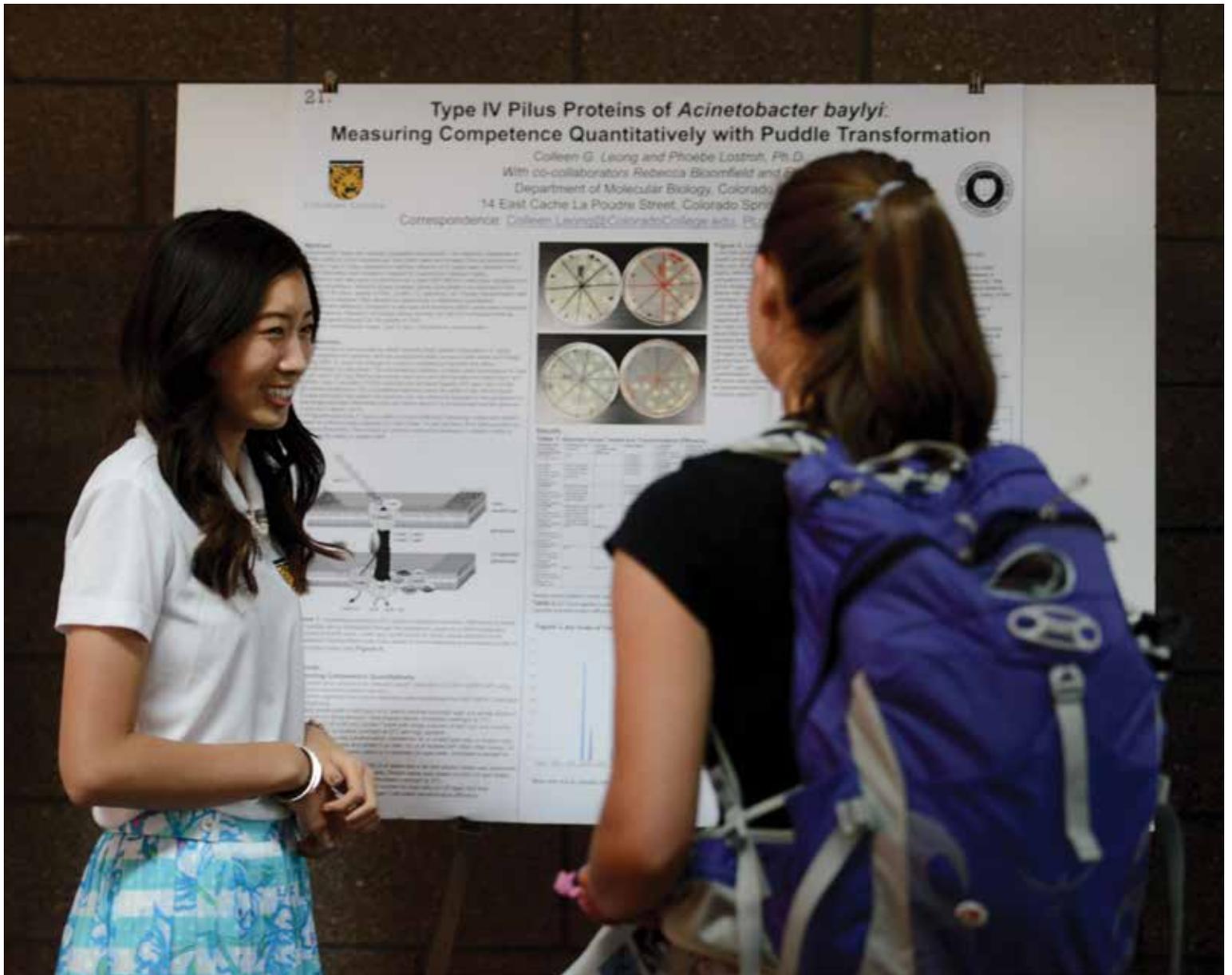


THE COLORADO COLLEGE PLAN:
**BUILDING ON THE
BLOCK**

ADDITIONAL SUPPORT FOR THE BLOCK PLAN

CENTER FOR IMMERSIVE LEARNING & ENGAGED TEACHING



SUMMER FACULTY-STUDENT COLLABORATIVE RESEARCH SYMPOSIUM

TUESDAY, SEPTEMBER 29, 2015

Summer Faculty-Student Collaborative Research Symposium

Tuesday, Sept. 29, 2015

Edith Kinney Gaylord Cornerstone Arts Center

3:30– 3:55 p.m.

Cornerstone Main Space

Opening Remarks and Faculty Perspectives on Researching with Undergraduates

Sandi Wong Faculty members	Dean of the College/Dean of the Faculty Ryan Bañagale , Music and Lori Driscoll , Psychology Phoebe Lostroh , Biology and Jane Murphy , History
Jill Tiefenthaler	President of the College

4 – 4:45 p.m.

Cornerstone Screening Room

Student Perspectives on Collaborative Research I: Concurrent Panel Sessions

Session A: Experiences of Self and Relations to Other

ABSTRACT A1	Thomas Roberts , “Jonathan Lear and a New Psychoanalytic Human Ontology”
ABSTRACT A2	Spencer Spotts , “Queens of the Kingdom: Misogynoir and Portrayal of Black Mother-Son Relationships in VH1’S ‘Love and Hip Hop’”

Cornerstone Experimental Classroom

Session B: Environmental Transformations

ABSTRACT B1	Caroline M. Boyd and Armand Dominquez , “Investigating the competence machinery in <i>Acinetobacter baylyi</i> through quantification of induced appendage formation in response to environmental DNA”
ABSTRACT B2	Vlad Radulescu , “The Transition of British Officers from the Military to Retirement in the 19th Century”

Cornerstone Room 301

Session C: Human Perception, Countervision, and Confinement

Abstract C1	Tess Gruenberg and Edward Weeks , “A Symphony of Senses: The Philosophy of David Foster Wallace”
Abstract C2	Eliza Mott , “Defining the Cage: A Historical Analysis of the Effects, Realities, and Impacts of Forced Confinement”

4:50-5:35 p.m.

Cornerstone Main Space

Student Perspectives on Collaborative Research II: Poster Presentations

4:50 – 5:15	POSTER SESSION 1	Abstracts P1 – P20
5:15 – 5:35	POSTER SESSION 2	Abstracts P21 – P39

5:40 - 6:30 p.m.

Cornerstone Main Space

Closing Remarks

Faculty members **Phoebe Lostroh**, Biology and **Jane Murphy**, History

Student Perspectives on Collaborative Research I: Concurrent Panel Sessions

Session A: Experiences of Self and Relations to Other

Cornerstone Screening Room

ABSTRACT A1 *“Jonathan Lear and a New Psychoanalytic Human Ontology”*

Student Researcher **Thomas Roberts**
Faculty Collaborator **John Riker**, Philosophy

This monograph attempts to unify Jonathan Lear’s ideas from his first great psychoanalytic work, “Love and its Place” in Nature, through his most recent work on irony and psychic integrity. In sum, we shall show Lear’s understanding of how the complex vulnerabilities of the human psyche to both internal and external disruptions have led human beings to rigidly organize their psyches, for without internal organization one can have neither a self nor a world. However, Lear contends that the Western insistence on a complete teleological organization of life has led to strong tendencies towards aggressing against both unconscious intrusions and external disturbances. Lear shows why and how a life based on a psychoanalytic understanding of the human psyche must give up the dream of a completely systematic organization of life and learn to thrive within the reality of a self-disruptive human psyche. To achieve any kind of integration of conscious and unconscious mental processes, Lear thinks that one must value openness, inquiry, and integrity, which in turn are fostered by developing dispositions to courage, irony, and hope. While these values might appear traditional and nothing revolutionary, Lear gives them new meanings by locating them in a psyche that harbors unconscious motivational structures. How we deal with psychic disruptions will make all the difference as to how well we are able to both be consonant with ourselves and live in a world with vibrant rather than closed possibilities.

