryogenic headspace sampling (PLOT-Cryoadsorption). The method uses a modified gas chromatograph (GC) to convert a liquid sample to a gas, and to sweep this gas from the sample container into a PLOT column using a flow of helium. This PLOT column is housed in a cryogenic chamber, which is held at low temperature to trap the analytes in the PLOT column. The analytes are then desorbed by passing a solvent through the PLOT column and collecting it in a GC vial for analysis by gas chromatography-mass spectrometry (GC-MS). In forensic science, the current method of detecting accelerants in arson evidence uses a carbon strip to absorb any gas emitted from the arson sample, which is then extracted by solvent and analyzed via GC-MS. This method can take anywhere from 30 minutes to two hours to obtain a viable sample. Using the PLOT-cryo method, different burned samples of evidence from an arson scene were tested to determine what the accelerants used were. The accelerants used were kerosene, diesel, and gasoline. Using the cryo method, the sample time was shortened down to 30 seconds per sample.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #20***

Title: **THE BENEFITS OF YOGA THERAPY FOR MENTAL HEALTH: A META-ANALYSIS**

Primary Presenter: Jordan Hidalgo – Psychology
Coauthors: Erik Vazquez, James Webster, Joshua Greatz
Faculty Mentor: Michael Rhoads

Abstract: A meta-analysis was conducted of studies that examined the benefits of yoga therapy for psychological disorders. A number of study characteristics (type of yoga, type of disorder treated) were identified in order to assess moderating variables. The findings of this study can be used to guide future research.

Summary: Yoga therapy is an emerging treatment for mental health issues. A number of studies have developed programs and implemented various forms of yoga in an effort to treat a wide array of psychological disorders. While prior systematic reviews have been conducted on yoga therapy, a meta-analysis has not been done to synthesize the findings. Additionally, a meta-analytic approach allows for an examination of moderating variables that can highlight avenues for future research. The following research questions were examined: Is yoga therapy effective for treating psychological disorders? What types of yoga therapy are most effective for treating psychological disorders? What types of psychological disorders are best treated with yoga therapy? What significant moderator variables can be identified by conducting a meta-analysis on yoga therapy? We hypothesize that yoga therapy is effective for treating psychological disorders. Additionally, we postulate that yoga therapy is more effective for treating less severe forms of mental illness, and that yoga therapy is more effective when it is provided by a certified mental health professional.

Yoga has been found to be helpful for children with ADHD in managing their emotional and behavioral problems (Abadi & Madgaonkar, 2008). This study followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). In order to determine which studies to include in this meta-analysis, the following inclusion criteria were used: 1) The study had to involve yoga therapy; 2) The study had to include an experimental group and control group; 3) The study had to report data that allowed for the calculation of all means, standard deviations, and sample sizes for the experimental and control groups; 4) The study had to be in English in order for the author to read, code, and interpret the data; and 5) The study had to be accessible. Studies were excluded if they did not meet all five of these inclusion criteria. Boolean operators and search limits were used to assist the literature search (Vincent, Vincent, & Ferreira, 2006). In addition, the reference lists of studies that met inclusion criteria were utilized to track down additional eligible studies. Once the selection of studies was completed, each article was coded by the lead researcher and by a research assistant. Inter-rater reliability was addressed by discussing any discrepancies in coded items so that a final percent agreement of 100% was accomplished.

The data were analyzed using OpenMEE open source meta-analysis software (Byron, 2016). An effect size (Cohen's d) was calculated for each study (Cohen, 1992). To test for heterogeneity of studies, a Q-statistic and an I2 statistic were calculated (Higgins, Thompson, Deeks, & Altman, 2003). In order to visually represent the effect sizes and confidence intervals of the studies included in this meta-analysis, a forest plot was generated. Due to the fact that different populations of participants were involved in the various studies included in this meta-analysis, we selected the random-effects model. We viewed this model to be most appropriate since participants in the various studies differed by age, type of psychological disorder, and other characteristics. However, we also calculated effect sizes using the fixed-effects model, which assumes that all studies are from a single population who are tested under similar conditions. An issue of meta-analyses is publication bias "the phenomenon in which studies with larger effect sizes are more likely to be published and included in a meta-analysis". We tested for publication bias by generating a funnel plot. This graph provides a visual representation of potential publication bias. Finally, we conducted a number of moderator variable analyses. The following study characteristics were coded and analyzed: type of yoga, type of psychological disorder, type of study (published or unpublished), location of study, study quality, and year of publication.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 – 12:00 PM), Poster #14***

Title: **SEARCH AND RESCUE ASSISTANCE ROBOT**

Primary Presenter: Jorge Iniguez – Mechanical Engineering Technology
Coauthors: Andrew Soper, Victor Gaytan, Cameron Hume
Faculty Mentor: Ananda Paudel

Abstract: When people are placed into dangerous positions through natural hazards or disasters, someone must come to their aid as first responders. In turn, the first responder must put themselves into the same situation. Our team will be building a robot to assist with the reconnaissance, recovery, and assistance to patrons who are placed into dangerous positions. The Search and Rescue Assistance Robot (SRAR) will be a small form factor, ruggedly maneuverable robot, which can carry medical or other supplies to the patron in need. To reduce the footprint, but increase the capability of the robot, high torque electric motors will be attached to a continues tracked tire (Tank Tread). The robot will be controlled by a simple Arduino system, which the operator controls remotely through a navigation pane aided by FPV (First Person View) camera system installed on the SRAR. The body will be made out of a composite structure, to help lessen the vehicles weight while at the same time preserving strength. Testing will be performed at remote locations which will mimic terrain similar to what will be encountered in a real-life search and rescue missions. The SRAR will be another tool to help first responders and law enforcement become more efficient, while at the same time reduce the risk of personal involvement in the situation. When seconds mean the difference between life and death, time is of the essence.

Presentation Time/ Location: ***Oral Presentation, Session III 2:30-2:45 PM, NC Room 1314***

Title: **VISUALIZING Tfap2a ISOFORM EXPRESSION IN ZEBRAFISH THROUGH IN SITU HYBRIDIZATION**

Primary Presenter: James Isaac – Biology
Faculty Mentor: Vida Melvin

Abstract: Key events in the development of the neural crest and its derivatives are orchestrated by the transcription factor AP-2°α. The sequence of *tfap2a*, highly conserved in vertebrates, contains seven exons which encode the protein's dimerization, transactivation, and DNA binding domains. Loss of function studies with zebrafish homozygous for a mutant form of the *tfap2a* gene called Lockjaw indicates that the transcription factor is essential for the development of the neural crest derived melanocytes, peripheral nervous system, and parts of the craniofacial skeleton. Although alternative splicing of the first exon is known to produce a number of isoforms in mice, sheep, humans, and various other species, it is currently unknown which isoforms are extant within zebrafish. We are performing In Situ Hybridization using antisense RNA probes specific for each splice variant to characterize the presence of the AP-2α isoforms at key developmental timepoints. Immunohistochemical methods will be used to visualize the presence of the isoforms within the embryo. Combined with the work of other students in the lab, these experiments will provide more comprehensive knowledge of *tfap2a* splice variant expression during zebrafish development.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 – 12:00 PM), Poster #9***

Title: **DETERMINATION OF ESSENTIAL INITIATION FACTORS FOR RNA STRUCTURE-BASED TRANSLATION WITHIN THE BLACKCURRANT REVERSION VIRUS**

Primary Presenter: Isaiah Jackson – Chemistry
Coauthors: Laura Baquero, Scott Wesley Bean
Faculty Mentor: Megan Filbin-Wong

Abstract: Viruses require specific cellular machinery or initiation factors for the process of viral protein synthesis. The plant RNA virus Blackcurrant Reversion virus (BRV) utilizes the unique RNA structure-based method of translation initiation called a cap-independent translation enhancer (CITE). The CITE is located in the 3' untranslated region of the RNA and is proposed to bind to initiation factors or ribosomal subunits and deliver them to the 5' end of the RNA to initiate protein synthesis at the genome start codon. Using in vitro transcribed and purified RNA for pull-down assays, it is believed that proteins that bind to the CITE in a structure and sequence-dependent manner can be identified. What has resulted from recent experimentation is the production of BRV RNA. This BRV RNA has been purified and concentrated in preparation for a Biotynlation pull-down assay and Co-precipitation. Moving forward pull-down assays and analysis techniques will be utilized in the determination of the specific initiation factors. Some prospective initiation factors include eIF4G and eIF4A. Following the acquisition of this information it is expected to be applicable towards understanding other viruses that are similar to BRV in regards to function and or structure. As well as this, this information would also beneficial in eradication of the BRV.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 – 12:00 PM), Poster #7***

Title: **WHERE DOES YOUR FOOD COME FROM? THE NEED FOR GREATER PUBLIC AWARENESS OF SUSTAINABLE FOOD SYSTEMS**

Presenter: Leigh Jardine – Individualized Degree Plan
Faculty Mentor: Cielle Amundson

Abstract: While the food movement has been gaining in strength and numbers during the past few decades, the majority of Americans still do not understand the importance of knowing where the food they buy and consume comes from, or how it got from the farm to their table.

The goal of this project is to increase public awareness about where food comes from, including the use of fossil fuels and chemical inputs to grow, process and ship it to market. There exists a better, non-harmful and non-extractive system for growing, processing and shipping food. Greater awareness of the issue will help convince people that they should care about this critically important issue that effects everyone.

Through a review of existing literature related to the problems with industrial agriculture, solutions based on sustainable farming methods, and analysis of both scholarly and popular works in this field, the author concludes there remains considerable education to be done to increase awareness of the need for a more sustainable food system as well as greater support for regional and local small-scale farmers.

Presentation Time/ Location: ***Oral Presentation, Session II 11:30-11:45 AM, NC Room 1311***

Title: **WHAT ARE BLIND BOXES AND WHY YOU SHOULD CARE ABOUT THEM**

Presenter: Mason Jenkins – History
Faculty Mentor: Sheila Rucki

Abstract: As video game budgets have evolved, so too have their revenue models. It is commonly the case that video game publishers and developers have pivoted towards a digital goods and transaction-based system. This revenue model is known within the video games industry as the games as a service, or micro-transaction model. Blind-Boxes are a staple of the micro-transaction model and the ethics of which are poorly understood and marketed to consumers; the governing rating agency for video games the ESRB currently only requires an “online purchases” warning with no associated rating prerequisite. The problem with this from a consumer’s advocacy perspective is that Blind-Boxes contain many of the psychological elements of gambling games. Behavioral economics provides useful heuristics, framing devices and market explanations for understanding and classifying non-rational behaviors of which are symptomatic of Blind-Boxes.

Presentation Time/ Location: ***Oral Presentation, Session II 10:30-10:45 AM, NC Room 1311***

Title: **LOS VERDADEROS DESEOS**

Presenter: Alyssa Johnson – Modern Languages
Faculty Mentors: Kelly Conroy and Meredith Jeffers

Abstract: This paper will compare two misunderstood protagonists from distinct literary works. The first is called “El banquete” written by Julio Ramón Ribeyro from Lima, Peru. The protagonist, Don Fernando, is seen as one who spends inconceivable amounts of money to better his political standing and to help others in his community. The work he does for others gives supplementary characters and readers the misconception that his intentions are morally just and not guided by his selfish desires. The other protagonist he will be compared to is El Pongo from “El sueño del pongo” written by José María Arguedas. There is a misconception that those who are “pongos” or servants are not intelligent nor capable of making a difference in their own lives or the lives of those who surround them. This misconception is proven wrong as El Pongo shows his righteous desires for himself and the other servants who work with him. El pongo tries to make a difference by expressing himself and warning his boss or “El Patron” of a dream he had that may be an omen of El Patron’s future consequences. Each story portrays the dreams of men striving to make a difference in their own circumstances, but they have vastly different desires and intentions. This paper will portray the desires of both characters and divulge their true intentions. By doing so, the reader will be able to correct the misconceptions of these characters in these culturally influential literary pieces.

Presentation Time/ Location: ***Oral Presentation, Session II 10:45-11:00 AM, NC Room 1313***

Title: **HISTORY AND AGE OF FOREST IS CORRELATED WITH WILDFIRE EXTENT IN THE COLORADO FRONT RANGE**

Primary Presenter: Dylan Jones – Environmental Science
Coauthor: Adriana Solano
Faculty Mentor: Sarah Schliemann

Abstract: Continued development across the Colorado Front Range has been giving rise to a fire

prevention system that is out of the norm of regular fire cycles within the environment. Fires have been controlled for nearly a century. This has caused more costly, large, and hot wild fires to occur due to the subtle changes in the forests vegetative characteristics and overall age; increasing the fuel available to burn, damaging the soils, and destroying seed beds, which is slowing down the forests regrowth. To see the impact of historical and recent fires in the Front Range during the years of 2002 to 2017, data was taken from ArcGIS's website for fires in the United States. Then, it was compared against data obtained from Arc, ESRI, and other geodatabases with additional data on vegetative information. The statistical information obtained was analyzed using linear regression to show the correlation between the forests and the fires. This study analyzes the association between the size and damage costs of wildfires to the relative "ages" of the forests.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #18***

Title: **ASSESSING THE SUCCESS OF REFORESTATION EFFORTS IN ONE OF COSTA RICA'S MOST VALUABLE HABITATS FOR NORTH AMERICAN MIGRATORY BIRDS**

Presenter: Rebecca Keen – Biology
Faculty Mentor: Faculty Mentors: Christy Carello and Erin Bissell

Abstract: Habitat loss represents a significant threat to biodiversity worldwide. Avian abundance and diversity, which are also used as bio-indicators of ecosystem health, have significantly declined in recent decades in response to habitat loss. While their decline has been clearly tied to changes in behavior and migratory patterns, how habitat loss and recovery affects bird species distribution, behavior, and movement is not as well studied. In this study, we assess the effects of reforestation efforts in the Monteverde region of Costa Rica on bird species composition in a pre-montane wet forest. Two 50 m belt transects have been established in the following sites: mature forest, new forest (5 yo), and pastureland. Each transect is surveyed monthly for 30 minutes from February to May 2018. All birds within 25 meters of the centerline of the transect are identified and relevant behaviors are noted; lastly, the height of each bird in the canopy is estimated. We will compare feeding guilds, migratory guilds, and avian behavior among restored, partially restored, and cleared forest habitats. Our preliminary data show that forests only 5 years old can provide habitat for forest dwelling bird species. Since resident birds stake a claim to preferred habitats in mature forest first, North American migrants are forced to occupy relinquished new forest and pastureland. Ultimately, we expect to find differences in avian species composition and habitat use among habitat types. This study is important for understanding the impacts of forest restoration efforts in the tropics.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #17***

Title: **THE INVENTION OF THE SPARK: HOW CINEMATIC ITERATIONS OF STALKING EQUATE PASSION WITH PURSUIT**

Presenter: Kelsey Kelly – Modern Languages
Faculty Mentor: Eneri Rodriguez

Abstract: Stalking is one of the most acutely underreported interpersonal crimes, especially within the LGBTQ community, where reports of relationship violence are notoriously absent because of a general lack of comfort with, access to and representation in local law enforcement. In the early 1990s, the first protective legislation defining stalking as a criminal behavior was drafted in the United States. At this same time, we see an

influx of film that illustrate stalking vignettes. These early representations are largely heteronormative, as the gender of the stalker directly impacts the tone of the plot. In performing content analysis of 21st century Western film that aligns and contrasts with the dominant narrative, I address common themes and expose how queer representations of these ideas are indicative of relationship norms and values influenced by the encompassing cultural environment. My foundational questions address representations beyond the heteronormative gender binary of Hollywood. How does queer film accept or reject the common understanding of stalking and what does this tell us about how film shapes our relationship expectations? In analyzing cinematic representations of pursuit in same sex relationships, I hope to better understand how patterns within the queer subculture are influenced by mainstream media and identify the means of resistance. Do we define the boundary between passion and peril, or are we following the script of a culturally constructed screenplay?

