

ABSTRACTS

**Clayton State University
Student Academic Conference**

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ORAL PRESENTATIONS

Understanding origins of multicellularity by protein analysis of *Monosiga brevicollis* vinculin

Maria Delgadillo-Tiscareno

ADVISOR Richard Singiser | *Chemistry and Physics*

Cell adhesion occurs when a cell attaches to surrounding cells, cell substrate, or the extracellular matrix. The interactions occur between transmembrane cell-adhesion receptors, adaptor proteins, and cell junctions. One important protein that assists in cell adhesion interactions is vinculin. Since vinculin plays a central role in the adhesion complexes, it is likely it played a role in the evolution of multicellularity. In order to investigate the importance of vinculin in primitive adhesion complexes, we will use the single-celled eukaryote, *Monosiga brevicollis*.

Adsorption of Metal Cations onto Clay

Davis Luu

ADVISOR Augustine Agyeman | *Chemistry and Physics*

The aim of this project is to study the adsorption of metal cations by clay, using atomic absorption spectrometry (AAS). Several forms of clays are used to adsorb metal ions like lead (Pb²⁺). The variables in this work are interaction time, temperature, and concentration of metal ions. These variables help increase cation exchange and adsorbent capacity in clays.

Modeling Bonding Behaviors Within MOFs Through Complex Formation of Xylyl Isocyanide and Half-Sandwich Iridium(III)-Cp* Fragments.

Tommy Stell, John Meyers

ADVISOR John Meyers | *Chemistry and Physics*

The combination of various metal ions and organic ligands can provide a 2D or 3D porous structure more commonly known as a metal-organic framework (MOF). Unfortunately, 2D molecular squares and rectangles are not well studied. A 2D square or rectangle utilizes metal ions as corner pieces and organic bridges as edge pieces to create a planar macrocyclic structure. The focus of this study is to better comprehend the ability of a common organometallic half-sandwich compound to coordinate multiple organic ligands and serve as a corner piece of a MOF. More specifically, this project examined the ability of the half-sandwich pentamethylcyclopentadienyl-iridium(III) fragment to support multiple xylyl isocyanide ligands. To accomplish this, multiple organometallic compounds were synthesized in which the number of ligands was varied. These compounds were characterized via IR and NMR spectroscopies and can be considered as models for future work entailing 2D and 3D MOFs.

GamEcology: The Eco-Friendly App

Mei-Ling Li

ADVISOR Jere Boudell | *Biology*

Educational apps can be beneficial in improving the education of both young children and adults. Many people are not aware of environmental changes because they do not have time to keep up with the news. That is why I designed, GamEcology, in hopes of promoting educational ecology. This user-friendly app will enable users to learn on-the-go. It contains a game to teach children the predator/prey/competition relationships that occur between organisms in the wild. There is also a learning and quiz component, which allows older users to take brief ecology lessons and test their knowledge. The app also includes a news section for users to stay current on what is happening in ecology today. GamEcology has the potential to raise environmental awareness and encourage learning among users of all age groups.

In a World of Bats

Lee Fletcher

ADVISOR Stephen Burnett | *Biology*

Bats create ultrasonic calls that require special devices to detect. Bats interact with their environment by sending out calls that reflect as echoes. Most commonly, this technique is used to detect food, other organisms, and objects within their environment. Testing devices that detect bat calls is a primary focus of our study. We conducted tests using different devices to analyze their properties to determine precise characteristics in terms of: the maximum possible distance between an ultrasonic source and recording device, identifying bat species within a recording, and determining the advantages or disadvantages of each device for appropriate studies.

The secondary focus of our study involved environmental conditions and their influence on bats (both their behavior and their sounds). We predict that cooler temperatures will be unfavorable for bat species reducing their activity versus warmer temperature in which activity will significantly increase.