ABSTRACT A2 *“Queens of the Kingdom: Misogynoir and Portrayal of Black Mother-Son Relationships in VH1’S ‘Love and Hip Hop’”*

Student Researcher **Spencer Spotts**
Faculty Collaborator **Heidi Lewis**, Feminist and Gender Studies

Since the mid 1900s, literature written about black families has primarily focused on blaming black single mothers for black male failure. The infamous Moynihan report, officially published under the title “The Negro Family: The Case For National Action” in 1965 by the United States Department of Labor, became the impetus for a strong emergence of this narrative not only in the academy but in popular culture as well. Through a feminist and critical race media analysis of VH1’s television series “Love and Hip Hop,” we argue that the reproduction of this narrative spreads and encourages misogynoir at a time when black women continue to face high rates of violence and discrimination. Coined by Crunk Feminist Collective scholar Moya Bailey, misogynoir describes the hatred of black women as a result of both racism and sexism. We analyze all three installments of “Love and Hip Hop,” looking specifically at the mother-son relationships and how mothers are depicted. These mothers are often scripted as seemingly psychotic, destructive to their sons’ romantic lives, and completely dependent upon their sons for survival. When mass media, such as reality television shows like “Love and Hip Hop,” mirrors the misogynistic and racist academic literature surrounding black families, black women once again become reduced to destructive images of a white supremacist and patriarchal society.

Session B: Environmental Transformations

Cornerstone Experimental Classroom

ABSTRACT B1 *“Investigating the competence machinery in Acinetobacter baylyi through quantification of induced appendage formation in response to environmental DNA”*

Student Researcher **Caroline M. Boyd** and **Armand Dominguez**
Faculty Collaborators **Kristine Lang**, Physics, and **Phoebe Lostroh**, Molecular Biology

Acinetobacter baylyi is a ubiquitous soil dwelling bacterium that is highly competent. In other words, it is specialized to take in DNA from its environmental surroundings and incorporate that DNA into its genome. The exact protein composition mechanism the competence machinery is still unknown. One of the proposed mechanistic models is the “fishing pole” model. In this model, the cell produces appendages that resemble a fishing pole that extends out, attaches to DNA, and then “reels” in that DNA, bringing it across the cell membrane. It is hypothesized that these appendages have a similar structure and function as the Type IV pili responsible for motility of the bacterium. In this study, we added various concentrations of DNA to cells’ environment and used atomic force microscopy to generate 3D images of the cells and their appendages. Next, we used a computer program, NeuronJ, to trace, classify, and quantify the appendages. Our results so far indicate that when more DNA is added, more appendages are produced until a threshold is reached. Further experiments and analysis are currently being performed to confirm this correlation. We hope to show that the fishing pole model best describes the mechanism of competence in *A. baylyi*.

ABSTRACT B2 *“The Transition of British Officers from the Military to Retirement in the 19th Century”*

Student Researcher **Vlad Radulescu**
Faculty Collaborator **Esther Redmount**, Economics and Business

England’s military system experienced radical changes in the 19th century through the Cardwell Reforms, which abolished the purchase of officer commissions and instead granted military rank and promotion through service and merit. An Army Purchase Commission was established on November 1, 1871 to determine appropriate amounts of compensation for officers with vested rights in the army. The purpose of this project is to explore the reasoning behind many officers’ decisions at the time to continue their service or choose a retirement plan. The data was collected from army records and letters between officers and the Army Purchase Commission. Through the development of an economic framework, patterns may be found among officers belonging to a wide range of characteristics such as age, rank and regiment. With the project still in progress, further work is required to provide conclusive results. The findings may be useful in addressing retirement decisions in our times.

Student Perspectives on Collaborative Research I: Concurrent Panel Sessions

Session C: Human Perception, Countervision, and Confinement

Cornerstone Room 301

ABSTRACT C1 **“A Symphony of Senses: The Philosophy of David Foster Wallace”**
Student Researcher **Tess Gruenberg** and **Edward Weeks**
Faculty Collaborator **Corinne Scheiner**, Comparative Literature

Exploring the ocularcentric paradigm that dominates Western thought and the way in which David Foster Wallace’s literary work acts as a contemporary ‘countervision’ to the seemingly invisible yet pervasive hierarchical structure of sensory experience. The oral presentation will include an extensive description on the history of ocularcentrism, the various philosophers that problematize the tradition of defining vision as the most objectively true sense of human perception and lastly, contextualizing Wallace’s literary voice within the philosophical realm.

ABSTRACT C2 **“Defining the Cage: A historical analysis of the effects, realities, and impacts of forced confinement”**
Student Researcher **Eliza Mott**
Faculty Collaborators **Jane Murphy** and **Susan Ashley**, History

This project involves a careful study and analysis of a variety of texts, primarily personal accounts, but also including literature, histories, and studies of or written in or as reactions to prisons, in order to formulate the a reading list that best teach the realities of the prison or confinement. The is goal of this reading list would be to help convey the experience, social and psychological impacts, and the historical and cultural universals/commonalities of forced confinement or confinement as punishment. These teachings will hopefully work to help create understanding of the current prison systems in place, the problems that they face, and help work towards solving the issues of this method of punishment.

Student Perspectives on Collaborative Research II: Poster Presentations

Poster Session I: Abstracts P1-P20

Cornerstone Main Space

P1 **“Stem retention: Who graduates with a degree in STEM fields at CC?”**
Student Researcher **Amairani Alamillo**
Faculty Collaborators **Traci Freeman**, Colket Learning Center and **Stephen Getty**, Quantative Learning Center

Although colleges and universities have made progress during the last 20 years to increase the number of underrepresented minorities (URMs) majoring in STEM fields, we still see significant disparities in STEM degree attainment at all levels. Our research investigated the pathways of underrepresented minority students (URMs) at CC. We sought to determine if there were patterns in STEM retention for students who demonstrated an early interest in STEM.

We had an initial pool of 1,500 students who graduated over a three-year period (2012, 2013, 2014). To ascertain early interest in STEM, we looked at students’ responses on the Common Application and the Advising Questionnaire (when available). We used a binary logistic model to test the relationships of demographic information, including race and ethnicity and gender, as well as ACT/SAT M scores and the number of AP/IB participation as an indicator of high school rigor, in the completion of a STEM degree.

We found that students’ early interest in STEM ($p = .000$) and their ACT/SAT M scores ($p = .000$) were the strongest, statistically significant predictors of graduating with a major in STEM. We found a positive coefficient with gender (favoring females) but equivocal significance ($p = .039$). A key finding of this study was that, at CC, a student’s URM status does not predict their) completion of a degree in STEM.

P2 **“Designing Cryptographically Secure Shared Databases”**
Student Researcher **Jay Batavia**
Faculty Collaborator **Ben Ylvisaker**, Mathematics and Computer Science

Recent events like the Snowden revelations have driven home the point that powerful insitutions like governments are actively asserting their capacity to inspect any personal data they can get their hands on. At this point it becomes important to develop technologies that people can use to protect their private data. This project involves designing a framework for private databases shared among informal groups of people. This framework relies on existing end-to-end encryption techniques exemplified by systems like iMessages or LastPass. To limit the project to a reasonable scope we have focused on a concrete web application: a chore recording app. This app allows for family and friends to have a set of shared chores. They can record a chore as done with the poke of a button from anywhere. The encryption and decryption of databases and other security related functionality is handled by the app in the user’s browser. This makes it possible to not have to transmit any unencrypted data between the client, server, and cloud. The big take-away from this project so far has been that the end-to-end architecture we designed is viable even using a third-party cloud storage system.