Presentation Time/ Location: ***Oral Presentation, Session I 10:00-10:15 AM, NC Room 1316***

Title: **ADDITIVE MANUFACTURING APPLIED TO ORTHOPEDIC SUPPORTS**

Primary Presenter: Josh Kenning – Mechanical Engineering Technology
Coauthors: Dan Skousen, Michaela Beadles
Faculty Mentors: Ananda Paudel and Devi Kalla

Abstract: Orthopedic Supports, specifically casts, are a crucial tool for medical treatment of bone fractures and other injuries. Key functions of casts and other supports are to support the injured area of the body and provide protection during the healing process. Current casting technology dates back to the 18th century, and poses problems in terms of comfort, cleanliness, and adjustability for the wearer, as well as lack of access for the physician.

This research project investigated the possibility of applying Additive Manufacturing (3D printing) technology to the creation of Orthopedic Supports. Additive Manufacturing is already being utilized for prosthetics and for procedures such as hip replacements. In the case of Orthopedic Supports, it may be possible to use Additive Manufacturing to address the problems of comfort, cleanliness, adjustability, and susceptibility to water.

Customized orthopedic supports were developed and analyzed in this project. 3D scanning technology was used to capture the size and shape of patient limbs. This data was converted into CAD files, which were then manipulated to create patient-specific printable supports. A user survey conducted at the end of the project indicated that the 3D printed support is rigid enough to provide support, while providing enough flexibility to accommodate small adjustments. Further refinements indicate that a water-resistant orthopedic support is feasible.

The implications of the project include the ability to tailor supports for patient comfort and individualized therapy needs, as well as the creation of a water-resistant or water-proof support.

Presentation Time/ Location: ***Oral Presentation, Session II 10:30-10:45 AM, NC Room 1314***

Title: **COMPARISON OF *AEDES AEGYPTI* AND *AEDES ALBOPICTUS* HABITATS ON THE BIG ISLAND OF HAWAII**

Primary Presenter: Jiwon Kim – Biology
Coauthor: Daniel Nichols
Faculty Mentor: Robert Hancock

Abstract: *Aedes aegypti* and *Aedes albopictus* are the two major invasive vector mosquitoes that have been established on the Big Island of Hawaii over the past century. On top of our own data collection, citizen science database, iNaturalist, was utilized to identify the *Aedes* breeding sites. Big Island offers a unique habitat for *Aedes* with its broad range of coastal climates from dry, desert-like climate to lush rainforest, resulting in habitat segregation. *Ae. albopictus* allopatry was observed in areas of highest rainfall and vegetation, while *Ae. aegypti* was found mostly in the driest part of the island. Data also supports that sympatry of the two species occurs in low rainfall areas. While iNaturalist provided locations of the breeding sites, it lacked information about containers used. We recorded our observations on the *Aedes* containers use. The larvae of both species were found in a broad range of containers used for breeding, from manmade waste such as buckets, bottles and tires, to natural habitat such as rock cavities or plants, especially ornamental bromeliads, which are classified as phytotelmata. Unlike in the continental United States, *Ae. aegypti* was found in exposed rock pools where territorial rock pool mosquitoes are normally found. The data observed in iNaturalist is useful, yet inconclusive. The observations can only identify positive locations, and is not extensive enough to confirm negative breeding locations of either species. Control on the Big Island is difficult, as the locals prefer to avoid chemicals available as adulticide. Reduction in numbers of adults is improving as education initiatives promote the reduction of containers in yards. However, the abundance of phytotelmata offers a prime breeding ground for weeks after a rain, as the plants retain water.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #12***

Title: **WHEN LIFE GIVES YOU GARBAGE, BUILD A HOME WITH IT**

Presenter: Kirstyn Kotwal – Individualized Degree Plan
Faculty Mentor: Sara Jackson

Abstract: In cities across North America, zoning, building, trespassing, and anti-camping regulations make transitional and non-conventional housing options scarce, while creating cultures of dependence and resistance. Incarceration and hospitalization for unhoused people is 300% more expensive than providing shelters or supportive housing. Current residential and commercial buildings also account for 39% of annual CO2 emissions in the U.S. To create a more sustainable solution to housing the unhoused and providing alternative dwellings for the housed, I am designing a village that utilizes local resources for lower costs than mainstream housing models. I am proposing a sustainable and self-managed village model built with natural and recycled materials for and by a mixed community of unhoused and housed people. Self-managed villages allow for social inclusion where decision-making, operation, and maintenance are placed in the hands of the inhabitants. Rather than the grid system used in modern city planning, established through political and economic structures, I suggest a more traditional community arrangement focused on social and natural concerns. The grid system reinforces property values by emphasizing an economically driven agenda devaluing housing opportunities perceived to negatively impact adjacent property value. This also reinforces social hierarchies through building development in which transitional and alternative housing have become endangered due to regulations holding low-income housing to the expectations of the middle-class.

Providing the unhoused with a place to reside reduces negative impacts on the city and returns some quality of life to vulnerable populations. I intertwine environmental, economic, and social needs and responsibilities within this sustainable design.

Presentation Time/ Location: ***Oral Presentation, Session I 9:00-9:15 AM, NC Room 1314***

Title: **A DEFINING MOMENT ON THE COLORADO RIVER, A KNOWLEDGE GAP ON HOW CLIMATE CHANGE WILL DECREASE THE RIVER'S FLOW 5 TO 20 PERCENT IN THE NEXT 40 YEARS**

Presenter: Eunice Kpekpee – Criminal Justice and Criminology
Faculty Mentor: None

Abstract: Management of global water resources presents one of the most crucial challenges of the 21th Century. Global Population will increase by three billion or more over the next 50 to 75 years coming, and the number of people living in urban area will more than double. Most of the world's Population growth will occur in developing countries where water is already critically short and many of the residents are impoverished. Even today, billion people do not have access to safe and affordable drinking water and perhaps twice that many lack adequate sanitation services. In fact, inadequate drinking water quality is a leading cause of infant mortality worldwide. Food production may soon be limited by water availability. Agricultural water use is not Sustainable in many locale around the reasons that include soil Desalinization, ground water Overdraft. and the over reallocation of available surface water supplies. Secondly the knowledge gap can result in an increased gap between people of lower and higher socioeconomic status. The attempt to improve people's life with information via the mass media might not always work. The way this is planned, mass media might have the effect of increasing the difference gap between members of social classes. for example: land water, one of the important of land coven, is the indispensable and important basic information for climate change studies, ecological environment assessment, Metro - Control analysis, etc. This article describes the overall study on land water in the program of global land cover remote sensing mapping, through collection and processing of land. Another example today in Colorado because of Over Population house rents growth up every day the same like water supply in future.

Presentation Time/ Location: ***Oral Presentation, Session I 10:00-10:15 AM, NC Room 1314***

Title: **PROPOSED RESEARCH ANALYZING INTERPERSONAL RELATIONSHIPS AND COMMUNICATION INVOLVING EDUCATION OF LEGAL CANNABIS**

Presenter: Cameron Krausman – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research project is to explain and apply the concept of "interpersonal communication" when educating and selling legal cannabis products to older generations who have lived majority of their lives during cannabis prohibition. There is one proposed research question. RQ1: To what extent, if any, do customers over the age of 40 feel uncomfortable or nervous when buying legal cannabis products for the first time? The proposed methodology will include surveys. This method will help determine which customers (age, gender, state of residence) are nervous or uncomfortable when shopping in retail cannabis shops as well as what interpersonal communication tactics better their experience. There will be at least two major implications that will be explored in my oral presentation.

Oral Presentation, Session III 2:30-2:45 PM, NC Room 1311

Title: **DECLINING MARRIAGE RATES IN THE UNITED STATES**

Presenter: Brent Labb – Communications Studies
Faculty Mentor: William Monsour

Abstract: The purpose of my work is to look closer at the decline in marriage rates in the US. Marriage is defined as the joining of man and woman (or homosexual marriages in states where it's legal). The marriage serves as a contract of sorts, tying the two people together financially, socially, and legally. The research questions posed are: 1.) Are millennials less inclined to get married than generations past? and 2.) If so, what is the rationale behind this decreased desire to go through the formal channels to solidify a relationship as a lifelong endeavor? To get a better understanding of millennials views on marriage, I will be analyzing both open ended questioning to reveal their inner feelings, and also a more straight forward Likert Scale questions to better understand to what extent the decreased desire to marry has become. The Likert Scale questions should offer a lot of quantitate data to analyze and compare to generations past. The expected findings are that more millennials are open to the idea of perusing other aspects of life before focusing on marriage. Put another way, marriage may fall behind other priorities for a period of time, or perhaps for their entire lives. These other priorities include career, friendship, and ability to live their lives with as much individual freedom as possible.

Presentation Time/
Location: ***Oral Presentation, Session II 10:30-10:45 AM, NC Room 1316***

Title: **HOW PHYSICAL ACTIVITY EFFECTS ACADEMIC ACHIEVEMENT AND THE CONNECTION TO BOREDOM**

Primary Presenter: Madeline Latimer – Psychology
Coauthors: Ruth Sherpa, Kayla Styles, Carolyn Villano
Faculty Mentor: Michael Rhoads

Abstract: Description: This study examined the effects of physical activity on the enjoyment, attention, and academic achievement of college students. Students completed experience sampling forms in class and completed a summative survey at the end of the semester. Brain booster activities were found to increase students' perceptions of enjoyment and attention. Summary: The purpose of this study was to explore the possible benefits of alternative teaching practices in statistics and research methods courses. We examined how movement-integrated learning affects academic outcomes. Students were encouraged to participate in various brain booster activities which incorporated movement with instructional content. Four brain booster activities were implemented (split room, sports galore, walk & talk, or stretch & review). After the activity, students were asked to complete a survey which assessed their perceptions of the brain boosters. At the end of the semester students were asked to complete a final survey and their overall grades were recorded and analyzed with consideration to the students' survey results. Previous studies have shown the benefits of adding movement to the classroom in both the primary and secondary school-aged population (Bobe, Perera, Frei, & Frei, 2014). Other studies have indicated classroom breaks with physical components can have a positive influence on academic achievement (Howie, Schatz & Pate, 2015). Additionally, research has shown that fitness levels positively correlate with cognitive abilities among children (Kibbe, 2011). Due to the positive cognitive benefits children have experienced from physical activity, we sought to examine this approach in adult learners at the college level. Our hypothesis predicted higher academic achievement for college students that were exposed to brain boosters versus those learning with traditional instructional strategies. We also hypothesized that brain boosters would enhance students' levels of enjoyment

and concentration. A total of 73 male and female students participated in the study at a University in the Midwestern United States. Participants ranged in age from 23 to 56 (M = 29, SD = 11). All students were read a verbal script at the beginning of the semester discussing issues of confidentiality and the voluntary nature of the study. Students in the experimental and control groups were asked to voluntarily fill out an Experience Sampling Survey using a phone, tablet, or computer in class that was to assess participants' levels of enjoyment and attention. At the end of the semester students were asked to complete a Summative Questionnaire that assessed the positive or negative attitudes that students held about utilizing the brain booster activities in class. The participant's quiz and exam scores were used to evaluate the learning effects of the brain boosters. A Repeated-Measures Analyses of Variance (ANOVA) was used to analyze the differences between the experimental and control conditions concerning the Experience Sampling Survey, Summative Questionnaire, and learning outcomes. All data collected were analyzed using SPSS. Using the experience sampling form, a number of comparisons were made between students learning with traditional instruction versus the brain booster activities. For the Enjoyment Scale, there was a significant difference between the types of instruction, $F(1, 218) = 14.81$, $p > .001$. For the Concentration Scale, there was a significant difference between the types of instruction, $F(1, 220) = 6.13$, $p = .014$. For the Social Scale, there was a significant difference between the types of instruction, $F(1, 219) = 18.59$, $p > .001$. Participants completed a number of survey items on a scale from 1 (strongly disagree) to 7 (strongly agree). In response to the statement "The Brain Booster activities helped me learn", participants showed an overall agreement ($M = 5.44$, $SD = 1.42$). For the statement "The Brain Booster activities helped me pay attention", participants had a mean of $M = 6$ ($SD = 0.71$). Participants also showed agreement to the statement "The Brain Booster activities helped make the material more fun and enjoyable ($M = 6.11$, $SD = 0.78$). In examining learning outcomes, student grades on 8 quizzes and 4 exams were compared. Half of the quizzes and exams occurred after traditional instruction, while the other half took place after instruction using the brain boosters. Students learning with traditional instruction ($M = 103.83$, $SD = 4.47$) performed at a similar level as when they learned with the experimental instruction ($M = 103.06$, $SD = 6.14$). Using a repeated-measures ANOVA, no significant differences were found between the conditions, $F(1, 8) = 0.12$, $p = .737$. To conclude, we found support for two out of our three hypotheses. Results indicated that participants perceived higher rates of enjoyment and concentration when learning with brain boosters versus traditional instruction. However, significant differences were not found between conditions for learning outcomes. Future research using brain boosters should continue to examine methods of instruction that can integrate movement in a developmentally appropriate and enjoyable fashion, while also increasing levels of attention and learning.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #10***

Title: **COMMUNITY BASED RESEARCH: A FOCUS ON TEACHERS' AND STUDENTS' GROWTH MINDSET AND SELF-EFFICACY BELIEFS**

Presenter: Alexandra Lee – Psychology
Faculty Mentor: Bethany Fleck Dillen

Abstract: The purpose of this study was to understand the relationship between middle school teachers' mindset about intelligence and their students' mindset, goal orientations, and self-efficacy beliefs. The participants in this study included 476 urban middle school students and 47 teachers; demographic data are shown in Tables 1 and 2. Both teacher and student participants completed questionnaires that included scales previously shown to have high reliability and validity for testing these constructs. The scales included: the

Assessment of Implicit Theories (Dweck, 2000) and the Patterns of Adaptive Learning Scales (Midgley, 2002). Academic achievement was measured by two sets of standardized test scores over a four-month span in Math and English Language Arts. To investigate the relationship between teachers' and students' mindsets, other motivational constructs (academic self-efficacy and goal orientations) and academic achievement, a Pearson bivariate correlation analysis was conducted on data from the nine variables. Detailed results are shown in Table 2. We will use additional analytical methods to answer other research questions including multiple linear regressions. The results will be discussed in the context of past research on motivation research in K-12 education. We will also discuss implications for classroom instruction and provide directions for future research. The present study adds to previous literature on growth mindset by examining the relationship between teachers' implicit theories of intelligence and those of their students, describing the activities teachers are using to teach students about growth mindset, analyzing how growth mindset relates to academic improvement, and exploring how growth mindset interacts with other motivational processes such as self-efficacy and goal orientations.

Presentation Time/ Location: ***Oral Presentation, Session II 11:00-11:15 AM, NC Room 1311***

Title: **EXPERIMENTS INVOLVING FERRIC REDUCTASE PROTEINS AND THEIR POTENTIAL ROLE IN IRON UPTAKE IN *DROSOPHILA MELANOGASTER* CELLS**

Primary Presenter: Gabrielle Lequia – Biochemistry
Coauthors: Brandon Garcia, Jessica Holst, Omar Rodriguez
Faculty Mentor: Emily Ragan

Abstract: Iron is capable of holding multiple charges, such Fe2+ and Fe3+, but Fe2+ can create free radicals in the body. With the ability of Fe2+ to cause toxicity, the transportation of iron must be heavily regulated to maintain a safe balance. Ferric reductase proteins can convert Fe3+ to Fe2+, then Fe2+ can likely enter the cell through a transporter. We are working toward RNA interference knock down of the expression of two proteins CG8399, a known ferric reductase, and CG1275, a candidate ferric reductase, to see if either protein influences the iron content in Drosophila melanogaster Sg4 cells. Gene specific DNA and negative control GFP DNA was amplified via PCR with sequence specific primers containing T7 RNA polymerase promoter. Agarose gel electrophoresis was used to separate the samples based on molecular weight and determine the success of the PCR reactions. The PCR amplified dsDNA was then purified and used to create dsRNA. Sg4 cells were maintained to be used in RNAi experiments, which involve silencing the genes necessary to produce ferric reductase, and an iron assay was conducted to determine the iron content within the cell. By using modern cloning techniques, the 318 bp sequence encoding the N-terminus of CG1275 isoform A was PCR amplified and ligated into plasmid pET-32a. Expression of the CG1275 N-terminal peptide will be used in the future to create antibodies for use in Western blotting to semi-quantify the amount of CG1275 isoform A protein present in Sg4 cell samples.

Poster Presentation, Session III (2:15 – 3:15 PM), Poster #11

Title: **BIOACCUMULATION OF HEAVY METALS IN THE STONEFLY SPECIES *PTERONARCYS CALIFORNICA* IN THE UPPER ARKANSAS RIVER**

Presenter: Andrew Lewis – Chemistry
Faculty Mentor: Garry Farmer

Abstract: The Arkansas River is the primary drainage for the Leadville Mining District. The area was heavily mined between 1859 and 1986. Effluent from poorly regulated mining operations led to severe contamination of the Arkansas river. The level of heavy metal toxicity in the upper Arkansas exceeded the survivable level for many endemic species leading to local extinctions including the stonefly species *Pteronarcys californica*. The polluted condition of the Arkansas river, which serves as the primary water source for domestic, municipal, livestock, and agricultural needs in the drainage led to the designation of the California Gulch Superfund site in 1988. Following 24 years of EPA funded remediation Colorado Parks and Wildlife determined the river suitable to begin the reintroduction of the extirpated stonefly *Pteronarcys californica*, commonly known as the giant salmonfly. This project intended to determine uptake rates of heavy metal pollutants by the benthic macroinvertebrates and if possible, the endemic trout species that predate on the stoneflies. Water and insect samples were periodically collected from 3 sites along the waterway. The insects were chemically digested with nitric acid and analyzed for the presence and concentration of heavy metals using an inductively coupled plasma mass spectrometer (ICP-MS) and an atomic absorption spectrometer (AAS). Elevated levels of manganese, zinc, copper and the highly toxic metal cadmium were found in the water samples from each of the 3 locations with significant evidence for high rates of bioaccumulation ranging from 10-40x or higher concentrations in the insect samples than were found in the water.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #4***

Title: **THE TALE OF THE ROCKY MOUNTAIN PALE PANTHER**

Presenter: Justin Loucks – Environmental Science
Faculty Mentor: Andrew Wilson

The purpose of this research is to use genetic sequence data to gain a better understanding of the *Amanita pantherina var. multisquamosa*; a phenotypically unique variety native to the Southern Rocky Mountains of North America. *Amanita pantherina* was originally described in Europe, and the name was then applied to a globally diverse range of morphologically similar populations. Previous phylogenetic studies have shown that the Eurasian and North American populations belong to separate clades, thus demonstrating the need for further research. This study will explore the genetic relationship between the Rocky Mountain *A. pantherina var. multisquamosa* and other North American *A. pantherina* populations. The data will then be used to compare the North American populations with Eurasian populations to better understand the species complex as a whole. Molecular sequence data from ITS, 28s and RPB2 regions will be studied under maximum likelihood and Bayesian methods of phylogenetic inference. This research will contribute data to the North American MycoFlora Project, as well as to the understanding of this "*Amanita pantherina* Complex".

Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #17

Title: **A 2D LANDMARK-BASED GEOMETRIC MORPHOMETRIC ANALYSIS OF SKULL DEVELOPMENT IN THE HADROSAURID DINOSAUR, *EDMONTOSAURUS ANNECTENS***

Primary Presenter: Ashley Lownsdale – Environmental Science
Coauthors: Dr. Joseph Sertich, Fox Freeman
Faculty Mentor: David Parr

Abstract: The Denver Museum of Nature & Science recently received a donation of over 6,000 fossils collected from a single locality in the Upper Cretaceous Lance Formation of eastern Wyoming from the Hankla family. The collection primarily consists of fossils from a disarticulated bonebed of *Edmontosaurus annectens*, a species of hadrosaur ("duck-billed dinosaurs"). This collection presents a unique opportunity for research as it has not yet been formally described in the scientific literature. The bonebed is notable as a rare, large sample from a single population of *E. annectens* at different ontogenetic (growth) stages. By comparing specific elements of the skull from the sample ranging from juveniles to adults, we can quantitatively evaluate how the skull of *E. annectens* changed as it matured. Skull shapes at different stages of development could be very different; juveniles likely had shorter skulls (anterior to posterior) compared to adults, with implications for the taxonomy of hadrosaurs specifically, and dinosaurs more broadly. The skull elements to be compared are the jugal, postorbital, frontal, maxilla, and nasal. These elements will be compared using geometric morphometric techniques applied to 2D landmark data. Skull elements are first photographed from lateral, medial, and dorsal/ventral views to create 2D images. Selected landmark data will be analyzed using multivariate statistics using R. The multivariate principal component analysis (PCA) will be employed to quantify ontogenetic change within the sample. Challenges include a small sample size (as is common in studies of dinosaurs) and incomplete specimens. This study will be the first to quantify the ontogenetic series of *E. annectens*.

Presentation Time/ Location: ***Oral Presentation, Session I 9:30-9:45 AM, NC Room 1315***

Title: **DIFFERENCES BETWEEN SPANISH AND FRENCH FOLLOWING THEIR SEPARATION FROM THE ORIGINAL LATIN**

Presenter: Yadhira Luera – Modern Languages
Faculty Mentor: Maria Rey Lopez

Abstract: "Spoken French is completely different from written French", "Spanish has too many grammatical rules", or "French is easier to learn than Spanish"; these ideas are based on the perception that speaker of each language has over the other, specifically when it comes to learning the language. In reality, the perception of the ease or difficulty of learning a language is based on the superficial structure which is the first thing the speaker confronts when learning the fundamental aspects in relation to other levels of the language, such as semantics, phrase structure, discourse, etc. The similarity of languages is relative. If the comparison were established between Chinese and French, for example, the differences would be much larger and profound than between French and Spanish. If it were made between Spanish and French with Catalan between the two, the similarities would be much closer. Languages are represented as branches on a tree where the tree represents the development of different languages from a common trunk which is then subdivided into smaller branches. The common trunk for both French and Spanish is Latin, which comes from an Indo-European trunk. The birth and growth of each of these languages doesn't perfectly correspond perfectly from place to place, but they did take place throughout a relatively unified European culture. This information will be reviewed in this poster, where there will be a comparison of texts from both languages. The poster will delve into the fact that both languages are more different than one would imagine given their relative proximity and attempt to answer why French and Spanish are so different from their original Latin.

Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #14

Title: **BLACK SCHOLES OPTION PRICING FORMULA: ASSUMPTIONS, DERIVATION, AND APPLICATIONS**

Presenter: Chris Lundberg – Mathematics
Faculty Mentor: Ben Dyhr

Abstract: The Black Scholes option pricing formula is used to value and price a wide range of financial derivatives. The derivation of the formula relies on a number of assumptions about the nature of financial markets. It is assumed that financial time series have returns that are lognormally distributed, that return volatility is constant, that there are no transaction costs, and that the price path of the underlying financial instrument follows a random walk. We will examine the mathematical development of the model and the validity of the model assumptions. We will also present a number of practical applications and plans for further research.

Presentation Time/ Location: ***Oral Presentation, Session III 2:15-2:30 PM, NC Room 1314***

Title: **CREATION AND CHARACTERIZATION OF GOLD-NANOPARTICLE CONTAINING CONDUCTIVE SCAFFOLDS FOR CULTURING CARDIOMYOCYTES**

Presenter: Marcos Maldonado – Biology
Faculty Mentor: Andrew Bonham

Abstract: Cardiomyopathies, diseases of the heart, are one of the major causes of death in the United States, and thus research into preventing and treating these complications is imperative [1]. However, due to the nature of limited availability of donors, heart tissue transplantation, culturing human tissues/tissue-derived cells and tissue engineering, finding a suitable extracellular environment in which cardiomyocytes develop and live is difficult to attain. As such, a great deal of work has gone into efforts to produce polymer mimics of the natural cell environment, in properties such as binding sites, stiffness, reactivity, and hydration [2-4]. The purpose of this research is to contribute to the development and characterization of conductive polymer scaffolds for cardiac tissue support for academic, research, and professional settings by creating high purity gold nanorods with defined surface functionalization. This research is important as it could contribute to the ongoing studies in properly accommodating cardiac cells to build functional cardiac tissue constructs and further improve cell retention, spreading, homogenous distribution of cardiac specific markers, cell-cell coupling and synchronized beating behavior at tissue level [5]. By improving this area of research, cardiac tissue engineering can be directed closer to ultimately repairing damaged heart muscle and improve cardiac function in cardiovascular diseases whether they have been acquired or developed through hereditary traits.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #12***

Title: **ATTACHMENT THEORY AND PSYCHOPATHIC BEHAVIOR**

Presenter: Randi Manning – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research project is to explain and apply the concept of “attachment theory” (Martorell, Papalia, D. E., & Feldman, R. D. 2014) as it relates to the explanation of psychopathic behaviors or tendencies. Attachment theory is a concept

in developmental psychology that concerns the importance of “attachment” in regard to personal development. It makes the claim that the ability for an individual to form an emotional and physical “attachment” to another person gives a sense of stability and security necessary to take risks, branch out, and grow and develop as a personality. An example of a positive attachment would be a child who had a secure attachment with their caregiver they are likely to feel confident enough to be actively engaged in their world. But what can be the outcome when that secure attachment is nonexistent? The childhood of a psychopath is usually marked by insecure attachment with their parents where the parents fail to respond to the needs of the preverbal infant thus leading to improper development. There is one proposed research question: RQ1: To what extent, if any does attachment theory play as an explanation in psychopathic behavior in males? The proposed methodology will be structured interviews and focus groups using incarcerated psychopaths as my primary method of delivery. There will be twenty questions pertaining to there early childhood ranging from ages 0-5. There are several implications that will be explored in my oral presentation.

Presentation Time/ Location: ***Oral Presentation, Session I 9:30-9:45 AM, NC Room 1316***

Title: **MICROSATELLITE SEQUENCE AMPLIFICATION AND PRIMER DESIGN FOR *FLUMINICOLA* SPP.**

Primary Presenter: Daniel McCullough – Biology
Coauthor: Andrew Pino
Faculty Mentor: Hsiu-Ping Liu

Abstract: The purpose of my research is to develop microsatellite primers for pebblesnail species. A microsatellite is a tract of tandem repeats within DNA in which certain DNA base pairs are repeated, typically 5–50 times. Primers will be designed and tested from microsatellite sequences. Gel electrophoresis was then used to visualize results. Successful microsatellites primers will be used to genotype individuals to further provide genetic information on a relatively unknown species.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #19)***

Title: **POINT SOURCE POLLUTION IN THE SOUTH PLATTE RIVER**

Presenter: Samantha McKinney – Environmental Science
Faculty Mentor: Sarah Schliemann

Abstract: The South Platte River is a vital part of resource for Colorado, but the river is highly impacted by pollution in the Denver metro area. In this project, we used GPS to map every storm drain along the river from Chatfield Reservoir to Brighton. Inputs that were flowing were marked for further sampling. We used this data to create a GIS layer to visualize the potential points of pollution. The storm drains showed a higher density near downtown Denver, which could indicate that these areas have an increased anthropogenic influence on water quality in the South Platte. The South Platte is a valuable resource to the Denver Metro area and Colorado as a whole. The results of this project can be used better understand the influence people have on the river and could ultimately help to improve water quality of this valuable resource.

Oral Presentation, Session I 9:45-10:00 AM, NC Room 1314

Title: **EVOLVING THE EVOLUTION OF NEURAL NETS**

Presenter: John McKinstry – Mathematics
Faculty Mentor: Steve Beaty

Abstract: The NeuroEvolution of Augmented Topologies (aka “NEAT”) algorithm provided a way to search through various machine built neural networks. This automated process reconstructed the overall organization of a particular neural network, and its weights, given a set of predetermined settings. After the number of generations or the fitness threshold had been satisfied, the algorithm would return the neural network with the lowest error in predicting the data’s outcome. This presentation demonstrates the result of adding a second genetic algorithm to search for the best set of predetermined settings beyond the default. If adjustments to the NEAT configuration settings were only made to a handful of particulars, there would be an approximate search space of roughly 40000 possible combinations. With brute force out of the question, the genetic algorithm evaluated the fitness of a particular set of settings for the given population. It would then select the top configurations by means of ‘Tournament Selection’, which observes the highest fitness of the entire population. Once the top configurations were found, the genetic algorithm would force a normally distributed randomized crossover of one agent’s particular settings and another to spawn a new agent. Before this entire process is completed again, the mutation feature, of a typical genetic algorithm, was added to randomly change an agent’s particular setting at a preset probability rate. The results presented a double edge sword. On one hand, automating the process of the NEAT’s configuration settings allowed the algorithm to find the best of the best without any human involvement. On the other hand, the time complexity of searching for the best set of predetermined settings made it difficult to expand the generation size beyond single digits just to lose a few points in the overall error.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 – 12:00 PM), Poster #13***

Title: **THE EFFECT OF CRIMINALIZATION, PLEA BARGAINING, AND MASS INCARCERATION: REFORMING THE CRIMINAL JUSTICE SYSTEM**

Presenter: Anna McLean – Political Science
Faculty Mentor: Amy Eckert

Abstract: Plea bargaining as an institution has justified criminalization of previously legal actions, creating mass incarceration with streamlined guilty verdicts while avoiding costly and necessary public oversight. Over-criminalization and over-policing of poor neighborhoods is designed to feed poor people into the system, then into prisons. The purpose of this thesis is to scrutinize the impetus for criminalization and its consequences. To determine the consequences for criminalization, human behavior studies were analyzed, as well as statistics for plea bargaining and exonerations. The multi-disciplinary research conducted shows that criminalization continues to get worse as new, more restrictive laws are passed, as well as mandatory minimums and sentencing reform. Currently, plea bargaining circumvents the trial-by-jury process, leaving out the legal checks which ensure fair treatment and preserve the constitutional rights of the accused. Secondary resources give a comprehensive and complimentary account of the history of criminalization. Tracing history back, plea bargaining began when slavery ended; over-criminalization and imprisonment replaced human-ownership. Since then, plea bargaining has become the main mechanism for resolving criminal disputes. Prosecutors have too much power to bargain with defendants, and judges who have little discretion, generally follow their recommendations. This project will show how decriminalization would reduce plea

bargaining and mass incarceration, and furthermore, society would be made safer. This legal system, operating on despair and vulnerability, must be reformed to be an apparatus that removes those who would do harm, but by never, itself, causing harm. Resources spent imprisoning people should instead be spent fixing systemic disparities affecting their lives and their communities. To make this system sustainable, over-criminalization and mass imprisonment must end, and people with mental illness or addiction must be treated as such.

Presentation Time/ Location: ***Oral Presentation, Session II 11:00-11:15 AM, NC Room 1313***

Title: **THE EFFECTS OF MEDIA COVERAGE IN WOMEN'S GOLF**

Presenter: Meg McMullen – Communications Studies
Faculty Mentor: William Monsour

Abstract: The key purpose for this proposed research project is to help the public sphere better understand the struggles that many women athletes face through social media and media communication or lack thereof especially in the golf realm. Throughout history women athletes have always faced a shortcoming in media coverage. The athletic world has been predominately men and just recently have women started to create more buzz and media coverage in the world of women's sports. From lack of coverage it has created a huge wage gap in almost every sport that there are both men and women's teams, not only has it created a wage gap but most of coverage in women athletics is about their clothing and their personal relationships. My research question will be: How does the lack of social media and media coverage in women's sports, specifically women's golf effect their pay, the amount of participants in the sport, and the conversation that surrounds the sport itself? My purposed methodology will use a lot of data analysis, I plan to look at sports channels to see how much time they spend discussing women in sports and the vocabulary used, taking a look at sports apps and accounts to compare how many posts men and women get, and looking at the stories in women's golf and see how they differ from the talk of men's.