P3 **“Documentary Film Editing & Casting”**
 Student Researcher **Courtney Blackmer-Raynolds**
 Faculty Collaborator **Clay Haskell**, Film and Media Studies

The first task of this research was to help edit a short documentary film. The film tells the story of a family that has hosted community dances in their barn for three generations. When the main character gets Parkinson’s disease, the family must sell the farm and adapt to a new lifestyle. My primary responsibilities on this project were to name and organize footage, cut select clips, and compile the best footage into scenes. The second component of my summer research was to help cast a short narrative film. The screenplay, written by Clay Haskell, shows a day in the life of an immigrant day laborer. Since the screenplay is written entirely in Spanish, my primary work on this project was finding Spanish-speakers to act in the film. I recruited actors from the community and conducted a casting session in Spanish. In working on both of these films I have learned a variety of new skills including how to edit footage for maximum coherence and emotional impact and how to find and choose actors. We are continuing to work on both of these films and hope to have them finalized for submission to film festivals soon.

P4 **“Analysis of Bacterial Morphological Adaptation”**
 Student Researcher **Jay Batavia**
 Research Collaborators **Victoria Bry** and **Samuel Huestis**
 Faculty Collaborators **Kristine Lang**, Physics, and **Chris Kempes ’07**, California Institute of Technology

In order to further the study of the morphological changes in the transition from exponential to stationary phase of bacteria populations begun by Lammers et al, we have modeled individual cell metabolic rate to their resource consumption. Using the volume of individual cells, taken from atomic force microscope (AFM) measurements, and a diffusion model, we have shown that the required metabolic rates of a cell are mirrored closely by the amount of resources available to each individual cell throughout a 10 hour growth cycle. In addition we have created a simulation of our cell population, using measured cell volumes and CFU (colony forming units) growth data, which is used to model the growth dynamics of the population over time. This simulation has produced results that imply that the morphological changes seen prior to the stationary phase are not solely connected to the growth curve and that the cell is making a more complex decision as when to enact these changes.

P5 **“Research on Food Allergies in Children”**
 Student Researcher **Ximena Buller Machado**
 Faculty Collaborator **Vanessa Lopes Muñoz**, Sociology

This research aims to understand how families make health decisions and assess institutions for their health needs. The research carried out focused more specifically on allergy treatment and what stimulates the activity of ‘doctor shopping’ which is highly used by parents of children with food allergies. The data collected in this study is based on in-depth interviews. These interviews were individual and intensive, gathering as much detail as possible from the experiences of the parents. These sessions lasted between 60 and 90 minutes and were audio recorded to later be transcribed and coded. The scope of this study includes parents of children within the ages of 3 and 10 that have severe food allergies in the Colorado Springs area. The results from this study suggest that parents more often than not make their own assessments regarding the severity of their child’s reactions and allergy treatment, are well informed or have strong opinions on the subject, which leads to the negotiation of medical diagnosis and often leads to doctor shopping. This part of the research proposes that some of the reasons these parents engage in doctor shopping include but are not limited to the empathizing treatment of their children by the physician, the doctor’s reputation and the appreciation from the specialist towards the parent’s opinions on the best treatment for their child’s food allergies. This study was limited by time and sample size, therefore more research regarding this subject should be carried out in the future.

P6 **“The function, structure and the dynamic abilities of the U6 RNA Internal Stem Loop in splicing pre-mRNA”**
 Student Researcher **Danielle Davis**
 Faculty Collaborator **Neena Grover**, Chemistry and Biochemistry

For most eukaryotic genes, the initial RNA that is transcribed from a gene’s DNA template must be processed before it becomes a mature messenger RNA (mRNA) that can direct the synthesis of a protein. An essential step in this process is known as splicing. Splicing is a complex mechanism carried out by the spliceosome, by which introns are cut out of an RNA sequence and exons are ligated together. The spliceosome is a megadalton ribonucleoprotein, composed of five small nuclear RNAs (U1, U2, U4, U5, and U6) and approximately 70 proteins. The U6 subunit of the spliceosome is a particularly interesting component. It has an Internal Stem Loop (ISL), which is a non-canonical region in RNA containing an unequal number of nucleotides on the two opposing strands. During catalysis, the C67-A79 non-canonical pair in the U6 ISL is unprotonated, which causes U80 to flip into the helix. This conformation allows Mg²⁺ to bind to the U6 ISL, which is essential in order for splicing to occur. In my research, I used an experimental technique known as Melting in order to shed light on the thermodynamic properties of the U6 ISL. Melting uses a spectrophotometer to obtain data about the stability of the ISL in differing solutions which can then be used to further understand the ISL’s properties.

P7 **“Squinting for Science”**
 Student Researcher **Armand Dominguez**
 Research Collaborators **Caroline Boyd**, **Rico Tenente**, **Mariko Foecke**, and **Colleen Long**
 Faculty Collaborator **Kristine Lang**, Physics and **Phoebe Lostroh**, Molecular Biology

My presentation will be about my work in the lab. It will cover the things I do in lab, the tools I work with, and the main goal of our lab. My presentation will complement my lab partner, Caroline Boyd. Her presentation will be focused on the biology aspect of the experiment while mine will be more on the biophysics aspect. I will briefly talk about the competence and explain how we are trying to understand how it works. I will then talk about atomic force microscopy and how it has helped us further understand the biological process of competence. From there, I will explain, how the AFM works. I will use the analogy of a record player that scans the topography of a record. After how the AFM works, I will talk about how I analyze my data. I will talk about how we record the images that we capture with the AFM and how I analyze the images using a program called ImageJ that allows me to trace the appendages of the images. I will supplement this presentation with photos and examples from work.

P8 **“Consequences of fault initiation on sandstone injection mechanisms: A comparison of structural features and local injectite units on Cheyenne Mountain, CO with well-characterized injectite systems elsewhere”**
 Student Researcher **Cody Duckworth**
 Faculty Collaborator **Christine Siddoway**, Geology

The Mesoproterozoic plutono-metamorphic rocks of the Colorado Front Range hold a vestige of Precambrian time by hosting a sandstone unit, informally known as the Tava sandstone. This structureless quartz sandstone containing rounded to subrounded quartz clasts and angular feldspar lithic fragments exists as sandstone injectites into the basement rock. The formation of the Tava Sandstone has been dated to the Neoproterozoic Era, a time when there are no other existing sedimentary units in the Front Range, providing insight into a previously undocumented time in Colorado’s geologic past. This study aims to answer the unexplained question of the emplacement mechanism for the Tava Sandstone through an examination of structural features within the Tava and along the associated Ute Pass Fault (UPF), as well as from drawing comparisons with various sandstone injectite complexes of California’s San Joaquin Valley and central coastline.

The geometries of structural features such as slick surfaces, fractures, dike margins, and fault planes in four field areas located in the hanging wall of the UPF were taken using a Brunton Field compass and mapped using ARCGis software.

These measurements were accompanied with kinematic interpretations based on careful observation of indicators such as Reidel fractures and offset markers. Oriented samples were also taken to reinforce field interpretations. Results have shown that the UPF has experienced several deformation events since it first formed. With further analysis of measurement geometries along with thin section analysis of the oriented sample, interpretations about sequential strain can be made and the tectonic setting for the emplacement of the Tava sandstone can be found.

P9 **“Representations of Word Meaning in Dyslexic and Non-Dyslexic Individuals”**

Student Researcher **Samantha Ellner**
 Faculty Collaborator **Emily Chan and Kevin J. Holmes, Psychology**

Dyslexia is traditionally defined as a discrepancy between reading achievement and intellectual potential. Previous research in the field has highlighted deficits in the processing of words. However, few studies have examined dyslexic individuals’ underlying representations of word meaning. In the present research, we investigated whether such representations differ in dyslexic individuals.