Presentation Time/ Location: ***Oral Presentation, Session I 9:00-9:15 AM, NC Room 1313***

Title: **THE MITOCHONDRIAL GENE ORDER OF SPRINGSNAIL**

Presenter: Kevin McQuirk – Biology
Faculty Mentor: Faculty Mentor: Hsiu-Ping Liu

Abstract: This research project is constructed to ascertain the mitochondrial nucleotide arrangement and gene order of the springsnail (*Pyrgulopsis*). An animal mitochondrion contains a circular molecule of DNA that is usually about 16,000 base pairs (bp) long. Mitochondrial gene order is conserved among lineages of eukaryotic organisms; however, lineages of Mollusca are known to be vacillate. No information is known about the mitochondrial gene organization in springsnail. The purpose of this project is to design primers to learn about springsnail mitochondrial gene organization. The minute freshwater snail genus *Pyrgulopsis* is one of the most prevalent and abundant aquatic invertebrates in northwestern North America. These miniscule snails are in the family Hydrobiidae and typically live in lotic habitats and fresh water. *Pyrgulopsis* is the largest genus of freshwater gastropods in the North America. Generally, the mitochondrial genome has 12 to 13 protein coding genes, 2 ribosomal genes, and 20-22 tRNA genes. Observing the Mitochondrial DNA sequences of *Pyrgulopsis* will involve several methods and procedures

to understand the genetic composition of the snail. To begin understanding the gene order of the *Pyrgulopsis* mitochondria, primers will be developed from sequences already obtained for *Pyrgulopsis*. Designed primers will then be tested using protocols developed by Liu et al. (2007). Propitious primers will then be used to test the gene order and DNA sequence. The forward and reverse primer for each gene will be used to examine the gene orientation. Agarose gel electrophoresis will provide a visible confirmation of the successful effect of designed primers. Further analysis will be conducted using amplified DNA fragments which will be sequenced to ascertain the nucleotide sequence. Mitochondrial gene order is a unique mechanism for studying relationships among major families of gastropods. The mitochondrial sequences can also evolve quickly and be a useful tool in determining species of snails.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #4***

Title: **FOOD COMMUNICATION AND THE WORKING CLASS: A CRITICAL APPROACH TO FOOD JUSTICE**

Presenter: Shanee Melendez – Communications Studies
Faculty Mentor: Brendan Kendall

Abstract: In the past 40 years, choices in food have been heavily influenced through the media. Prior to media persuasion, working communities relied on local farmers to produce healthy and reliable food choices, but as society has evolved so have the sources of food. A large portion of consumer choices, especially for the working class, are now limited to big brand and processed foods due to monetary status. Persuasion from food providers and food agencies media campaigns lead to food injustices and food deserts. As more and more urban neighborhoods are developing throughout the country, more citizens of the working class, opposed to the ruling class, are suffering from inequalities surrounding food opportunities. American communities are becoming victims of diet related health issues. In the research conducted a closer look at media campaign persuasion is taken to shed light on why the working class continues to choose processed, unhealthy food options.

Presentation Time/ Location: ***Oral Presentation, Session I 9:15-9:30 AM, NC Room 1313***

Title: **GEOGRAPHICAL ANALYSIS OF HOMICIDE RATES IN DENVER FROM 2013-2017**

Presenter: Danira Memisevic – Criminal Justice and Criminology
Faculty Mentor: Hyon Namgung

Abstract: This study will observe homicide rates in the Denver metropolitan area over the past five years. The purpose of this research is to analyze what changes occurred within the city. This study will include multiple maps based off of the Denver Open Data Catalog. This catalog is a database where crime data for the City of Denver are stored and all data are publicly available. ArcGIS, which is a platform that was created in order to display and analyze data in a geographical manner, will be used to create a story map in order to analyze the patterns of homicide from 2013 to 2017. This study hopes to find an association between environmental changes and homicide rates within the city of Denver. Limitations and future implications will also be discussed.

Presentation Time/ Location: ***Oral Presentation, Session II 11:15-11:30 AM, NC Room 1315***

Title: **STATISTICAL ANALYSIS OF ACADEMIC SUCCESS FOR DENVER URBAN SCHOLARS AND COLORADO YOUTH AT RISK**

Primary Presenter: Nicole Menke – Mathematics
Coauthor: Joel Markworth
Faculty Mentor: Ben Dyhr and Nels Grevstad

Abstract: We will describe conclusions of a group Senior Statistics Project to identify factors that affect academic success for students in Denver Urban Scholars (DUS) and Colorado Youth at Risk (CYAS). These two nonprofit organizations specialize in mentoring, events, and providing a safe space for at risk youths. These organizations have merged and we analyzed which programs from each organization have significant effects on student success. The organizations will use our conclusions to inform their reorganization processes. We use GPA and graduation rates as response variables and use mentor hours, event attendance and demographic information as predictors in our statistical analysis. We also analyzed two questionnaires, Positive Youth Development (PYD) and Development Assets Profile (DAP), that are used to measure an adolescent's individual mindset and level of support system during key areas over time. We used exploratory data analysis to identify items in these questionnaires that could be used as useful predictors in future work. Finally, we discuss challenges encountered in our data analysis including delays, missing data, regression assumptions and the combination of qualitative and quantitative predictors.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #19***

Title: **THE FISCAL IRRESPONSIBILITY OF CRIMINALIZING PROSTITUTION**

Presenter: Dacia Messing – Criminal Justice and Criminology
Faculty Mentor: Andrea Borrego

Abstract: The sex industry is a largely untapped multi-billion dollar a year business. As states face increasing budget deficits and ballooning criminal justice costs, it may be time for them to evaluate the fiscal responsibility of continuing to criminalize prostitution. This paper will use a two-prong qualitative analysis to examine if there is a net benefit to states in legalizing prostitution. First, as the only state with legal prostitution, Nevada will be used as a model to examine the regulations and monitoring needed. Second, the legal marijuana industry will be used to evaluate what the cost of implementing legal prostitution might be for states. The potential impacts to public health and safety from legal prostitution will also be discussed.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #10***

Title: **ROLE MODELING PHENOMENON**

Presenter: Macy Miller – Communication Studies
Faculty Mentor: William Monsour

Abstract: This paper will specifically focus on the topic of role modeling in youth organizations. I will identify and explore the impact of analyzing personalities in youth organizations and the role it plays in role modeling phenomenon. Once I define my terms of role modeling, introverts and extroverts, I explain my reason for studying this phenomenon and why it is important to do so. After I have stated my reasoning, I will review the literature of authors

that have studied peer mentoring in youth organizations and what their input is regarding the subject. Based off of the literature, I formulate two research questions revolving around my study. These questions will pertain to the relationship between youth and peer mentoring in a youth organization setting. RQ1: Role modeling in youth organizations: Why do youth tend to gravitate towards extroverts and not introverts? I then utilize the Social Comparison Theory, Social Judgement Theory and the dimensions of credibility as my research methods to study peer mentoring. This research method will allow me to understand how peer mentoring affects youth and how the dimensions of credibility influences youth. The final section of this paper will focus on the "expected results" of my study and what I believe will come out of it. There are two major implications of this work that will be inquired in my oral presentation.

Presentation Time/ Location: ***Oral Presentation, Session III 2:45-3:00 PM, NC Room 1314***

Title: **ON THE HYPEROPERATION KNOWN AS TETRATION (or hyper-4)**

Presenter: Leland Minaker – Mathematics
Faculty Mentors: Brendan Fry and Diane Davis

Abstract: We briefly go over definitions and the history of Tetration to provide a background to the audience. After this, we look at a few conjectures I've made for an equation that holds "novel" behaviors. From here, the behaviors are elaborated from my own personal inquiries and a conclusion is made about the equation in question.

Presentation Time/ Location: ***Oral Presentation, Session I 9:45-10:00 AM, NC Room 1315***

Title: **CREATING CULTURALLY APPROPRIATE IMMIGRANT SERVICES USING ANTHROPOLOGY**

Presenter: Margaret Nation – Anthropology
Faculty Mentors: Rebecca Forgash and Megan Hughes-Zarzo

Abstract: Current immigration integration services work towards integration, often at the cost of the immigrants' home culture; for instance, employing nutrition counseling that is based on a mainstream American diet instead of the immigrants' home culture's food traditions. By exploring the definitions and goals of integration held by both the agencies and the immigrants themselves, a better understanding will be attained of the ways that these services could be more sensitive, and yet effective. This will be done with field interviews, surveys, and observations of both parties involved. This research will show that by applying a holistic, anthropological approach to the field of immigration services, a cost-effective, time-efficient, and culturally sensitive integration would be achieved. This study will contribute to both the anthropology and human services fields, as to the commonly held beliefs of this population regarding health, and the services created to serve this population. This could impact public policy, health services and overall behaviors and prejudices that may be present, on both sides.

Presentation Time/ Location: ***Oral Presentation, Session I 9:00-9:15 AM, NC Room 1311***

Title: **THE FINANCIAL IMPACT OF THE TAX CUTS AND JOBS ACT ON LOWER INCOME TAXPAYERS**

Presenter: Zachary Nelson – Accounting
Faculty Mentor: Amy Cardillo

Abstract: This study samples 50 tax returns prepared at Metropolitan State University's Volunteer Income Tax Assistance (VITA) location. VITA is an IRS-sponsored program that offers tax preparation services to taxpayers earning less than $54,000 per year. This study reviews the impact the passage of the 2017 Tax Cuts and Jobs Act (TCJA) could have on lower income taxpayers. This study reviewed changes to the following: 1) The standard and itemized deductions. The standard deduction is a deduction to adjusted gross income (AGI) that a taxpayer is allowed to take on his or her return. This deduction directly reduces the amount of taxable income on which the taxpayer is required to pay tax. The TCJA increases the standard deduction for all filing statuses. 2) The personal exemption. The personal exemption, which is also a deduction to AGI that a taxpayer is allowed to take for each person claimed on a return, is eliminated under the TCJA. 3) The various income tax brackets and rates. The TCJA lowers several marginal rates for each tax bracket. 4) The child tax credit is a non-refundable credit of $1,000, and the Additional Tax Credit is refundable within restrictions. The TCJA essentially combines the refundable and non-refundable portion and increases the credit to $2,000. 5) The Affordable Care Act individual mandate. The penalty for not carrying health insurance will no longer apply to returns filed after 2018. Of the 50 returns sampled, 36 filed as single, seven filed as head of household, and the remaining seven filed as married filing jointly. Using 2017 income data and applying the TCJA changes, 49 of the 50 taxpayers had a lower tax liability.

Presentation Time/
Location: ***Poster Presentation, Session II (11:00-12:00 PM), Poster #21***

Title: **FARM TO TABLE**

Primary Presenter: Tiffany Nesteby – Industrial Design
Coauthors: Natalie Smith, Jacob Dengal
Faculty Mentor: David DeMalteris

Abstract: The Farm to Table movement within Denver is very important and the more the public is exposed to the benefits the more change we can make within the community and hospitality industry. Our research will take place within the hospitality community in Denver and surrounding cities. We will discuss urban gardens, local farmers markets and buying directly from the local farmers. Our purpose is to find out if using local farms is actually cost effective to the consumer or just a fad that only the rich can afford. We will also discuss the importance of urban gardens within communities that would be considered food deserts. And if access to healthy foods from local (or even backyard) gardens would decrease the cost of healthcare within these communities as well. We are also researching the effect of teaching gardening and sustainability within communities with a higher crime rate helps to decrease this rate by redirecting attention to growing food and building communities within these neighborhoods. We hope that we can teach our audience about the benefits of eating food that grows in Colorado naturally and the benefits of patronizing the businesses that choose to source locally, support our local growers and reap the benefits of a strong agricultural community. We also hope to inspire people to take control of their food choices and use fresh fruits and vegetable as opposed to processed "boxed" foods that negatively impact their health. To do so we will lightly touch on nutrition as well as the effects long travel has on the quality of food.

Presentation Time/
Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #13***

Title: **PROPOSED STUDY OF THE EFFECTS OF RANK ON COMMUNICATION WITHIN FIRST RESPONDERS**

Presenter: Elliot Netzer – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose for this proposed research is to explain the idea of how relationships in a workplace can be affected by seniority or rank, specifically looking into the relationships within the public safety realm. Typically, when it comes to the idea of rank or seniority within public safety there is a mindset that individuals achieved positions due to recognition of hard work and time on the job, or experience. This brings up a question, what cost does this idea of rank and seniority have on the communication that takes place in an often stressful environment and are there ramifications on the relationships that could cause fallout between individuals? Such as, there would be difference in the levels of confidence when comparing a new firefighter and an experienced firefighter completing the same task as required by the commanding officer. When situations like this arise that could potentially involve safety is there a barrier made between communication between the new hires and those with more experience. One of the proposed research questions is: RQ1: What kind of communication barriers, if any, are caused by rank and seniority in workplaces, and do these barriers impact safety concerns? To study this one would use some iteration of a general study method by a survey. Survey would be given to those members who work in public safety; police officers, firefighters, and those in emergency medical services. The questionnaire would hold several questions with a rating system from; never to always.

Presentation Time/ Location: ***Oral Presentation, Session I 9:45-10:00 AM, NC Room 1316***

Title: **DEVELOPMENT OF NOVEL BIOSENSOR FOR NON-INVASIVE AND RAPID DIAGNOSIS OF CELIAC DISEASE**

Presenter: Anna Nguyen – Biochemistry
Faculty Mentor: Andrew Bonham

Abstract: There is a pressing need for rapid, non-invasive, and accurate detection methods to diagnose individuals with the autoimmune disorder, celiac disease (CD). It is estimated to affect up to two million Americans and is caused by an autoimmune response to consuming gluten, resulting in damage to the lining of the gastrointestinal tract that leads to abdominal pain, diarrhea, nausea, and many other complications. Accurate diagnosis of CD remains challenging; the current diagnostic procedure involves multi-day laboratory protocols, followed by an invasive duodenal biopsy. Here, we demonstrate work towards a blood sample-based diagnostic tool to allow for early identification of CD in patients. Our methods utilize known autoimmune interacts that occur in the body of an individual with CD; specifically, when they consume gluten, a part of gluten incorrectly binds to an enzyme in the bloodstream, and the resultant structure that forms between the gluten and the enzyme is targeted by their immune system. Researchers have identified how parts of this novel structure specifically interacts with the autoantibodies involved in CD. These peptide epitopes closely recapitulate the disease state. We have thus created a biosensor that relies on using these peptide epitopes as the capture probe to detect levels of disease-specific antibodies. This strategy was incorporated into an electrochemical DNA (E-DNA) biosensor; a common type of biosensor that utilizes small changes in electric conductivity to measure whether a target molecule is bound or unbound. The sensor design can, in principle, use unprocessed finger-lancet blood samples to provide a rapid digital readout, allowing for efficient and sensitive detection of CD in patients.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #6***

Title: **INVESTIGATION OF INVOLVEMENT OF FERRIC REDUCTASES OF IRON UPTAKE IN S2 *DROSOPHILA* CELLS**

Presenter: Alma Ochoa– Biology
Faculty Mentors: Emily Ragan and Maureen Gorman

Abstract: Iron is an important element, necessary for the proper functioning of different organisms to maintain homeostasis. However, if there is a deficiency or excess of iron content, it can lead to harmful effects. Even though its regulation is essential, the iron transport mechanism is only understood in mammals. Unfortunately, the biochemical pathway of how insects transport iron from the hemolymph into any type of cell is still unclear. We hypothesize that ferric reductases are involved in iron uptake. It is known that reductases are capable of reducing ferric ion (Fe3+) to ferrous ion (Fe2+). Drosophila melanogaster has a known ferric reductase, CG8399, and we identified a putative ferric reductase, CG1275. We have detected ferric reductase activity in D. melanogaster S2 cells (Sg4 isolate). In order to test if CG8399 and CG1275 are involved in the ferric reductase activity in Sg4 cells, an RNA interference (RNAi) experiment was performed to knockdown their expression in the Sg4 cells. RNAi permits the silencing of a gene by reducing transcript levels of mRNA. To test the effectiveness of the RNAi, reverse transcriptase was used to analyze levels of mRNA from CG8399 and CG1275 and the iron content levels in Sg4 cells was determined through a ferrozine-based iron content assay. In the long term, our results will help elucidate the role of ferric reductases in iron uptake by Sg4 cells to provide an insight of the physiological mechanism of iron uptake in insects

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #2***

Title: **DENVER'S CHANGING WATERFRONT: EXPLORING PLATTE RIVER REDEVELOPMENT IN THE 20TH CENTURY**

Presenter: Sean Oliver – Geography
Faculty Mentor: Sara Jackson

Abstract: This research project explores how multi-use flood management and redevelopment has contributed to displacement of local families along the South Platte River in the Denver area. The focal points are the Greenway Project's impact around the Confluence Park area near the South Platte within the city limits. The project examines the city's reaction to natural disasters such as flooding in the area especially the occurrences that happened in 1965. The project also examines how the resulting Greenway Project lead to the development of Confluence Park and the trails along the South Platte river. By looking at a study conducted by the city of Denver in 2016, Gentrification Study: Mitigating Involuntary Displacement and old city plans for the area, we can explore how the Confluence Park area has transformed over time from Denver's founding through its industrial phase and finally to mixed-use development in the area today. Using a study published in The Journal of Real Estate Finance and Economics, we can examine the impacts of trails and greenbelts on home prices. The development of trails and greenways along with transforming old industrial building to create a scenic landscape for a river walk had an impact on the home and retail property prices along the Riverwalk in San Antonio just as it did along the Platte in downtown Denver. The study from the Journal of Real Estate Finance and Economics notes that San Antonio's Riverwalk is a model for redevelopment that many cities try to emulate with the storefront, real estate, and its addition to trails along its riverfront. While there have been some positive impacts from the redevelopment, changes in how Denver has managed the river has also contributed to families that have lived in the area for decades to be priced out of the neighborhood. This project will explore

the consequences of flood management and redevelopment of the Platte River on various communities throughout Denver.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #5***

Title: **FACING THE PAST: THE NICOYA CHILD**

Primary Presenter: Faye Olsgard – Anthropology
Coauthors: Chelsie Worth, Shaina Pauley
Faculty Mentors: Sarah Harman and Ted Shin

Abstract: Forensic facial reconstruction is a method used in forensic anthropology to aid in the identification of human skeletal remains. A reproduction of facial features produced through a technique that incorporates a balance of art and science in an emanation of a living individual's likeness. This undergraduate research project expands current CT scanning and 3D rapid-prototyping beyond the existing boundaries to virtually reconstruct the human infant crania from fragmentary osteo artifacts. By applying a combination of art, science, and new digital technologies, this research strives to structure a new methodology, ultimately producing a representational likeness of an ancient human child. A process of artifact reconstruction, investigation, and duplication with applications in education, preservation, and the study of vanished human cultures.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #2***

Title: **THE CORRELATION BETWEEN HOMELESSNESS AND MENTAL HEALTHCARE FOR WOMEN LIVING IN THE UNITED STATES**

Presenter: Isabel Palacios – Psychology
Faculty Mentor: Arlene Sgoutas

Abstract: The focus of this thesis paper is the correlation between homeless women and mental healthcare. This paper utilizes psychological perspectives to explain how U.S. culture and its corporate healthcare system contribute to homelessness. Qualitative and quantitative research obtained from studies focused on homeless women is used to make a correlation analysis. The history of mental healthcare and its impact on homeless women in the United States will be discussed, and compared to healthcare systems in other countries. The paper also examines conditions that generate homelessness, the effectiveness of current mental healthcare in the U.S., and the way other mental healthcare systems adequately address and prevent homelessness for women. The result illustrates that the U.S mental healthcare system is ablelist and inadequate to meet the needs of one of its most vulnerable populations.

Presentation Time/ Location: ***Oral Presentation, Session III 2:45-3:00 PM, NC Room 1313***

Title: **ACTIVITY BUDGET AND ALLOCATION OF ENERGY OF *SCIURUS NIGER***

Presenter: Rick Paoletti – Biology
Faculty Mentor: Christopher Cooley

Abstract: Whether directly or indirectly, humans may have a significant impact upon the foraging activities of many species. The purpose of this study will be to investigate the effect of

human population density on activity budgets in the Colorado Fox Squirrel (*Sciurus niger*). I will conduct an observational study on *S. niger* to determine how surroundings and resources affect the allocation of time and energy. I will be gathering data to construct an activity budget by recording the amount of time spent foraging by individuals in different environments. My hypothesis is that if the *S. niger* has an abundance of food and shelter in an urban setting, then they would spend less time foraging compared to *S. niger* in a rural setting. Observations will be conducted in an urban setting (Auraria Campus) and in a rural setting (City Park). Observations will be taken for two hours per week over four consecutive weeks from late winter to early spring. Data will be statistically compared and results will be summarized following the completion of data collection.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #2***

Title: **SELF-ESTEEM AS A SOURCE OF RESILIENCE AGAINST DEPRESSION IN THE FACE OF ACADEMIC STRESS**

Presenter: Jordan Parmenter – Psychology
Faculty Mentor: Lisa Badanes

Abstract: College is a vulnerable period for psychological disorder, in part due to the high levels of stress that students report (Beiter, et al. 2015). Finding effective buffers against stress, therefore, is a research priority. One such buffer may be self-esteem or an individual's positive or negative evaluation of themselves (Eisenbarth, 2012). By increasing the value of worth that college students place on themselves, self-esteem may increase an individual's perceived ability to manage academic stressors and challenges.
137 Introductory to Psychology students (62% female, average age 24, 63% white) completed questionnaires. Self-esteem was measured using Rosenberg's 10-item self-esteem scale (Rosenberg, 1986). Symptoms of depression was measured using the Center for Epidemiological Studies Depression Scale (CES-D) (Radloff, 1977). Academic stress was measured using 27-item questionnaire (Solberg, O'Brien, Villareal, Kennel, and Davis, 1993).

Females (M = 18.90) reported significantly higher levels of depression than males (M = 13.89), t (108) = -2.36, p >.05. To examine whether levels of self-esteem moderated the relationship between academic stress and depression, we ran a linear regression predicting depression including gender, academic stress and self-esteem, as well as interaction term. The model explained 55% of the variance in depression with academic stress, self-esteem and our interaction term all significant predictors of depression (See Table 1 for regression coefficients). These results indicate that the extent to which academic stress contributes to depression depend on current levels of self-esteem (See Figure 1). Our discussion focuses on the importance of self-esteem in buffering students against the effects of stress.

Presentation Time/ Location: ***Oral Presentation, Session III 3:00-3:15 PM, NC Room 1313***

Title: **DEATH AND GRIEVING: COMMUNICATION PROCESSES ACROSS THE WORLD**

Primary Presenter: Molly Patrick – Linguistics
Coauthors: Colby Whitaker, Haley Smith, Cecilia Romero
Faculty Mentor: William Huddy

This paper reviews the nature of communication and behaviors surrounding death and

grieving amongst different cultures across the world. It is also concentrated on healthy communication practices surrounding death and grieving and strives to identify which cultures generally practice the healthiest communication processes. It will focus on which processes of communication surrounding death and grieving are most conducive towards maintaining and recovering mental health after loss. This will allow readers to reflect on their own behaviors towards these topics and perhaps learn better practices and perspectives from other cultures. These topics will be researched through reviewing literature surrounding grief and death communication in Asian, European, North American, historical (Native American, Mayan, Aztec), and tribal cultures. The literature reviewed will include scholarly, peer reviewed journals, personal accounts (from blogs, videos, or otherwise), and other materials gained from the web. Keywords: Death, grieving, communication, culture, mental health.

Presentation Time/ Location: ***Oral Presentation, Session I 9:15-9:30 AM, NC Room 1316***

Title: **DISORDERED EATING AND INTERGENERATIONAL TRAUMA**

Presenter: Alexandra Perez – Gender, Women and Sexualities Studies
Faculty Mentors: Kat Martinez and Arlene Sgoutas

Abstract: The purpose of this research paper is to identify how family plays a role in the intergenerational transmission of trauma for disordered eating in young women. This is achieved through an analysis of primary sources including autoethnographic work of my own journal entries and Tumblr posts along with the use of public postings from anonymous users on Reddit to understand the relationship between intergenerational trauma and disordered eating. I analyzed these posts and journal entries if they referred to themes such as body shame, appearance, eating habits, and physical well-being. My journal entries and Tumblr posts are further examined for information about the relationship between my mother toward other women, herself, or me that relate to body image. I use trauma theory through a feminist lens to analyze and interpret these primary sources for redefining what is commonly considered “trauma”. From my research, I hope to attain a better understanding to how intergenerational transmission of trauma occurs within the family through a feminist framing of trauma theory.

Presentation Time/ Location: ***Oral Presentation, Session II 11:30-11:45 AM, NC Room 1316***

Title: **DETECTING DECEPTION IN A COMPUTER-MEDIATED WORLD**

Presenter: Jessica Pouzeshi– Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research project is to examine the implications of detecting deception in a world driven by computer-mediated interactions – i.e. text messaging, emailing, and social media. Deception occurs across every communication platform, whether in person or online. However, now more than ever, the amount of textual information received on a daily basis, both personal and organizational, is overwhelming. In most cases, the general population can be poor at detecting acts of deception, even when it is face-to-face communication (Hancock, Woodworth & Goorha, 2010). “Truth-biases,” especially in cases of close personal relationships, often cloud a person’s judgment to perceive deceptiveness in an interaction. There is one proposed research question –RQ1: In what ways, if any, does the widespread use of text-based computer-mediated social interactions alter the way individuals detect dishonest messages? The

proposed methodology is a survey that will seek to examine both the individual habits of computer-mediated deception and the person's concern/ability to recognize online deception. Specifically, this paper will focus on the notions of truth bias and Interpersonal Deception Theory (IDT). The major implication of this work concerns both the lack of nonverbal communication and the effortlessness of deception on online platforms. Most people strongly believe, or want to believe, that their friend, partner, or business associate is being truthful to them. However, that not always being the case, it's important for individuals to comprehend the implications of deception in computer-mediated-communications (CMC) and how to recognize it if and when it occurs.

Presentation Time/ Location: ***Oral Presentation, Session II 10:45-11:00 AM, NC Room 1316***

Title: **PROPOSED RESEARCH ANALYZING CONFLICT THEORY WITHIN VIETNAMESE FAMILIES CAUSED BY EXPECTATIONS**

Presenter: Melody Quach – Communication Arts and Sciences
Faculty Mentor: William Monsour

Abstract: Today, life-changing secrets have become a very common part of life, and it is likely that private information needed to be said play a crucial role in why families either come together or dissolve. This effectiveness of communication is probably connected to the overall satisfaction of parents revealing the difficult times with others to increase the chances of closing the spaces to bond families together. Communication management theory pulls together five principles that can affect the way people communicate with one another, such as taking charge or one's privacy or being told something which turns that person into a co-owner of valuable information or risking relationships in boundary turbulence. CMT is an overall system that takes a look at how private information is being used, distributed, or stored. This theory has a fascinating way of bringing together families when communicating with one another through hardships such as revealing to a child he or she is adopted. The initial thought process for choosing this theory is asking the question, "why do people keep secrets and why do they tell the person they tell?"

Presentation Time/ Location: ***Oral Presentation, Session I 10:00-10:15 AM, NC Room 1315***

Title: **THE IMPORTANCE OF CRITICAL RACE AND GENDER BASED EPISTEMOLOGY WITHIN NONPROFIT STUDIES**

Presenter: Lilly Redford – Gender, Women and Sexualities Studies
Faculty Mentor: Arlene Sgoutas

Abstract: As neoliberal political and economic policies continue to push formerly state funded services into the realm of the third sector, college curriculums surrounding nonprofit education form their programs to produce students who will reinforce these trends. The Nonprofit Management program at Metropolitan State University of Denver is no exception, with classes that focus primarily on funding. By analyzing the course descriptions of all offered courses within the department, this study finds that little to no attention goes toward teaching students important frameworks for approaching working with or advocating on behalf of marginalized populations. By introducing epistemologies from departments such as Gender, Women, and Sexuality Studies, Africana Studies, or Chicano Studies, these students would gain necessary knowledge for creating lasting community change.

Presentation Time/ Location: ***Oral Presentation, Session I 10:00-10:15 AM, NC Room 1313***

Title: **SOURCES OF NUTRIENT POLLUTION IN THE SOUTH PLATTE RIVER**

Presenter: Steven Reeves – Environmental Science
Faculty Mentor: Sarah Schliemann

Abstract: The South Platte River originates in the beautiful Rocky Mountains of Colorado as a clean, clear and crisp snowmelt river. It then courses through our state's capital and becomes a dirty, polluted waterway that has lost its appeal. Through several years of ongoing research, we have found certain sections of river throughout the greater Denver metro region to consistently have elevated levels of nutrients. In this project, these segments were then subjected to a more intensive sampling effort to further examine point-source and nonpoint-source pollution contribution. Samples were collected monthly December-March and analyzed in the lab at MSU Denver using a colorimetric approach. We were unable to conclusively identify the source of the nutrients, but further testing this summer may provide further insight. The quality of water running through our state and through our nation should be of great importance to us all. If we wish to see our standards rise and the quality of our water increase then we will have to provide real solutions. Real solutions require specific problems. Our sampling efforts are aimed at finding those problems so solutions can arise.

Presentation Time/
Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #8***

Title: **Synoptic- and Meso-Scale Weather Patterns associated with the Rapid Glacier Loss Across the Semi-Arid Chilean Andes**

Presenter: Stephanie Reichlin – Meteorology
Faculty Mentors: Sam Ng and Jason Janke

Abstract: Snowpack in the semi-arid Andes Mountains of central Chile is a vital water resource for sustainable agriculture, economic development, and consumptive use. A recent drought (since 2010) created an unforeseen strain on the region. The majority of water supplied to rivers comes from melting snow, glaciers, debris-covered glaciers, and rock glaciers. In the past, glaciers have compensated for low snowfall totals by proving late-season water resources; however, reduced snowpack and accelerated melting since 2010 has placed additional pressure on glaciers and raised imperative questions about the sustainability of agricultural and urban development in nearby major cities such as Santiago and Valparaíso. In-situ instruments were installed in the upper-catchment near glaciers contributing to the Aconcagua River to collect atmospheric data. Here, we examine the local- and large-scale weather patterns that are impacting the glacier mass loss.

Presentation Time/
Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #6***

Title: **"And He Cured Them": The Fallacy and Abuse of Preaching Jesus' Healing**

Presenter: Cassandra Reid – English
Faculty Mentors: Lisa Suter

Abstract: Christianity has been intertwined with medicine for centuries. This essay consider the ethical applications of preaching prosperity faith to patients of chronic diseases. Specifically, the preaching of Jesus curing a disease in exchange for tithes. Evidence is composed in part of translation options taken from commentaries including the New Jerome, Interpreter's Bible, and International. Modern instances of harm against congregants of the Word of Faith movement, specifically those headed by Kenneth and

Gloria Copeland, are used as examples of tangible consequence. My argument is that continuing such a practice is unethical. As greater caution is taken with other antiquated notions in the Bible, so must the same be done with the preaching that Jesus will cure a person rather than medicine.

Presentation Time/ Location: ***Oral Presentation, Session II 11:15-11:30 AM, NC Room 1316***

Title: **THE LEARNING ORGANIZATION AS AN APPROACH TO ADDRESSING SEXUAL HARASSMENT IN THE WORKPLACE AND THE ROLE OF TRAINING & DEVELOPMENT**

Presenter: Rebecca Reid – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research project is to examine whether and how a learning organization approach can be implemented to address the problem of sexual harassment in the workplace. The #metoo and #timesup movements are a response to systems of sexual abuse and harassment that have plagued our society. At work, instances of sexual harassment have far reaching repercussions. As a result, employers have developed policies and compliance trainings to address the issue, but a culture shift is necessary to truly eliminate sexual harassment. This research proposes the following research questions: RQ1: In what ways, if any, can a learning organization be used as an approach to combating sexual harassment in the workplace? RQ2: In what ways, if any, can training & development support the learning organization as an approach to combating sexual harassment in the workplace? The research methodology I propose is a content analysis of organizations that have a positive track record of addressing sexual harassment, and the elements of their culture and training programs that may have contributed to that success. A content analysis would include an investigation of the mission vision, values, trainings, and other cultural texts. The expected findings should indicate that Senge's five disciplines provide a framework for addressing sexual harassment in the workplace, and that training & development programs can reinforce an organization's ability to address sexual harassment through the learning organization framework.