Participants were asked to rate words on the dimensions of valence and arousal, as well as complete a reading questionnaire to assess on a scale how dyslexic they presented. Participants who scored higher on the dyslexia measure rated words significantly more positive and more arousing. These findings indicate that individuals who are more dyslexic do view words differently compared to those who are not. However, more research must be conducted to better understand this relationship. Future research will investigate whether dyslexic individuals’ implicit representations of word meaning differ from their explicit judgments.

P10 **“Community, Islam, and the Rational Sciences: a Social Network Analysis”**

Student Researcher **Siena Faughn**
 Faculty Collaborator **Jane Murphy, History**

As the use of technology expands in the field of history, digital history, and network analysis in particular, it holds vast potential to reveal structures and nuances of historical groups which traditional historical analysis may not reveal. With this project, Jane Murphy and I have focused on the structure of networks Islamic scholars of the rational sciences in hopes of revealing important figures, texts, and subjects, and the prominence of the rational sciences in general.

During my summer research, I spent three weeks working with Professor Jane Murphy in order to analyze a database of 18th and early 19th-century Muslim scholars engaged in scientific study broadly defined. This database draws on biographical dictionaries and manuscript catalogues, enabling us to track and understand teacher-student-text relationships. With a database of over 100 biographical entries of Islamic scholars, I worked to make visual representations of this community in order to reveal its structural organization and scholarly focus. Included in the data set was information on teacher and student relationships as well as books and topics studied. The first step of our analysis was to create a sociogram of the teacher-student relationships using a Microsoft Excel add-on called NodeXL. This visual revealed a community connected by several scholars. The next step in our research will be to make a similar sociogram connecting scholars to texts and topics.

In addition to the specifics of this database, we explored potential ways that digital history could be used to create new projects and interconnected databases for scholars and students at Colorado College and beyond.

P11 **“Strain Construction in Acinetobacter baylyi Using Synthetic DNA”**

Student Researcher **Mariko Foecke**
 Research Collaborator **Colleen Leong**
 Faculty Collaborator **Phoebe Lostroh, Molecular Biology**

The competent soil bacteria *Acinetobacter baylyi* possesses extracellular appendages, such as the Type IV pilus, giving it the ability to import environmental DNA through its cell envelope. ADP1 can then incorporate the DNA into its own genome and thus acquire new characteristics. In order to confirm the phenotype of gene knockout mutants from the French collection lacking proteins predicted to be important in the Type IV pilus as well as to test ADP1’s competence, we constructed mutant cell lines possessing antibiotic resistance and gene additions. After transforming synthetic DNA gBlocks and DNA isolated from the French collection mutants into wild type cells, we then isolated DNA and ran PCR analysis. Additionally, we ran gel electrophoreses to ensure the weight in kilobases was concurrent with that expected. Further work with synthetic DNA is required since the transformation results were inconclusive.

P12 **“Influence of Bifidobacterium infantis on the Development of Anxiety, Depression, and Stress in Adolescent Rats”**

Student Researcher **William Harris**
 Research Collaborators **Tia Tummino, Spencer Cooke, and Ryan Lach**
 Faculty Collaborator **Lori Driscoll, Psychology**

The importance of gut bacteria composition in shaping nervous system structure and function is becoming increasingly evident. In rodent models, oral supplementation of the beneficial bacterium *Bifidobacterium infantis* has been shown to alleviate depression resulting from maternal separation. The effects of other strains of bacteria (e.g. *Lactobacillus rhamnosus*) on the nervous system have been found to be mediated exclusively via the vagus nerve. The purpose of the current study was to elucidate the effects of *Bifidobacterium infantis*, administered during adolescence, on a rodent model of anxiety, depression, and stress. Further, we explored whether these effects were mediated by the vagus nerve, and if the effects varied by sex. It was hypothesized that supplementation with *B. infantis* would decrease anxious and depressive behaviors, as well as the HPA-axis response to stress, in a vagally-dependent manner, and that males would benefit more than females. Rats were subjected to transection of the vagus nerve, or a sham surgery, as weanlings; they were then supplemented daily with *B. infantis* or vehicle for 14 days. In adulthood, the rats received a series of behavioral tests for anxiety, depression, and stress. Following sacrifice, blood serum and brain samples were collected for biochemical analysis.

P13 **“Race and Gender in the Post World War II South: A Short Bibliography”**

Student Researcher **Kaimara Herron-July**
 Faculty Collaborator **Bryan Rommel-Ruiz, History**

In this research project I built a short bibliography to help in the development of a chapter for the book project proposed by Professor Bryan Rommel-Ruiz. The proposed book will analyze cinematic representations of the south in the mid-20th century. This particular chapter will focus on race and gender. In building this bibliography and subsequently writing 10 critical book and article reviews I hoped to find a non-exhaustive list of appropriate and relevant secondary sources. I had three main tasks to complete for this project and those were as follows: compile a list of 20-30 secondary sources regarding race and/or gender from the bibliography of Glenda Gilmore’s book “Gender and Jim Crow,” choose 10-15 sources to read and critique, and finally write an academic review of each book or article.

P14 ***“An Investigation into the Cognitive Mechanisms Involved in Mindfulness Meditation”***

Student Researcher
Faculty Collaborator

Adam Hunter
Kevin Holmes, Psychology

An experiment was designed to assess the independent effects of the two components of mindfulness, a meditation technique commonly used in treating psychological conditions such as stress and depression. These components are defined as attention redirection and thought labeling. Attention redirection is the practice of intentionally controlling attention such that it does not fixate on harmful thoughts. Thought labeling is the practice of changing one's relationship with harmful thoughts such that they have less influence. Participants either practiced a meditative technique that focused on labeling thoughts, a meditative technique that focused on redirecting attention by turning it towards the sensations of breathing, or a relaxation technique that served as a control. Before meditating, participants were tested for trait levels of various tendencies. “Trait levels” refer to the participants' experiences and habits as opposed to “state levels” which refer to their present moment experience or action. The tendencies measured included tendencies toward anxiety and responsiveness to appetitive stimuli. After meditating with their given technique they were tested for state levels of the same tendencies. Through comparing trait levels to post-meditation state levels, the effectiveness of the various meditation techniques was measured. Preliminary data suggests that thought labeling may outperform the control and attention redirection techniques in reducing responsiveness to appetitive stimuli, but presently there is no evidence that the techniques differ in their impacts on stress levels.

P15 ***“Flammulated Owl Study Abstract”***

Student Researcher
Research Collaborators
Faculty Collaborator

Rebecca Hunter
Devon Lucero and **Luke Paulson**
Brian Linkhart, Organismal Biology and Ecology

Prescribed burns of North American forests has been invoked to reduce the extent of highly destructive wildfires and benefit biodiversity (Pastro & Dickman et al 2011). Few ecological studies have been conducted on how reintroducing fire in ponderosa pine ecosystems affects plant and animal communities, particularly species that are adapted to frequent-fire stands in these ecosystems. The Hot Creek Research Natural Area on the Rio Grande National Forest in southern Colorado, currently is planning for implementation of prescribed burning in 2017. The Hot Creek RNA Management Plan identifies Flammulated Owls to function as management indicator species for ponderosa pine because of their close associations with older stand conditions. We plan to begin the first of three years of pre-treatment data collection on demographic parameters, density, and movement patterns of radio-tagged owls, and compare these parameters to the same data for at least three years after prescribed burn treatments have been implemented, and to random sites where no prescribed burning occurs. The 2015 field season included two full crew trips to Hot Creek with the purpose of 1) building upon the survey work done last season, 2) identifying and banding new territorial males and breeding pairs, and 3) radiotracking males to define territorial boundaries. The Flam Crew employed spotmapping, listening, and nest searching which led us to define thirteen territories controlled by a territorial male. We placed radiotrackers on two known breeding males and monitored their activity. The research team was also able to locate and process two fledglings, and band eleven new birds this to produce a total of thirteen total banded birds in the 2014 and 2015 seasons. We also performed nest site vegetation quantification across the study area.