Presentation Time/ Location: ***Oral Presentation, Session II 11:00-11:15 AM, NC Room 1316***

Title: **LIFE SATISFACTION, MEANING IN LIFE, AND QUALITY OF LIFE AS PREDICTORS OF DEPRESSION IN COLLEGE STUDENTS**

Primary Presenter: Louis Ricciardelli – Psychology
Coauthors Drew Stem, and Sean Vieau
Faculty Mentor: Cynthia Erickson

Abstract: In today's society depression has a significant impact at family, social, and economic levels; it is on its way to becoming the principal cause of morbidity in developed countries (Apostolo, 2009). Therefore, the intention of this study was to explore if life satisfaction, meaning in life, and quality of life were predictors of depression in college students.

Previous research suggests that as depressive symptoms decrease, quality of life increases, and vice versa. Past literature also shows that dissatisfaction with life relates to increased depression in most individuals (Koivumaa-Honkanen et al., 2009). As a final point, it has been shown that enhancing a personal meaning in life is an effective way of

reducing depression (Robatmili et al., 2015). We thus hypothesized that higher levels of life satisfaction (LS), meaning in life (MIL), and quality of life (QOL) would predict lower levels of depression in college students.

The sample consisted of 164 MSU Denver students, with an age range from 18 to 47 (M = 20.56, SD = 4.38), and was 59.1% female, 66.5% White, and 34.1% Hispanic. Depression, LS, MIL, and QOL were measured via self-report questionnaires. A multiple regression analysis revealed that two of the ten variables were significant predictors of depression ($F = 34.05$, $p > .001$). Emotional quality of life emerged as the strongest predictor for depression ($Î² = -.40$, $p > .001$), accounting for 28.0% of the variance in depression. The second strongest factor for predicting depression was life satisfaction ($Î² = .23$, $p > .007$), accounting for an additional 3.4% of the variance in depression. Meaning in life was not a significant predictor for depression.

The discussion will focus on one outcome that seemed counterintuitive: life satisfaction positively correlated with depression. Future directions will need to focus on how this relationship may occur in college students.

Presentation Time/ Location: ***Oral Presentation, Session III 2:45-3:00 PM, NC Room 1315***

Title: **DO SOMETHING DIFFERENT**

Presenter: Caleb Robbins – Psychology
Faculty Mentor: Pamela Ansburg

Abstract: Unconscious work describes the brain accomplishing a task without thinking about it while also being occupied elsewhere at the same time. We aimed to further investigate the theory that unconscious work occurs during incubation (a break) and can help someone complete a previous task while also producing better, more creative results. Gilhooley et al. (2013) found that an incubation period effectively produced creative solutions when the incubation task differed from a previous task. This supported the unconscious work theory by showing that performing a similar task during incubation exhausted certain mental processes and left little for the target task. We attempted to similarly exhaust cognitive resources by making the incubation task difficult and show that it didn't matter whether the incubation task used the same resources. We hypothesized that harder incubation tasks lead to significantly less creative solutions on target tasks, thus, replicating the findings of Gilhooley et al. (2013). Our participants included 151 Introductory Psychology students with ages ranging from 18-57 (M=21.78, SD=5.80). Among them, 39.1% male and 60.9% female. We used an independent-groups design involving four experimental groups and one control group. The experimental groups worked on a spatial creative problem-solving task for five minutes, then worked for five minutes on an incubation task and returned to the spatial creative problem-solving task. The control group did the main creative task two times in a row and did not get an incubation period. Unfortunately, there were no significant main effects or interactions between task type or task difficulty on the creativity participants displayed ($p > .05$). We suspect the main cause of these results being that participants spent time thinking about the incubation task rather than doing it, which makes the incubation period ineffective.

Presentation Time/ Location: ***Oral Presentation, Session III 3:00-3:15 PM, NC Room 1315***

Title: **HERMITE NUMERICAL INTEGRATION**

Presenter: Jeff Rowell – Computer Science
Faculty Mentor: Henricus Bouwmeester

Abstract: The Hermite numerical integration rules are designed to exceed the classical numerical integration strategies such as the Trapezoidal and Simpson's rules that are typically introduced in a Calculus II course by reducing the number of computations required while attaining improved accuracy and efficiency. This research utilizes Hermite polynomials to derive two new numerical integration rules, rather than using Lagrange polynomials where the Trapezoidal and Simpson's methods originate. The difference between Lagrange polynomials and Hermite polynomials is the later include derivative information, whereas the former do not. The goal of this study will focus on the computational performance of the Trapezoidal and Simpson's techniques compared to the new rules we derived that are almost the same, but use derivative information evaluated at the endpoints of the function. To do this we will deduce two separate integration rules from two different Hermite polynomials such that one will be used for comparisons against the Trapezoidal rule, and the other will be used to compare against Simpson's rule. Our main difference is to include derivative information in our derivations. However, it is possible we cannot obtain derivative information at the endpoints of our function, so we will approximate the derivative using finite difference formulas. Our comparisons will entail computational cost, number of operations, and the accuracy of the numerical integration techniques. Using Python, we will repeat an integral calculation 30,000 times with each rule, and then take the average time elapsed for each of the numerical integration rules to execute. We show that these derivative based methods are far superior to the classical methods of numerical integration.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #10***

Title: **SYNTHESIS AND CHARACTERIZATION OF THERMOTROPIC BENT-CORE LIQUID CRYSTALS**

Presenter: Lukas Russell – Biochemistry
Faculty Mentor: Ethan Tsai

Abstract: The synthesis and characterization of thermotropic bent-core liquid crystals aids in the investigation of new phases of matter. W540 is a de Vries SmA bent-core liquid crystal containing symmetrically substituted [422] perfluorinated tails. Synthesis of the individual components; a central bent-core, rigid side arms and perfluorinated tails are utilized in a convergent approach in the synthesis of W540. Characterization of W540 aims to provide insight to the metastable optically isotropic "dark phase" of W622, an analog of W540 containing symmetric [4222] perfluorinated tails, a phase which is not observed with W540.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #8***

Title: **ZEROMILE MAGAZINE, ISSUE 11**

Primary Presenter: Teresa Scaggiari – Communication Design
Coauthors: Daniel Kallsen, Michaela Small, Spencer Eudaly, Gaia Orr, Allyson Coan, Dara Xiong, Bailey Barner, Paige Bellmer, Tara Petersen, Greta Erickson, Salena Elledge, Cooper Hansen, Andrea Thurber, Lysander Romero, Sean Finch, Klovit Kikanga, Mallory Wilke, Evan Wirths, Jason Gerboth, Daisy Corso, Jack Brownson, Richard Tu
Faculty Mentors: Peter Bergman and Jessica Weiss

Zeromile Magazine is published annually by students in two Metropolitan State University of Denver Department of Art classes – Art History (ARTH) 2600 Reading and Writing Visual Culture and Communication Design (CDES) 4000 Zeromile and Zines. Zeromile is a student-authored and designed art and design magazine. Issue 11 of Zeromile Magazine focused on exploring the theme of Movement in society, politics, culture, gender, and art. The publication included twelve polished articles that responded to the theme of Movement. The theme itself was a response to the theme of Issue 10 of Zeromile magazine: Tension. The content of the final articles ranged from recreational and educational to political and social in nature and proposed action towards solving conflict in today's culture. All of the authors completed a total of three drafts that were reviewed by the editorial staff. Each article was paired with a designer and the relationships between the authors and designers dictated the direction of the articles. The subject matter the authors chose to respond to also determined their article's position within the magazine; the front half being dedicated to less controversial subjects and the back half being dedicated to more argumentative issues. Design challenges were completed twice weekly by the communication design students. The design for Issue 11 was divided into two initiatives. Some of the students designed to the standards of the first half of the magazine, with intentionally duo-toned images and soft-hued color palettes. The other students designed for the second half of the magazine, which utilized high contrast images and bright colors. This transition illustrated movement in a physical, print setting. The beginning of the magazine introduces the reader to the theme and then builds tension to guide the viewer through the publication in an intentional way.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #11***

Title: **ANALYZING THE FREQUENCY OF HIGH AMPLITUDE WAVE PATTERNS AND THEIR RELATIONSHIP WITH EXTREME WEATHER EVENTS IN THE NORTHERN HEMISPHERE**

Presenter: Jennifer Shepard – Meteorology
Faculty Mentor: Keah Schuenemann

Abstract: Recent studies suggest that Arctic Amplification (AA) due to climate change has reduced the temperature gradient in the Northern Hemisphere, leading to in an increase in wave amplitudes resulting from a zonal wind reduction in the mid-latitudes. 500mb data from the National Centers for Environmental Prediction- National Center for Atmospheric Research reanalysis (NCEP/NCAR Reanalysis 1) is gathered to calculate the waviness, or sinuosity trends from 1948-2017. A value of sinuosity is computed using an average of the 5760, 5640, 5520, 5400, and 5280 geopotential heights that represent mid-latitude circulation. The length of these height contour lines and the area enclosed poleward of these contour lines is found by using the geosphere package in R. Once the length and area of the contours are gathered, an equivalent latitude is determined by using the line with an equal area enclosed poleward as the contoured polygon. Sinuosity is then calculated as the ratio of the length of the contour line divided by the length of the equivalent latitude. This can be further broken down into seasons, when Arctic sea ice is at a minimum or maximum to correlate with the sinuosity in the Northern Hemisphere. We then explore the hypothesis that wavier patterns are conducive to extreme weather events by comparing high precipitation events to time periods of higher sinuosity.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 – 12:00 PM), Poster #11***

Title: **COMPOST: THE ULTIMATE RECYCLE**

Presenter: Karma Sherpa – Restaurant Management
Faculty Mentor: David DeMalteris

Abstract: This study many types of composting was analyzed to view the difference as well as the similarities. The research was done for four different types of composting which are vermiculture, bokashi, Rudolf Steiner: Biodynamic fertilizer and using feces. The purpose of composting is to provide nutrients to the plants through the soil from the microorganisms and earthworms. Composting is beneficial is so many was beside helping plants flourish it also helps by being able to recycle kitchen waste depending on the type of composting is being done. There are many varieties for composting there is no wrong or right way just as long as it provides the plants with the necessary nutrients. For this study, it was concluded that many types of composting do work despite how unconventional it may be, as long as the proper procedures are followed.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #19***

Title: **FRESHWATER STREAM INVERTEBRATE SPECIES RICHNESS**

Primary Presenter: Sydney Simmon – Biology
Coauthor: Anna Tran
Faculty Mentor: Christopher Cooley

Abstract: Species diversity can be influenced by a number of environmental factors such as climate, nutrient availability, latitude, and elevation. Elevational gradients in species diversity have been documented in a number of different species across North America but little is known about the effect of elevation on species diversity in the Rocky Mountain region, specifically Colorado. Freshwater stream invertebrates have a significant role in maintaining community structure in both aquatic and riparian ecosystems and, as such, can be important to the overall health of these ecosystems. The purpose of our study will be to investigate the effect of elevation on species diversity in Bear Creek. I, Sydney Simmon, will be working with Anna Tran in this study. Our hypothesis is that since higher elevations have colder water, which holds more dissolved oxygen meaning it might be able to support more species. To do this, we will be taking invertebrate samples from Bear Creek Lake Park (1700 m above sea level) and from Evergreen, Colorado (2200 m above sea level). Invertebrates will be identified by phylum, class, or order and diversity indices compared using Paleontological Statistics (PAST v 3.04). It is hoped that our study will provide valuable information about vertical diversity gradients in freshwater invertebrate species found in Colorado rivers and streams.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #9***

Title: **RUSSIAN OLIVE COMPETITION IN RIPARIAN HABITATS**

Presenter: Mayumi Smyers – Biology
Faculty Mentor: Christopher Cooley

Abstract: Competition between native plant species and non-native invaders has been an issue in some ecological settings. If conditions are favorable, an invading species may be able to flourish and multiply much faster than the trees native to an area, for example: pushing out different types of Ash trees. This is an example of the competitive exclusion

principle applied to tree species because it is two species competing for limited resources in a constant environment and one will have slight advantage over the other, eventually pushing the other species out of its native territory. The goal is to apply this thinking to the invasion of Russian Olive trees (*Elaeagnus angustifolia*), which is a known invader in Colorado.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #17***

Title: **MADAGASCAR HISSING COCKROACH (*GROMPHADORHINA PORTENTOSA*) SEX-BASED FORAGING BEHAVIOR**

Presenter: Adriana Solano – Biology
Coauthor: Nina Tu
Faculty Mentor: Christopher Cooley

Abstract: Sexual dimorphism is apparent within Madagascar Hissing Cockroaches, where males have horns on top of their head that are used for aggressive interactions, and females have a smooth head. These differences in appearance might indicate that each individual sex may have different nutritional requirements, based on their instinctive roles. If males are aggressive and females must reserve energy for producing offspring, their diet should reflect those needs. In our experiment, we provide three choices of food to represent carbohydrates, sugar, and protein. The food choices are potatoes, bananas, and cat food respectively. The preference between these three food choices should reflect each sex's nutritional needs based on their foraging behavior. In theory, females should choose to eat protein more often than carbohydrates or sugars since it should help them produce eggs. Males should prefer the carbohydrates and sugars for an immediate source of energy. To check if this is true, each sex will be separated into individual tanks each containing 10 individuals. Every week, 10g of each food will be provided in a petri dish. At the end of the week, the food will be weighed to obtain circumstantial evidence of food preference. The foods provided, will be dried to ensure hydration is not included in the net loss of weight. The food group that has the most weight loss over the course of the experiment will be labeled as the sex's preference.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #1***

Title: **EMOTIONAL INTELLIGENCE AND VERBAL ABUSE**

Presenter: Michal Solowiej – Communications Studies
Faculty Mentor: William Monsour

Abstract: The purpose of this proposed research study is to identify and explain any correlations that may exist between emotional intelligence and dispositions to verbally abuse another individual. The Annual Review of Psychology describes emotional intelligence (EI) as "the ability to carry out accurate reasoning about emotions and the ability to use emotions and emotional knowledge to enhance thought" (Mayer, 2008). EI is still not very well understood in the academic world, however, most people will equate the concept of EI with positive traits such as self-fulfillment and ability to maintain relationships (Mayer, 2008). Preconceived notions of EI indicate that there can be many inherent benefits to developing such an intelligence; moreover, the lack of EI may have symptoms that onlookers may describe as negative. Here lies the impetus of this proposed research: in what ways, if any, does the level of EI impact the probability of someone acting verbally abusive towards another? The proposed methodology will take subjects to one on one interviews, fill out

questionnaires, and complete conventional emotional and verbal intelligence tests. The expected findings should indicate that as EI goes down, predispositions to act verbally abusive go up.

Presentation Time/ Location: ***Oral Presentation, Session II 10:30-10:45 PM, NC Room 1315***

Title: **ONTOGENETIC VARIATION IN CRAYFISH DIETS REVEALED BY STABLE ISOTOPE ANALYSIS OF 15N**

Presenter: Heidi Sorensen – Biology
Faculty Mentor: Jason Kolts

Abstract: Virile crayfish, (*Orconectes virilis*), are common inhabitants of streams and ponds in Colorado. They are omnivorous and consume a wide variety of plants and animals. A number of studies have analyzed the diets of various crayfish species, although the results have been inconsistent in terms of which life stages of crayfish are more carnivorous. In this project, we are examining the diets of crayfish from three metro-area streams that vary substantially in available prey to see how carnivory among crayfish size classes correlates with prey availability. We are analyzing tissues from a variety of different-sized crayfish and prey from each site for the stable isotope of nitrogen (δ15N), as incorporation of 15N in animal tissues correlates positively with trophic level. We have completed δ15N analysis of samples from our first study area, City Ditch in Washington Park. Potential invertebrate prey was less abundant there compared to our other sites, and the available prey was either very small (amphipods) or large (odonate larvae). Results of δ15N analysis supported our hypothesis that the degree of carnivory should vary among crayfish size classes and correspond to the availability of appropriately-sized prey. Large crayfish capable of handling the large odonate larvae had the highest δ15N values. Small crayfish that were likely eating amphipods exhibited medium δ15N values. Medium-sized crayfish exhibited the lowest δ15N, likely due to the absence of appropriately-sized invertebrate prey. We expect to see higher levels of δ15N among medium-sized crayfish at our study areas with greater densities of medium-sized invertebrate prey.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 PM), Poster #20***

Title: **CHATFIELD VEGETATION SURVEY: BBIRD IS THE WORD**

Primary Presenter: Kayla Starr – Biology
Coauthors: Ashley Purcell, Trevor Starr, Shania McCain
Faculty Mentor: Erin Bissell

Abstract: Chatfield Reservoir in Littleton, CO provides municipal drinking water, recreation, and flood prevention for the Denver Metro Area. A reallocation plan proposed by the Army Corps of Engineers will modify the reservoir to retain more water in future years, which may have an adverse effect on the riparian cottonwood forests in Chatfield State Park. This study was designed to measure the ecological impact of broad-leaf cottonwoods (*Populus deltoides*), specifically on bird usage in these communities. *P. deltoides* occurs in two distinct age categories: 1) younger stands in dense formation, and 2) more widely spaced older legacy trees. This study is in two parts: 1) Before/After Control/ Impact (BACI) study with the hypothesis that bird habitat will be lost to flooding events, 2) Comparative study between forest types with the hypothesis that more habitat is available for birds in the stand forests, likely to be lost under the reallocation plan. To set up the BACI, vegetation surveys were performed according to a modified BBIRD vegetation sampling protocol at 10 stand sites

and 9 legacy sites in the park, as well as 3 control sites at Denver Botanic Gardens (DBG) Chatfield Farm. Control sites were selected as the closest riparian analog where flooding will not occur. By comparing vegetation composition and bird usage in legacy and stand forests, we may be able to anticipate likely effects of reservoir level changes on avian diversity at Chatfield. Maintaining biodiversity increases ecosystem stability, making it critical to understand how these changes affect avian populations.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #5***

Title: **DEGRADATION OF POLYETHENE (CLING-WRAP) BY MICROBIAL COMMUNITIES**

Primary Presenter: Drew Strosnider, Kayla Rojas – Biology
Coauthors: Max Dalton, Lisa Potter
Faculty Mentor: Helene Ver Eecke

Abstract: This bioremediation project seeks to find and optimize microorganisms that biodegrade polyethene/cling-wrap. This project has obvious societal impacts, as over 300-million-tons of plastic are produced a year, accumulates in our landfills, and is not broken down for hundreds to thousands of years. Bacterial communities can colonize, degrade, and/or digest polyethylene in nature, albeit at a tediously slow rate. This research team has collected field samples, have been incubating polyethelyne with these microbial populations, and are monitoring plastic degradation over 200+ days. Subsamples of polyethelyne have been pretreated in various abiotic ways that may potentially enhance biodegradation. Our hunt for natural samples that may contain microbial inhabitants with a metabolism that efficiently breaks down plastic included field trips to a caved-in mine, compost facility, and an upcycling facility of pet excrement. These ecosystems were selected because of the apparent introduction of petroleum/plastic to a microbial ecosystem for an extended period of time, which hopefully has provided a selective force to further promote the microbial metabolism of polyethylene. Amplicon sequencing of taxonomic genes has been performed and bioinformatics will elucidate what microbes were present in each sample. The current phase of this experiment aims to quantify the relative change in degradation of polyethylene. Degradation will be assessed by surface topography and biofilm formation via Scanning Electron Microscopy, functional group modification via Fourier Transform Infrared Radiation, and hydrophobicity via static contact angle. These findings will provide a greater insight into the mechanisms that microbes utilize to break down plastic waste, and can help guide future recommendations for smarter disposal methods in homes and landfills.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #12***

Title: **DEGRADATION OF POLYETHENE BY MICROBIAL COMMUNITIES**

Primary Presenter: Drew Strosnider – Biology
Coauthors: Kayla Rojas, Max Dalton, Lisa Potter
Faculty Mentor: Helene Ver Eecke

Abstract: Bacterial communities can colonize, degrade, and digest polyethylene in nature, albeit at a tediously slow rate. This pace is accelerated by abiotic, heat and/or ultra violet radiation, conditioning of the substrate. This experiment quantified the relative change in degradation of polyethylene film via community based microbes by abiotically treating the film prior to incubation. Microbial assemblages were collected from three environments: cave, compost, and fertilizer. Degradation from these microbial sources was assessed

by scanning electron microscopy of surface topography and biofilm formation, functional group modification via FTIR, and change of hydrophobicity via static contact angle. We observed that pretreatment with abiotic factors facilitated microbial colonization and degradation of polyethylene. These findings provide a greater insight into the mechanisms that microbes utilize to break down plastic waste, and can help guide future recommendations for smart landfills.

Presentation Time/ Location: ***Oral Presentation, Session II 11:15-11:30 AM, NC Room 1314***

Title: **ANALYZING SYMBOLIC INTERACTIONISM AND AMERICAN GUN CULTURE BELIEFS**

Presenter: Matthew Sturbaum – Communications Studies
Faculty Mentor: William Monsour

Abstract: The major purpose of this proposed research is to analyze applications of "symbolic interactionism" (Mead, 1931) which occur in American gun culture and how symbolic interactionism is communicated through both political and social media channels to influence pro-gun attitudes and beliefs within the gun owning community. According to Mead (1931), symbolic interactionism occurs when social interaction and symbols act together to construct social narratives about how people see themselves in society. As an example, American gun culture uses constitutional symbolism and language in an attempt to construct a patriotic narrative. Furthermore, American gun culture frames any attempt to enact gun-control legislation as an assault on the second amendment and Americans' right to bear arms. There will be two proposed research questions: RQ1: In what ways if any, do gun owners who are members of the NRA have substantially different views on gun legislation than gun owning non-members?

RQ2: Do gun owners believe that their gun-control attitudes are more influenced by political communication or through social media communication channels? The proposed methodology will include a general survey administered at several public shooting ranges and gun stores throughout the Denver Metro area. Multiple closed-ended survey questions will be asked to a sample population of 500 people. The expected findings should indicate that the majority of those polled will list political messaging channels as more influential on their gun related beliefs than social media channels.

Presentation Time/ Location: ***Oral Presentation, Session II 10:45-11:00 AM, NC Room 1315***

Title: **SEASONAL PREVALENCE OF *ESCHERICHIA COLI* IN FECES OF THE CANADA GOOSE, *BRANTA CANADENSIS***

Primary Presenter: Ashley Tackman – Biology
Coauthors: Elliza Casey, Ellsbeth Webb
Faculty Mentor: Rebecca Ferrell

Abstract: The Canada goose, *Branta canadensis*, is a common member of both urban and rural communities. A previous report (Kullas, et al 2002) indicated that while the bacterium *Escherichia coli* was readily isolated from Canada goose feces during the summer months, it was rarely found during the colder months of the year. The current study sought to investigate this phenomenon, and the results have shown that E. coli is indeed found in virtually all *B. canadensis* fecal specimens in summer, but is rarely detected in winter, with transition points that can be identified in fall and spring. This is evidence that *E. coli*

pollution of open waters that is sometimes attributed to large Canada goose populations actually may not be produced by the birds during the winter months. In addition, we have found that winter Canada goose fecal samples that do not yield *E. coli* do contain an organism that produces fluorescence in MUG media and can create a false positive for E. coli detection on Idexx ColiLert media; the identity of this organism is currently under investigation.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #8)***

Title: **PROJECT C.A.R.P.P**

Primary Presenter: Justin Valdez – Mechanical Engineering Technology
Coauthors: El Khalifa Beyah, Nick Ausmus, Brycen Calvin, Kevin Frazier
Faculty Mentor: Devi Kalla

Abstract: As waste produced by the human population continues to grow, it can be seen throughout the world that plastics, foam, cigarette butts, and other low-density objects are the significant problem with a wide range of waste making its way into rivers, lakes, and Oceans. This is having a dramatic impact on the health of our water ways. Our objective is to design and develop a working prototype to clean and remove trash from our state's waterways, using a sustainable environmentally friendly system. In researching competing technologies, we have found that there are only a few mechanically automated machines that remove trash from waterways. Much of current technologies for removing debris from moving water ways utilize a slow and steady flow, or volunteers picking up what washes to the banks and can be collected and removed by hand. There are seemingly no designs that would be ideal for the faster moving waterways that can be seen in the Colorado, Arkansas, Rio Grande, Putter and the Platte Rivers of Colorado. Project "CARPP" will be a design that is specific to removing waste from water ways with high velocity current flow. Utilizing an abundance of Engineering topics including fluids, dynamics, machine design, materials, technical writing, technical drawing, statics, digital manufacturing, and circuits. This project will utilize our understanding of turbulent flow, fluid friction, and buoyancy.

Presentation Time/ Location: ***Oral Presentation, Session I 9:15-9:30 AM, NC Room 1315***

Title: **VARIATION OF PLANT PERFORMANCE ON A METROPOLITAN GREEN ROOF IN DENVER, CO**

Primary Presenter: Erik Vazquez – Biology
Coauthors: Jenessa Fischer, Alex Whalen-Wagner
Faculty Mentor: Christopher Meloche

Abstract: The installation of extensive green roofs is increasingly common in urban areas around the world, even becoming required in cities like Toronto and Denver. Plant performance can vary widely due to local conditions. There is little published data about performance of plant species on green roofs in the intermountain west. Our study site, the green roof on the MSU Denver Student Success Building, shows differences in vegetation texture across the surface that are visible in both aerial photos and casual observation. Previous research has shown that these differences are not due to loss of species or strong spatial sorting of species. We hypothesize that individual plant performance varies in a systematic way across the landscape. The study site is bounded on the NW and NE by walls, with glass windows, that rise two stories above the vegetated surface. Height and diameter were recorded for Sedum sp. plants with dome-shaped growth forms along with the distance to

both the NW and NE walls. Preliminary results suggest that there is a negative correlation between distance to nearest wall and plant size. We hypothesize that this correlation is the result of a combination of factors relating to distance from the wall, including fertilization from window cleaners containing nitrogen, increased solar radiation reflected by the windows and differences in temperature caused by both reflection and shading. Further research in this project will include quantifying this complex suite of factors.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #1***

Title: **SELF-IDENTITY AND HOW IT IS DEVELOPED THROUGH YOUTH**

Primary Presenter: Kenneth Velarde – Management
Coauthors: Jonathan Belina, Bengamin Dooley, Kiley Feliciano, Hayden Haveman
Faculty Mentor: William Huddy

Abstract: Today's world is driven by the impressions others perceive of every individual. These impressions are made upon first interactions, and continue throughout every interaction, physical and non-physical, such as, social media, professional websites, and numerous others. Ideas of "self" have many different developmental progression paths, but can be generalized into four quadrants known as the Johari Window. This paper uses this model to provide research insights and associated problems into self, more directly, identities, establishment and how that is developed through growth. First, the Public Area, developed very young with unique identities (characteristics defining an idea or picture of, the most basics of our identity, who they are through physical attributes, significance of their age among peers, etc.). Every interaction creates a conflict with another until a decision is made to project specific "identities" These identities lead into the Blind Area, closely related to social relationships, continuously modified and re-created from feedback. Characteristics clear to others but the individual is unaware of. Recognition of these identities produce positive and negative self-esteem, leading to development of personal and professional maturity/immaturity by establishing values and moral principles throughout the teenage years. Hidden Area identities are well known to the individual, and hidden from others, our deepest secrets. Unknown Area characteristics, limited in research due to their nature, are completely unknown attributes to "self" and others until an event brings them to the surface. Individual identities progressive growth and education is critical to every culture to create a mature, responsible, and collective society.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #3***

Title: **EVALUATION OF CRANBERRY EXTRACT IN THE INHIBITION OF MICROBIAL GROWTH AND BIOFILM FORMATION**

Presenter: RoseAnn Vik – Biology
Faculty Mentor: Sheryl Zajdowicz

Abstract: Biofilms are a lifestyle adapted by many different species of bacteria as a means of survival and can confer tolerance/resistance to antibiotics, thereby mediating infection. In light of this, alternative methods for biofilm prevention and subsequent treatment must be sought. Previous research indicates cranberry extract to be an effective antimicrobial agent against a variety of microbial species; however, research into prevention of biofilm formation is lacking. In this study, we aim to investigate the effect of cranberry on biofilm formation. Ten representative species comprised of Gram-negative and Gram-positive bacteria, as well as a fungal species were tested. The organisms were grown on Mueller-Hinton agar plates,

were exposed to alcohol-free cranberry extract, and observed for zones of inhibition. The cranberry extract was shown to inhibit growth in 7 of the 10 organisms tested and inhibited both Gram-positive and Gram-negative bacteria, with no growth inhibition observed in the fungal species. Following determination of susceptible organisms, a minimum inhibitory concentration was obtained for each. The effect of cranberry extract or proanthocyanadin on both biofilm formation and on mature biofilms was investigated. *Staphylococcus aureus* and *Pseudomonas aeruginosa* were highly affected by these compounds. Further evaluation of the effect of cranberry extract on the expression of *icaA* and *lasR* in *S. aureus* and *P. aeruginosa*, respectively, is in progress.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 – 12:00 PM), Poster #3***

Title: **BASE HYDROLYSIS OF AMIDES**

Presenter: Jack D. Walizer – Chemistry
Faculty Mentors: Russell Barrows and Chad Magee

Abstract: The hydrolysis of carboxylate can be achieved in both acidic and basic conditions. In both cases, the leaving group must first be protonated to allow for the formation of the carboxylic acid. In acid hydrolysis, the proton needed for the formation of the acid comes from the solvent. However, in base hydrolysis, there is no proton available to protonate in the intermediate, allowing for the formation of carboxylic acid. Therefore, base hydrolysis of amide under basic conditions should not occur due to the high reactivity of the necessary leaving group, whose pKa is ≈36. Base hydrolysis of amides is a common reaction in both the laboratory and the biosphere. The amine portion of the amide must first be protonated to the point where it becomes a viable leaving group. Once the amine portion becomes protonated, the overall reaction can continue to the formation of the carboxylate. In order for base hydrolysis to occur in base, an intramolecular proton transfer is needed to achieve this protonation of the amine and hence the completion of the reaction. To demonstrate the necessity of an intramolecular proton transfer, solid NaOD (Deuterium Sodium Hydroxide) was needed. This deuterated base was synthesized by adding deuterated oxide (D2O) to solid sodium in a nitrogen atmosphere. NMR analysis showed that the isotropic purity of the deuterium sodium hydroxide was better than 95%. With the synthesis of the NaOD complete our investigation of the intramolecular proton transfer in the base hydrolysis of amides will continue.

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #8***

Title: **WOULD WILDLIFE CROSSING STRUCTURES FOR WEST CHATFIELD STATE PARK BE BENEFICIAL?**

Presenter: William K. Walters – Biology
Faculty Mentor: Christopher Cooley

Abstract: Properly placed wildlife crossing structures have had enormous effects on wildlife related car accidents all over the world. They significantly decrease these accidents and increase essential motility for wildlife's fitness. For Chatfield State Park, the west side is the only way wildlife can access the park from the mountains and the addition of S Wadsworth Blvd has fragmented these two areas. Our study will be attempting to answer whether wildlife crossing structures would be beneficial for S Wadsworth Blvd. We will estimate the total amount of cost that wildlife impose on this stretch of road from crash reports, and compare that to the cost of crossing structures, wildlife preventative fencing, and emergency exits

along the highway. We will estimate the number of structures required by researching for commonly used crossing areas by wildlife in the area. We will find these areas by mapping wildlife related crashes, dead wildlife along the highway, tracks found crossing the highway, photos taken by wildlife cameras, and scouting wildlife crossing the highway. Our study is expected to show that if the crossing structures are built efficiently, they are cost effective and will reduce the amount of wildlife related car accidents, which in term would increase their population size and their chances of gene flow by creating a highway where wildlife and humans can cross undisturbed.

Presentation Time/ Location: ***Poster Presentation, Session IV (3:30 – 4:30 PM), Poster #15***

Title: **BATTLE OF THE VAGINA: THE DEBATE CONTINUES**

Presenter: Natalia Walton – Gender, Women and Sexualities Studies
Faculty Mentors: Arlene Sgoutas and Douglas Mpondi

Abstract: This paper outlines the debate in academia on the existence of the vaginal orgasm. This paper explores why the debate exists, how it is reproduced in the media and in academic journals, and how it is internalized by women. Authoritative figures push the debate towards the existence of vaginal orgasm(s) inferring that women are supposed to have them to facilitate maturity, reproduction, and demonstrate a healthy mind and body. However, this paper argues that this is a patriarchal view of women's bodies forsaking the clitoris, and women's sexuality. This paper does not resolve the debate, but rather exposes the battle forged on the vagina of female kind.