P16 ***“Do Japanese and English Speakers Perceive Motion Events Differently? A Cross-Linguistic Change Blindness Study”***

Student Researcher
Faculty Collaborators

Eileen Kitrick
Kevin Holmes, Psychology, and Kathy Hirsh-Pasek, Temple University

The objective of this project is to investigate how language influences visual perception by comparing speakers of different languages. In Japanese, there are two distinct verbs to describe movement for passing through/crossing a plane (wataru and toru) depending on the presence or lack of barriers. A scene of people crossing a path with bounded barriers, such as a road with stoplights, would necessitate the verb “wataru” (“shingo wo wataru”). A scene of people crossing a path with no such barriers, such as a grassy field, would necessitate the verb “tooru” (“hatake wo tooru”). “Wataru” and “tooru” are not interchangeable even though they both translate to “to move across” in English. Because this distinction does not exist in English, a scene of people crossing a bounded path and a scene of people crossing an unbounded path could both be described as, “The people crossed the street/field.”

The change blindness paradigm presents one image followed by a similar image in which only one thing has changed from the first image. The images alternate until the participant finds the difference in the photo (responding by pressing a computer key) and then another sequence of images is presented until the participant has completed every trial. Using this change blindness paradigm, we can measure participants' accuracy and reaction times to images that are described by Japanese speakers as either “wataru” or “toru.” Through this, we can better understand how linguistic distinctions in one's native language affect the ability to notice perceptual changes, and, more broadly, how language affects perception. We hypothesize that, compared to English-speaking participants, Japanese-speaking participants will show an advantage in discriminating images portraying scenes that are described using distinct Japanese verbs with no English equivalent.

P17 ***“Synthesis and Characterization of Cobalt Complexes with Salen-Derived Ligands Exhibiting Spin Crossover Behavior”***

Student Researcher
Faculty Collaborator

Mike Kuntzman
Amanda Bowman, Chemistry and Biochemistry

Complexes exhibiting Spin Crossover (SCO) are being studied for their many practical applications such as molecular switches, optical displays, and data storage devices. Six Schiff base ligands were prepared by condensation reactions between salicylaldehyde and three different diamines: ethylenediamine, phenylenediamine, and 4-chloro-o-phenylenediamine. Analogs of the ligands were prepared by thiolating the alcohol using sodium hydrosulfide hydrate. These Schiff base ligands were then coordinated to cobalt to form air sensitive tetradentate square planar cobalt complexes that exhibit spin crossover behavior. 1H-NMR and IR spectroscopy were used to characterize each complex and variable temperature 1H-NMR was used to study the effect of temperature on ground state electron configuration. Future characterization will include EPR spectroscopy and magnetic measurements.

P18 ***“Synthesis of Bis(imino)pyridine ligand cobalt complexes”***

Student Researcher
Faculty Collaborator

Salley Lee
Amanda Bowman, Chemistry and Biochemistry

Thermochromism, the change of color of a substance based on temperature, is used in paints, ink, plastics, and textiles. These thermochromic materials are progressively becoming more widely studied and produced. Spin-crossover, generally a change from low-spin to high-spin states of a metal complex, is a trait that demonstrates the thermochromic behavior. This trait is commonly seen in cobalt complexes with 2+ and 3+ metal centers. Thus, in this research project, bis(imino)pyridine ligand cobalt complexes were synthesized to analyze the spin-crossover behavior and contribute to the design and use of thermochromic materials. During the ten week research period, three bis(imino)pyridine ligand cobalt complexes and one benzenamine, N,N'-(2,6-pyridinediyl)diethylidene)bis[2,6-dichloro-(9Cl) ligand was made using experimental techniques

such as refluxing, and extracting, and characterized using ¹H nuclear magnetic resonance(NMR). Further experiments would include synthesis of more bis(imino)pyridine ligand complexes and analysis of these complexes for spin-crossover behavior using nuclear magnetic resonance (NMR), ultraviolet-visible (UV-Vis) spectroscopy, infrared (IR) spectroscopy, electron paramagnetic resonance (EPR), and X-ray crystallography.

P19 **“Colorado Encyclopedia Research”**
Student Researcher **Daniel Levitt**
Faculty Collaborator **Anne Hyde**, History

This summer I worked along professor Anne Hyde to fact-check and rework essays that will be published in the Colorado Encyclopedia. Colorado College students initially wrote the entries for Anne and I to edit before we submitted them for approval to editors at the Colorado Encyclopedia. I researched essays on a variety of topics ranging from the history of brothels in Colorado to the history of the Air Force Academy. Delving into such a breadth of topics provided a special learning experience for me. It taught me the importance of being detailed in my research. It was also rewarding to carry on the work of my classmates and collaborate with a scholar of Anne’s renown. More than anything, I’m excited that my work will go on to educate people interested in the history of Colorado.

P20 **“Constructing the Canon: Identifying the Idiomatic Features of the Jazz French Horn through the Music of its Artists”**
Student Researcher **Abe Mamet**
Faculty Collaborator **Ryan Bañagale**, Music

Since there has never been any extensive research on the musical idioms of improvising jazz French horn players, I transcribed various improvised jazz solos on the French horn to determine the features of certain musicians’ playing. I focus on three horn players: Willie Ruff, David Amram, and Julius Watkins, and discuss their history with the horn as well as their playing. I transcribed all solos that appear in the paper, of which there are 18, 6 per player. I used accepted jazz analysis, specifically looking at unique ideas a musician presents, to analyze a musician’s playing and determine their idiomatic features. I also summarize a history of the horn in jazz as well as work that has been done on the jazz French horn in my review of literature. The rest of my research includes a background of modern theories of musicology, based on the work of Joseph Kerman, and extending to jazz through the work of Scott Deveaux.

P21 **“Investigating the role of RNA-binding proteins in C. elegans dendrite development”**
Student Researcher **Katie Miller**
Research Collaborators **Alec Sheffield, Natasha Riveron, Simona Antonacci, and Meghan Lybecker**
Faculty Collaborators **Darrell Killian**, Molecular Biology, and Eugenia Olesnicky, UCCS

Dendrites are cellular processes of neurons that receive information from other cells or the environment. Proper branching of dendrites is important for making connections with other cells that dictate learning, memory, and behavior. Defects in dendrite branching are associated with neurological disorders. Therefore, an understanding of how dendrite development is controlled at the molecular level is important. Recently, RNA-binding proteins (RBPs) have been implicated in neuron development in several species such as Drosophila, C. elegans and mouse, however the specific roles that RBPs play in neurons is still under investigation. RBPs can regulate RNA at many levels such as transcription, splicing, localization, translation, and degradation. The RBPs SUP-26 and CGH-1 are important for dendrite development in C. elegans and their homologs regulate dendrite development in Drosophila suggesting that they are evolutionarily conserved (Antonacci et al 2015; Olesnicky et al 2014). However, their molecular functions are unknown. To learn more about how these proteins function, we aimed to create transgenes to express these proteins with fluorescent tags, isolated these proteins from lysates, and identify interacting proteins using co-immunoprecipitation and mass spectrometry and interacting RNAs using sequencing. We successfully identified many proteins that interact with SUP-26 that suggest that it functions as a translational regulator. We also isolated RNA and await sequencing results. For CGH-1, we successfully built a transgene and integrated it into the C. elegans genome and will proceed with co-immunoprecipitation in the future. Interestingly, our results suggest that SUP-26 and CGH-1 interact and thus likely work together to regulate dendrite development.

P22 **“The Deportation of Cambodian-Americans”**
Student Researcher **Juliean Neylan**
Faculty Collaborator **Purvi Mehta and John Williams**, History

Over 500 Cambodian-American legal permanent residents have been deported since the repatriation agreement between the U.S. and Cambodia was signed in 2002. These deportations occur after legal permanent residents commit crimes of particular categories call aggravated felonies or for a number of misdemeanors. The Cambodian refugees who came over to the U.S. in the early 1980s entered an environment that was highly conducive to criminal activity. Crimes committed in the early years of resettlement have led to deportations in the future because in 1996 the Illegal Immigration Reform and Immigrant Responsibility Act was enacted, which made criminal sentences apply retroactively for immigration purposes. legal permanent residents who committed aggravated felonies are being deported without a fair hearing from an immigration judge. Many Cambodian deportees have no familiarity with Cambodia or have never set foot there. Immigration law must allow for evaluation of all of the factors involved in deportation by an immigration judge. Fair evaluation by an immigration judge will make sure that cases like the deportation of Cambodian-Americans does not occur.

P23 ***“Treeline Micrometeorology: Pikes Peak Abrupt Treeline Dynamics”***

Student Researcher **Meredith Parish and Eric Neumeyer**
Research Collaborators **Mike Raab, Lani Chang, and Adam Young**
Faculty Collaborator **Miro Kummel and Darren Ceckanowicz, Environmental Program**

We addressed the question of how the spatial structure of the treeline influences the ability of the treeline to respond to forcing from regional climate change. Our hypothesis was that an abrupt treeline will interact with regional airflow in a way that is analogous to that of a shelterbelt. This may create a sheltered area of width that is approximately two to five times the height of the trees. Our results are broadly congruent with that structure: Early spring snow distribution was restricted to the sheltered area, and trees within the sheltered area do not suffer wind damage, while trees outside the sheltered area flag into irregular growth forms as a result of the dominate winter wind direction. The sheltered area is a result of an eddy formed on the leeward side of treeline during the day. This eddy leaves a pocket of air that experiences less mixing, creating unusual temperature and wind profiles that promote tree growth. Handheld instruments reflected the existence of an eddy - the data show higher air temperatures in the sheltered area than in the open tundra above treeline. Higher soil moisture within the eddy supports our hypothesis of limited mixing compared to the open tundra. The benefit of the sheltered area appeared to be restricted to trees taller than about 1 m. This finding is congruent with the nighttime regime in which the landscape is dominated by downvalley winds. We hypothesize that these winds are dammed up by the shelterbelt, causing cold air to pool, inhibiting the growth of trees under 1m. Further analysis will help reconcile the existing microclimate at treeline with the documented prevailing daytime winds which tend to be almost parallel to treeline rather than perpendicular as expected.

P24 ***“Design and Synthesis of Novel Quinazolinone Derivatives for the Treatment of Human African Trypanosomiasis”***

Student Researcher **Truc Pham**
Research Collaborators **Maddie Walden**
Faculty Collaborator **Amy Douney, Chemistry and Biochemistry**

Human African Trypanosomiasis (HAT), or African sleeping sickness, is a parasitic illness transmitted by tsetse flies. The disease occurs in 36 sub-Saharan African countries, with about 10,000 reported cases of sleeping sickness a year. Most patients live in rural areas with little to no access to health services. So little progress has been in the treatment of African sleeping sickness that it is classified as a neglected tropical disease (like many diseases found almost exclusively in third world countries). African sleeping sickness has two stages. In the first stage, the parasite is found in the blood but has not yet crossed the blood-brain barrier. In the second stage, the parasite is found in the central nervous system, causing serious neurological changes. Our research aims to design and synthesize a compound that is effective in treating both stages of HAT and can be orally administered. Through a two-step synthesis, we have created novel quinazolinone derivatives to be tested for anti-trypanosomal activity.

P25 ***“Investigating the role of RNA-binding proteins in C. elegans dendrite development”***

Student Researcher **Natasha Riveron**
Research Collaborators **Katie Miller, Alec Sheffield, Simona Antonacci, and Meghan Lybecker**
Faculty Collaborators **Darrell Killian, Molecular Biology, and Eugenia Olesnicky, UCCS**

Dendrites are cellular processes of neurons that receive information from other cells or the environment. Proper branching of dendrites is important for making connections with other cells that dictate learning, memory, and behavior. Defects in dendrite branching are associated with neurological disorders. Therefore, an understanding of how dendrite development is controlled at the molecular level is important. Recently, RNA-binding proteins (RBPs) have been implicated in neuron development in several species such as Drosophila, C. elegans and mouse, however the specific roles that RBPs play in

neurons is still under investigation. RBPs can regulate RNA at many levels such as transcription, splicing, localization, translation, and degradation. The RBPs SUP-26 and CGH-1 are important for dendrite development in C. elegans and their homologs regulate dendrite development in Drosophila suggesting that they are evolutionarily conserved (Antonacci et al 2015; Olesnicky et al 2014). However, their molecular functions are unknown. To learn more about how these proteins function, we aimed to create transgenes to express these proteins with fluorescent tags, isolated these proteins from lysates, and identify interacting proteins using co-immunoprecipitation and mass spectrometry and interacting RNAs using sequencing. We successfully identified many proteins that interact with SUP-26, which suggest that it functions as a translational regulator. We also isolated RNA and now await sequencing results. For CGH-1, we successfully built a transgene and integrated it into the C. elegans genome and will proceed with co-immunoprecipitation in the future. Interestingly, our results suggest that SUP-26 and CGH-1 interact and thus likely work together to regulate dendrite development.

P26 ***“Studying and Purifying Proteins in TerY-P triad of Acinetobacter baylyi (A. baylyi)”***

Student Researcher **Esra Siddeek**
Research Collaborators **Madhura Roy**
Faculty Collaborator **Margaret Daugherty, Chemistry and Biochemistry**

The reason why studying A. baylyi is important is because they can help serve as a model for us to combat more dangerous bacteria in its genus. Currently, a related species of A. baylyi, Acinetobacter baumannii (A. baumannii), has been creating a problem in hospitals because of its ability to quickly develop resistance to antibiotics. In addition to being able to evolve quickly, the Acinetobacter species have been found to survive under starvation conditions and on sterile surfaces in hospitals, which makes them difficult to completely eradicate. Our interest is in the following three genes: ACIAD1964, 1965, and 1966, which are proposed to express a kinase, phosphatase and metal-binding protein, respectively. These genes are collectively known as the TerY-P triad. It is proposed that the three protein products of the TerY-P triad individually, or with other Ter components, create a signaling machinery that allow the cell to respond to oxidative stresses. In order to study how these proteins interact with each other, the three genes need to be first cloned into a protein expression vector. The proteins expressed will need to be then isolated. DNA sequencing has shown that we have successfully cloned the 1965 gene, and protein purification is being optimized. Our original cloning of the 1964 gene was missing a single nucleotide at the beginning of its sequence, which suggested that new primers were needed. Currently, we are in the process of recloning this gene. The cloning process of the 1966 gene has yet to be completed.

P27 ***“Colorado’s Prison History”***

Student Researcher **Sarah Tatum**
Faculty Collaborator **Jane Murphy and Carol Neel, History**

This summer I researched where and what kind of sources can be found in Colorado that provide a history to US prisons and incarceration. As I assumed before my research, the archives in which I studied contained primarily Colorado history. Colorado College’s Tutt Library, CSU Boulder’s archives, and Cañon City’s history center provided me with rich and bountiful material on the state’s prison history. Just an hour south of Colorado Springs, Cañon City is informally known as Prison Valley. Cañon City, the agricultural town that is home to the Royal Gorge Bridge, houses thousands of prisoners in its 13 prisons – both state and federal. Located in the same county, Fremont County, is the United States Penitentiary Administrative Maximum Facility otherwise known as ADX Florence. Amongst other significant topics, this means that 2 out of the 14 prisons in Fremont County house their inmates in solitary confinement. This poster is a presentation of Colorado’s fascinating prison history - a history that is older than Colorado statehood.