Presentation Time/ Location: ***Oral Presentation, Session II 10:30-10:45 AM, NC Room 1313***

Title: **PREVALENCE OF TREMATODE PARASITE INFECTION IN SNAIL ASSEMBLAGES OF THE DENVER METRO AREA**

Presenter: Anna Wanek – Biology
Faculty Mentor: Faculty Mentor: Jason Kolts

Abstract: Cercarial dermatitis, or Swimmer's Itch, is caused by parasitic trematodes which infect a variety of vertebrate and invertebrate hosts. Larval (cercarial) flatworms are released from their intermediate invertebrate host to find their definitive vertebrate host. They sometimes mistakenly penetrate the skin of humans, causing the painful rash known as Swimmer's Itch. In Colorado, common intermediate hosts for these flatworms are freshwater snails in the *Physa* genus. Quantifying the prevalence of infected *Physa* spp. can help us better understand and predict where larval trematodes are likely to come into contact with humans or pets. Approximately 150 snails were collected from July 2016 to September 2017 at each of our five study areas in the Denver metro area: Walden Ponds, Washington Park, Lowell Ponds, McKay Lake, and City Park. We recorded the number of infected snails and the types of trematodes present at each site. Because feeding behaviors in hosts are often affected by parasites, we are using analysis of δ13C and δ15N to indicate if this is the case in infected snails. While initial data suggests no difference in δ13C and δ15N that could be attributed to trematode infection, snails from our different study areas varied substantially in their isotopic composition. We also found that infection rates differed greatly among our study sites, possibly due to differences in densities of waterfowl, which serve as a definitive host for trematodes. Minimizing contact with water where high densities of waterfowl and *Physa* spp. occur would likely decrease incidence of Swimmer's Itch in humans.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #7***

Title: **SHOULD LATINOS BOYCOTT HOLLYWOOD?**

Presenter: Chanel Ward – Individualized Degree Plan
Faculty Mentors: Ramon Del Castillo, Orlando Archibeque, and Megan Hughes-Zarzo

Abstract: This paper will examine the exclusion and stereotyping that Latinos endure within the film/movie industry, both behind and in front of the camera, while proving through recent studies that Latinos are in fact contributing to this ongoing problem through their above average spending and viewership, all despite Hollywood's omission to Latinos. To accurately present the recent findings conducted by various sources aiming to expose the exclusionary treatment of minorities in mainstream media, it's also important to examine the long-term effects suffered from this treatment and how that ultimately translates over to the societal treatment of Latino communities and individuals. A recent study by the Media, Diversity and Social Change Initiative at the USC Annenberg School for Communication and Journalism titled; "The Comprehensive Annenberg Report on Diversity" dedicated 10 years of research to the lack of media attention for women and people of color to find that the growing Hispanic population is amongst the highest ethnicity group to support an industry that hardly portrays or represents them. The findings proved that women of color are the least represented group on television and in movies and even lower for written and director roles. In addition to the Annenberg Report, the paper will also utilize a study from Columbia's Center for the Study of Ethnicity and Race to show how the buying power of Latinos and the effects of media mergers contribute to the exclusiveness.

Presentation Time/ Location: ***Oral Presentation, Session I 9:00-9:15 AM, NC Room 1316***

Title: **THE TWITTER REVOLUTION: A LOOK AT HOW TWITTER HAS CHANGED OUR NEWS CYCLE**

Presenter: Kyle Wearner – Communications Studies
Faculty Mentor: William Monsour

Abstract: The main reason of this proposed research project is to explain and identify how the social media platform, Twitter has changed the landscape of media in the United States. The popular website has been gaining momentum for a number of years, but the rampant use of it by Donald Trump has revolutionized how we receive communications from our government. For example, in the past we would wait for a press secretary or an official statement to be released before we received any word from the White House, but the way in which Donald Trump Tweets his thoughts at all hours of the day has given us a glimpse into the thought processes of the world's most important man. RQ1: In what ways, has Twitter changed how we receive our news and ultimately view the world around us, if at all. Research will include reviews of literature, interviews and survey's conducted both online and in person to gain an understanding of how people view Twitter and how they interact with it on a regular basis. I expect to find that Twitter has given society a hunger for real time news and immediate feedback, gone are the days of waiting for the 5 o'clock news to see what is going on in the world. These findings will be discussed in an oral presentation when all research has concluded.

Presentation Time/ Location: ***Oral Presentation, Session II 11:00-11:15 AM, NC Room 1315***

Title: **MASCULINITY IN MEDIA AND ITS EFFECT ON MALE BODY IMAGE**

Presenter: James Webster – Psychology
Faculty Mentor: Michael Rhoads

Abstract: Misrepresentation and exaggeration of the male body in media is an obscure issue and, unfortunately, seldom talked about. The intent of this study and literacy review is to highlight how frequently men are shown with above average muscle mass in advertising and entertainment. The constant portrayal of men sexualized in this manner leads to unrealistic body image ideals and body dissatisfaction in men. The forming of these aesthetic ideals comes in many forms of media, such as cinema, television, advertising, video games, and social media. In recent generations, adolescents are surrounded by the media as they develop; fitness aspirations and body ideals that were once formed by average social interactions, are now formed by the exaggerated nature of entertainment. The consequences of this can be seen in the increase of muscularity and muscle dysmorphia cases in men. This content analysis evaluates an hour of commercial media to highlight the male body types most frequently and infrequently used in advertising. The data collected shows that the average represented body type was mesomorphic and muscular, while body types such endomorph and on the lower side of Ectomorphic were much less common. Men with remarkable muscle mass were usually the centerpiece or "hero" of the commercial. The average body type in this study is vastly different than the average body type of Americans, while this may lead to a successful ad campaign, it also creates a false expectation of how men should appear aesthetically, changing societies perception of what the average male physique looks like.

Presentation Time/ Location: ***Oral Presentation, Session III 2:30-2:45 PM, NC Room 1316***

Title: **NOT USING A CONDOM? RISK FACTORS FOR UNPROTECTED SEX IN COLLEGE STUDENTS**

Primary Presenter: Leora Whiteaker – Psychology
Coauthor: Olivia Breedin
Faculty Mentors: Aaron Richmond and Maureen Flynn

Abstract: Casual sex and 'hook-ups' are normalized sexual practices amongst American college campuses. Typical students enrolled in 4-year universities are young adults who go through a transition of autonomy and independence. During these first years outside their parents' home, students often engage in risky behaviors, such as; underage drinking, recreational and illegal drug use, and unprotected sex with uncommitted and multiple partners. In this study, we sought to further the understanding of sexual risk taking in college students by focusing on stigma associated with condom use. Sexual risk taking was defined as rates of unprotected sex, multiple sexual partners, and starting age of sexual activity. We specifically looked at how alcohol use, drug use, STD knowledge (cause/cure and general knowledge), and gender predicted risky sexual behavior. In a preliminary study, undergraduate students (n = 61) enrolled in an Introduction to Psychology course at an urban university participated in the study. Hierarchical multiple regressions were conducted to examine the predictive value of stigma in three risky sexual behaviors. There were two significant findings, first, a gender difference in condom attitudes (women tend to have more positive attitudes than men about condom use). Second, identity stigma (attributes such as 'boring', 'geeky', 'jerk' and 'promiscuous') predicted higher rates of unprotected sex. Because of the personal and sexually related content of the material, participants might not have been as truthful as they might have

been taking the survey online. Therefore, we are continuing data collection to boost sample size and the ability to detect more meaningful results.

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #6***

Title: **ALIGNING EVENT CLASSES LEARNING OBJECTIVES TO EVENT ENTRY LEVEL POSITIONS**

Presenter: Madeline Wiebeck – Hospitality, Tourism & Events
Faculty Mentor: Cynthia Vannucci

Abstract: The Bureau of Labor Statistics (BLS) data confirms that in 2012 there were 94,299 meeting, convention, and event planners employed across the US. According to the BLS this number was forecasted to grow 33 percent by 2022, resulting in 31,300 new positions. Metropolitan State University of Denver (MSU Denver in Spring Semester 2016 started its new B.S. in Event and Meeting Management (EVTM) degree. Recognizing that this a growing job market, educators in this field want to determine if EVTM course learning objectives meet skill sets necessary to prepare students for these professional positions. The purpose of this study by the MSU Denver Hospitality Tourism and Events Department is to garner this data to further advance the assessments of program learning objectives and to utilize the results for curriculum mapping for the major. A data base of over 150 Colorado Association Executives and 200 Meeting Professional International members in the Rocky Mountain Region were surveyed. Data was gathered on their opinion of the 3000 and 4000 level Event and Meeting Management class learning objectives using a Likert scale. Demographics of survey respondents were also included in the data. This was an exploratory study to gather descriptive statistics. Participants were asked about other learning objectives that should be included in upper division course work, and to share their experiences of hiring a college graduate into the field of event and meeting management. Anticipated results of the research are designed to collect opinions on the learning objectives and to determine if the necessary skill sets for an entry level event and meeting planning position are being taught.

Presentation Time/ Location: ***Oral Presentation, Session III 3:00-3:15 PM, NC Room 1311***

Title: **MARVELOUS MICROBES**

Primary Presenter: Pamela Yang – Restaurant Management
Coauthors Hannah Johnson, Molly Ward
Faculty Mentor: David DeMalteris

Abstract: This project will be discussing the benefits of microbes in a gardening aspect. It will explain the effects of beneficial bacteria versus harmful. This will show what is needed for healthy soil resulting in plant growth. There are different options to incorporate microbes into your soil, which will be presented.

Poster Presentation, Session I (9:30 – 10:30 AM), Poster #18

Title: **A SURVEY OF UNDERGRADUATE-LEVEL WORKS FOR PICCOLO**

Presenter: Kara Ylitalo – Music
Faculty Mentor: Patricia Surman

A Survey of Undergraduate-Level Works for Piccolo. The purpose of this study is to create an annotated bibliography of unaccompanied works for flute written between c. 1700 and the present day. This survey has three objectives: to develop a list of works for piccolo that would be appropriate for undergraduate study; to investigate the musical value of these works; and to investigate notable compositional techniques and devices employed in these works. This study will lead to the production of an annotated bibliography of the music researched in the survey. The following information will be included in each annotation: • Composer's name, dates, and native country • Title • Movement titles and/or tempo indications • Publisher, location, date of publishing of composition, or date of composing • Grade of difficulty • Duration • Musical style and genre • Performance considerations and notable compositional techniques

Presentation Time/ Location: ***Poster Presentation, Session II (11:00 AM – 12:00 PM), Poster #18***

Title: **ENGINEERING CLEAN RIVERS**

Primary Presenter: Nathan Yudnich – Civil Engineering Technology
Coauthor: Kessler McCarthy
Faculty Mentor: Richard Wagner

Abstract: Trash entering into waterways is a problem that has been identified across the globe, and plastics are of particular concern. Since the production of plastics began, an estimated 8 billion tons have been produced. Only 9% is recycled, and 8 million tons of plastic make their way into oceans each year. An estimated 80% of the world's marine pollution comes from land-based sources. The Natural Resources Defense Council reported that "[cities] farther inland often don't recognize their role in cleaning up inland streams and rivers to prevent debris downstream" (Monroe, 2013). While California is spending $450 million per year in preventing litter from entering our environment, no such trash removal methods are in place for Denver waterways. Our research involves designing a trash removal system, testing and adapting its effectiveness, and systematically documenting the trash removed from urban streams. An initial design was implemented as a Clean River Design Challenge, sponsored by the Greenway Foundation in 2015-16, and tested briefly on Cherry Creek in June 2016. In March and April 2018, the apparatus will be deployed on a section of the Cherry Creek adjacent to the Auraria Campus. Results focus on identifying design and engineering challenges and also document the composition of floating trash at different locations and different flow conditions. The goal is to access the benefits and feasibility of whether or not Denver could start implementing such projects. Monroe, L. (2013, August) Waste in Our Waterways: Unveiling the Hidden Costs to Californians of Litter Clean-up. Retrieved from https://www.nrdc.org/sites/default/files/ca-pollution-in-waterways-IB.pdf

Presentation Time/ Location: ***Poster Presentation, Session III (2:15 – 3:15 PM), Poster #18***

Title: **MIGHTY MUSHROOMS**

Primary Presenter: Amber Zius– Biochemistry
Coauthors: Noelle Helmer, Kristina Golinka
Faculty Mentor: David DeMalteris

Abstract: Fungi plays several integral roles in the earth's ecosystem; from decomposition of dead matter to human consumption, mushrooms come in all colors, shapes and sizes. They

have a special set of enzymes that the majority of other living things do not, thereby creating an invaluable niche that only they can fulfill. This diverse domain has many developmental stages, where each stage interacts with its environment in a unique way. The environment in which fungi interacts is continually changing, and unfortunately it is becoming devastatingly polluted as the human population continues to increase. New and improved methods to remove pollutants from contaminated soil and water must be discovered to sustain the expanding population. Specifically, mycoremediation is showing terrific promise as a solution to this pollution problem. Mycoremediation is the process by which fungi has the tremendous ability to isolate, digest, and alter toxic materials in soil and water; making unusable resources usable again. Through biodegradation, biosorption, and bioconversion, mycoremediation may be one of the greatest technologies utilized to return our damaged planet to its true and healthy form. Better understanding the mycoremediation process, from the underground tangles of hyphae (mycelium) to the visible and often edible fruiting body (basidium), is crucial to propel this sustainable and reviving process forward.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #3***

Title: "The Last Bill" film screening and Q & A panel

Presenter: American Democracy Project

Abstract: This session is organized by the American Democracy Project, a committee on campus dedicated to advancing campus wide civic engagement. The session includes a film screening and panel for general Q&A. "The Last Bill" is produced by former Senator Linda Newell. "In her last session, Senator Newell filmed this short behind-the-scenes documentary of a senator's real-life story carrying a bill through the legislature. Here, you'll see from an insider's perspective how difficult it can be to turn a bill into law. As you follow Senator Newell, joined by Senator Kevin Lundberg, through the process, she works her bills of suicide prevention and intentional misrepresentation of service animals, being challenged from across the aisle, attempting bipartisanship, all with a bit of humor and fortitude." Read more here: https://www.lindanewell.org

Presentation Time/ Location: ***Film and Q & A Panel Presentation, Session III 2:15 – 4:15 PM, NC Room 1402***

ADDENDUM

Title: **THE EFFECTS AND PERCEPTIONS OF BRAIN BOOSTERS ON THE ACADEMIC ACHIEVEMENT OF COLLEGE-AGED STUDENTS**

Primary Presenter: Kayla Styles
Coauthors: Madeline Latimer, Carolyn Villano, Ruth Delgado Sherpa
Faculty Mentor: Michael Rhoads

Abstract: This study examines physical activity effects on academic outcomes and the perceived influences of brain boosters on college students. Brain boosters were administered throughout the semester and students were asked to report their perceived effectiveness qualitatively by filling out Experience Sampling Surveys in class and completing a summative survey at the end of the semester. The areas that show significant differences are considered for future research questions about how physical activity and brain boosters relate to academic achievement for college students. (Keywords: physical activity, academic achievement, brain boosters)

Presentation Time/ Location: ***Oral Presentation, Session II 10:45 - 11:00 AM, NC Room 1311***

Title: **STUDENT VETERANS EXPERIENCE WITH DISCRIMINATION ON CAMPUS**

Primary Presenter: Steven Hauser
Coauthor: Juliet Madsen
Faculty Mentor: Jovan Hernandez

Abstract: The purpose of this qualitative research study is to investigate student veterans' experiences with discrimination in the college campus environment. The study will also help the researchers gain insight as to how these perceptions affect veterans' interactions with the campus community. In addition, this research study aims to determine whether some of these experiences can be classified as microaggressions. Microaggressions are intentional or unintentional derogatory statements, acts, or environmental factors that can interfere with a targeted person's identity (Sue et al., 2007). These microaggressions may in turn negatively affect an individual's psychological well-being.

Presentation Time/ Location: ***Poster Presentation, Session I (9:30 – 10:30 AM), Poster #21***

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