Fremont County became the center of my historical research, but with solitary confinement in mind and the simple fact that one county holds 14 prisons I also researched America’s commitment to rehabilitation, mental health, and parole and probation policy. My intention for this poster is also to show people that our nations ‘prison problems’ namely overcrowding,

recidivism, solitary confinement, and mental health are not modern occurrences, but significant themes in our nation's prison history – they have always been there. What does that tell us about America's prisons and criminal justice system? Who is really benefitting from mass incarceration and what conversations are we not having?

P28 **“Native American Music: Building a Bibliography and Preparing Archival Materials”**

Student Researcher **Breana Taylor**
Faculty Collaborator **Victoria Levine, Music**

My role in this research was working with Professor Victoria Levine to build a bibliography for her book, “FOCUS: Native American Music,” and to type notes from her previous field work on Choctaw Indian music to be deposited in an archive. The book is divided into four parts: “Native American Music: People, Place, Perspective,” “Sounding Native American,” “Focusing in: Native American Music in Oklahoma,” and “Re/Sounding Native American.” The topics I researched specifically included the NAMMY’S, issues of sovereignty, Red Power, the Gourd Dance, demographics, the Indian wars, and more. In building the bibliography I made a conscious effort to find articles and books written by Native American authors, though the works of non-Native authors were also included in this study. All in all, ensuring that the voices and history of Native American peoples are the main focus of the texts I found. The end goal of this study for myself was to provide Professor Victoria Levine with enough materials for her book that are inclusive of many voices within Native America. This will help Professor Levine, who is not Native, to better represent the Native experience through a lens of understanding and respect for Native culture.

P29 **“Liquid imaging live, competent *Acinetobacter baylyi* with Atomic Force Microscope”**

Student Researcher **Ricardo Tenente**
Student Collaborators **Caroline Bird**
Faculty Collaborator **Phoebe Lostro, Molecular Biology, and Kristine Lang, Physics**

Imaging live bacteria with an atomic force microscope is a challenging process, taking into account the lateral forces exerted by the probe on cells that must be immobile in liquid. It is necessary to have a working combination of liquid media and sample preparation method while maintaining the cells alive, competent (ability to take up DNA from environment), and stuck to the AFM pucks with porcine gelatin. The combination was tested with different washing and gelatin immobilization media (distilled deionized water, phosphate-buffer saline with and without 0.2% succinate), as well as the imaging media (distilled deionized water, diverse dilutions of Luria-Bertani broth with and without sodium chloride). The combinations that presented the most satisfying images of stuck cells with the AFM in liquid were submitted to a live/dead bacterial assay and competence tests. Washing and immobilizing the cells with distilled deionized water, and imaging them with 50% Luria-Bertani broth without sodium chloride was the most successful combination, but it did not achieve the same magnification and image quality as when imaged in air. It was the first time that live, competent *A. baylyi* has been imaged with an AFM in liquid. Further research should focus on testing smoother media transitions to avoid osmotic pressure stress and starvation.

P30 **“Comparative neuronal morphology of gigantopyramidal neurons in primates, felines, ungulates, rat, and wallaby”**

Student Researcher **Mackenzie Tennison**
Student Collaborators **Karen Chui**
Faculty Collaborator **Bob Jacobs, Psychology**

Although the basic morphological characteristics of gigantopyramidal cells in primates have been documented, virtually nothing is known about the quantitative morphological characteristics of these neurons across different taxa. To that end, the current study investigates gigantopyramidal cells in the primary motor cortex of 12 species across five taxa: primates (human, golden tamarin, baboon, lemur), felines (lion, caracal, Siberian tiger, clouded leopard, mongoose), ungulates (zebra, giraffe), rodents (rat), and marsupials (wallaby). Specifically, three neuron types (superficial pyramidal, deep pyramidal, and gigantopyramidal neurons; N = 336) of the primary motor cortex were stained with a modified rapid Golgi technique and quantified on a computer-assisted microscopy system. Results showed significant variation in both soma size and dendritic branching across species. Specifically, felines had much larger somatic volumes than all other species, whereas those in the wallaby and mongoose were much smaller. Additionally, dendritic branching was much more complex in primate species than all other species. Shape variation was also apparent; caracal gigantopyramidal neurons appeared much rounder than other species, whose cells were typically more pyramidal in shape.

P31 **“Who Are These Guys?”**

Student Researcher **Madalene Travis**
Faculty Collaborator **Gail Murphy-Geiss and Deborah Smith, Sociology**

Life as an academic poses particular challenges to finding work/life balance, especially while there are still gendered expectations in home/childcare. The field is structured by completing PhD coursework, writing a dissertation, job searching, and attaining tenure. This presents a challenge to female academics as they partner and consider having children. With such time-bound structure—as well as 60-hour workweeks—finding a male partner who is willing to work within this structure can prove difficult. This study investigates the experiences of couples made up of female academics and male non-academics. Specifically, it explores the ways these men navigate masculinity(s) as partners of high-achieving career-focused women.

P32 **“Influence of *Bifidobacterium infantis* on Anxiety, Depression, and Stress in Adolescent Rats”**

Student Researcher **Tia A. Tummino**
Student Collaborators **William Harris, Ryan Lach, and Spencer Cooke**
Faculty Collaborator **Lori Driscoll, Psychology**

The importance of gut bacteria composition in shaping nervous system structure and function is becoming increasingly evident. In rodent models, oral supplementation of the beneficial bacterium *Bifidobacterium infantis* has been shown to alleviate depression resulting from maternal separation. The effects of other strains of bacteria (e.g. *Lactobacillus rhamnosus*) on the nervous system have been found to be mediated exclusively via the vagus nerve. The purpose of the current study was to elucidate the effects of *Bifidobacterium infantis*, administered during adolescence, on a rodent model of anxiety, depression, and stress. Further, we explored whether these effects were mediated by the vagus nerve, and if the effects varied by sex. It was hypothesized that supplementation with *B. infantis* would decrease anxious and depressive behaviors, as well as the HPA-axis response to stress, in a vagally-dependent manner, and that males would benefit more than females. Rats were subjected to transection of the vagus nerve, or a sham surgery, as weanlings; they were then supplemented daily with *B. infantis* or vehicle for 14 days. In adulthood, the rats received a series of behavioral tests for anxiety, depression, and stress. Following sacrifice, blood serum and brain samples were collected for biochemical analysis. Results are pending.

P33 **“Examining Potential Galago maholi and Otolemur crassicaudatus Research Sites”**
 Student Researcher **Mariah Weaver**
 Faculty Collaborator **Krista Fish**, Anthropology, and Brandi Wren, Sepela Primatology
 Course leader

This summer I participated in a field primatology course as part of the field school, Sepela. Over the course I visited three different field sites in South Africa and evaluated them as potential research sites for Krista Fish. I noted any Galago maholi and Otolemur crassicaudatus, as well as overall ecology of the area. Included in my report are the amenities each site provides, the dangerous animals in the area, and to which organization Dr. Fish would have to apply for permits. Dr. Fish will now take into consideration my recommendations and continue forward in the selection of a new field site.

P34 **“Humanizing Incarceration through Art Therapy”**
 Student Researcher **Erica Willard**
 Faculty Collaborator **Ryan Platt**, Theatre and Dance, and **Jane Murphy**, History

The word “felon” has become the divider for discrimination in today’s society. Those given this title become an outcast and are denied the chance to have a second chance in society. When a felon is released from jail, they are not fully out of the system. They are under surveillance, strict rules, and not given the chance to find a job. Thus, they are unable to make a living. This proves to be a problem. The felon is unable to see a future in a world where they do not feel welcomed. A felon feels as though he, or she, is treated as an alien in a society that they grew up in. Therefore, a felon becomes depressed and looks for a place that will welcome them, and the one place is the system. A felon will return to the place that they know best and have comfort, yet still feel depressed.

One approach to fixing this problem is art therapy. The main purpose of the therapy is to help bring forth the inner emotions of the inmates and provide a way for the inmate to feel human again in a world that does not treat them as such. Studies have shown that inmates are depressed and feel that they are going to live the rest of their lives in the system. When all they want is to be seen as the human beings that they are. Therefore, the results of art therapy is one of great importance. The therapy humanizes the inmates.

P35 **“Radha: From Lover to Mother”**
 Student Researcher **Hannah Wilson**
 Faculty Collaborator **Tracy Coleman**, Religion

This summer, Professor Tracy Coleman and I examined a significant female figure in the devotional traditions of Hinduism: Radha, lover and beloved of the popular god Krsna. Radha is an erotic figure and the subject of Jayadeva’s *Gitagovinda*, but her status has changed through the millennia from rustic, erotic cowherdess to a purified and desexualized co-creator of the universe. Many assumptions are made about Radha’s status as divine or mortal, married (and therefore an adulteress) or unmarried, and whether or not she serves as a model for human women, as does the goddess Sita. Working with various primary and secondary texts, including ancient poetic traditions, we determined that the figure of Radha does not represent an ideal for human women to follow. Her prominent role in the *Gitagovinda* reveals a more profound concept of the dualistic nature of reality and also exposes ways in which male trepidations about female sexuality transformed Radha into a more acceptable female role in subsequent texts - that of a defenseless virgin or a desexualized mother, rather than a lover and an equal to Krsna.

P36 **“Progress Towards the Synthesis of Fluorinated Antimalarial Analogs”**
 Student Researcher **Ingrid Wilt**
 Research Collaborator **Casey Keegan**
 Faculty Collaborator **Habiba Vaghoo**, Chemistry and Biochemistry

Malaria’s ability to mutate and readily develop drug resistance emphasizes the need for new drug development. Amodiaquine exhibits promising antimalarial activity, but is shown to cause adverse side effects, specifically hepatotoxicity. This is a result of the oxidation of an alcohol in the 4-aminophenol side chain into a carbonyl. We hypothesize that the replacement of OH with CF₂H will eliminate in vivo oxidation, thus preventing the drug’s toxic effects of amodiaquine, while maintaining the hydrogen bond donating quality of the functional group. As follows, we propose a five step synthetic route for the new series of fluorinated analogs and the progress we have made towards the final product.

P37 **“Effects of high-intensity fire on soil carbon bioavailability in forested ecosystems of the Colorado Rockies”**
 Student Researcher **Kyra Wolf**
 Faculty Collaborator **Rebecca Barnes**, Environmental Program

Disturbance often has important implications for regulating flows of matter and energy in ecosystems. Fire is a major source of disturbance in Colorado forests. Frequent low intensity fires are natural for Ponderosa Pine forests. However, recent decades have seen a number of catastrophic fires in Colorado. The implications of high intensity fire for the recovery and resilience of carbon stocks in forested ecosystems are not fully understood. This study addressed the fate and quality of carbon in aboveground and soil carbon pools in fire-disturbed and undisturbed forested watersheds of the Colorado Rockies. In particular, we focused on bioavailability of soil carbon. Carbon that is more bioavailable is more readily broken down through microbial decomposition and released into the atmosphere, impacting sequestration and release from soil carbon pools. Study sites included terrestrial plots in the Hayman burn area and the Waldo Canyon burn area in the Colorado Front Range, and the Hinman burn area in the Routt National Forest in Northern Colorado, as well as control plots in both regions. Soil respiration rates, measured in laboratory incubation experiments over a 7 week period, were used as a proxy for bioavailability of soil carbon. In addition, soil C pools will be characterized by elemental analysis, % black carbon, bulk density, and charcoal > 2mm. I will compare soils from the Hayman and Waldo Canyon fires, which occurred ten years apart, to show how soil carbon stocks change over time after disturbance. Comparing soils from the Hayman and Hinman fires will show the effect of high-severity fire on carbon pools in different ecosystems (i.e. montane Ponderosa Pine forest versus subalpine Lodgepole Pine forest).

P38 **“Acquired Resistance in Cuban Tree Frog Hosts against Parasitic Gut Worm”**
 Student Researcher **Qiu Chang Wu**
 Faculty Collaborators Sarah Knutie and Jason Rohr, University of South Florida

Parasites influence many fundamental aspects of the evolutionary ecology of their hosts. Consequently, hosts have evolved different defense mechanisms to combat their parasites. For example, hosts can evolve resistance mechanisms, such as the immune response, which serve to reduce parasite damage by affecting parasite fitness. Our study examined the acquired immunological resistance in Cuban tree frogs *Osteopilus septentrionalis* against the parasitic nematode *Aplectana* sp. *Aplectana* is a skin-penetrating worm of frogs that ultimately lives and reproduces in the colon. Specifically, we tested whether frogs initially exposed to *Aplectana* are less susceptible to parasite infection upon a subsequent exposure. We exposed individuals from the experimental treatment to 20 worms each and exposed the control treatment to a sham-infection. After clearing the infection two weeks later with an anti-helminthic medication, we exposed each individual from both treatments to 20 worms. If frogs have acquired resistance against the worm, the experimental treatment will demonstrate a stronger immunological response and have fewer worms compared to the control treatment. We specifically compared the number of worms that penetrated the frogs in each treatment and how many worms successfully establish in

the gut. The initial skin infection and later gut infection represent two different opportunities for immunological resistance by the frogs.

P39 ***“The Marianne Stoller Archives Research Project”***

Student Researcher

Kendra Wuerth

Faculty Collaborator

Mario Montaña, Anthropology

The topic of my research is Marianne Stoller. Marianne was an anthropologist at CC who specialized in Southwest cultures, particularly the folk arts of the Southwest. Over the course of her career, Marianne developed a vast collection of materials including letters, legal documents related to indigenous litigation cases, photos, illustrations, and slides. This summer I began my work by archiving these materials. As I went through the process of digitizing and learning about Marianne’s career, I realized that this research project fills a void in the study of women anthropologists in the southwest. Not only have I found research on women anthropologists to be a narrow field, but I also realized that research of women anthropologists in the Southwest is an even narrower field. For this reason, I began to supplement my work digitizing Marianne’s collections with research on women anthropologists of the southwest. By addressing the intellectual history of women and anthropology in the Southwest, my research summarizes the work of several women anthropologists and then focus on the key issues addressed by women anthropologists in the Southwest. My goal for this research is that it will help both the anthropology department and the Southwest Studies Department to enhance their curricula regarding the inclusion of women in the intellectual development of Southwest studies and anthropology. The ultimate outcome of this project is an online archive in which Marianne’s legacy will be available to researchers throughout the country. This archive will be available on the Colorado College website.

THE COLORADO COLLEGE PLAN:
**BUILDING ON THE
BLOCK**

The **Colorado College Plan: Building on the Block** guides CC's mission to be one of the world's finest liberal arts institutions. Each of the plan's strategic recommendations has a distinct focus, yet they complement and reinforce each other to create a more dynamic liberal arts experience that is authentically Colorado College.

The plan's premier recommendation is to provide additional support for CC's pioneering Block Plan. The **Center for Immersive Learning and Engaged Teaching** serves as a focal place for academic support and to support faculty and students as they experience the full potential of the Block Plan. In supporting that recommendation, the aim of the summer research program is to fund collaborative research between faculty and students during the summer in order to support faculty in their research activities and to provide students with a first-hand research experience as undergraduates. The intent is to expose students to the diverse goals, research methods, and skills to conduct advanced research in their fields of study, prepare research reports of their findings, and present their conclusions to their peers in classes or at professional meetings. Undergraduate research is one component mission of the center, where faculty from across campus will mentor thesis and summer research students in an interdisciplinary approach to learning.

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