The Effects of Serotonin in Pairwise Interactions of *Procambarus clarkii*

Linh Le-Nguyen

ADVISOR Barbara Musolf | *Biology*

Procambarus clarkii are freshwater crustaceans that exhibit aggressive behaviors that occur in response to competing for food, mating access, and shelter. Observed behaviors include display of chelipeds, boxing, tail-flipping and unrestrained fighting. Serotonin (5-HT) plays a role in initiating aggressive behaviors when injected into the hemolymph of crayfish. We decided to investigate these effects using a non-invasive method of applying 5-HT. We placed *P. clarkii* in a beaker with 0.05mM/L 5-HT for 30 minutes to allow 5-HT to be absorbed through the anus and gills, into the hindgut. We hypothesize that this method of applying 5-HT will be as effective as injection. This method may also reduce confounding variables such as stress caused by anesthetization and injection of the crayfish. To test the success of this method, we performed immunohistochemistry on the ventral nerve cord to view if 5-HT was taken up, and we scored aggressive behaviors of pair-wise interactions.

An Evaluation of the Gut Microbiome of *Blaberus discoidalis*

Mei-Ling Li

ADVISOR Nikki Sawyer | *Biology*

Many animals engage in symbiotic relationships with microorganisms and the tropical cockroach, *Blaberus discoidalis*, is no different. This semester, I analyzed how diet can affect the gut microbiome of *B. discoidalis*. A total of 25 potentially different strains of bacteria were isolated from its fecal contents prior to a high-protein diet, and another 25 strains were isolated afterward. Each strain was grown individually on agar plates and bacterial characterization was done using morphology, gram stains, and a variety of selective and differential media. If there is sufficient evidence to support that *B. discoidalis*'s normal microbiota changes with diet, its microbiome can be manipulated in future experiments to further investigate the potential connection between a gut microbiome and animal behavior.

Inhibition of Major Virulence Factors of *Klebsiella pneumoniae*

David Eap

ADVISOR Renee McFarlane | *Biology*

Hospitals are believed to be the place where one can be cured of their illnesses. However, that turns out to be false for most cases when people go to the hospital to treat one illness, then come out with another illness. This is called a nosocomial infection. One particular bacterium that is known to cause nosocomial infections is *Klebsiella pneumoniae* (KP). This Gram-negative bacterium is responsible for hospital-acquired illnesses, such as pneumonia and urinary tract infections (UTI). In this experiment, the major virulence factors of KP were targeted, specifically the fimbriae, siderophores, and capsule. The protein lactoferrin will be used to inhibit fimbriae and siderophores. Zinc sulfate (ZnSO₄) will targeted the enzyme tyrosine phosphatase which creates the capsule for KP.

Having Our Say: How the Delany Sisters Survived Jim Crow

Hilary Singh

ADVISOR Kathryn Pratt Russell | *English*

In their earlier stages of life, Sadie and Bessie Delany would be displaced by the Jim Crow laws mandated in North Carolina, among all Southern states. Their familiar and slightly sheltered childhood would be shattered, exposing them to the dogmatic, racist ideologies held by the whites of the South. Because their parents rejected the notion of preparing them for this, deeming it unethical to strip away their childhood, both sisters were blindsided by the segregation laws but quickly recovered to withstand these racial injustices. The Delany Sisters' childhood in the black community, played an integral role in shaping their personalities and creating defense mechanisms to extenuate the indignities of Jim Crow. Upon their first encounter with the newly enacted Jim Crow laws, the Delany sisters would witness the veritable depth of institutionalized racism as it sought to rid its advocates of their humanity and degrade the black community.

Morality in Video Games

Ryan Nash

ADVISOR Christopher Ritter | *English*

I will be discussing the concepts of moral mechanisms in games, as well as players as moral agents.

The Pain in My Anger

Gertrude Scudder

ADVISOR Stephanie Richardson | *English*

Through a short story and spoken word poetry, the pain that has inflicted my life-pain that hides behind my anger and frustration are brought to light. Topics such as sexuality, family, gender and death are discussed through imagery and metaphors, as well as how my hearing loss has shaped my life to this day. Feeling trapped outside of society contributed greatly to my struggle with gender identity and sexuality as well as how I handled the deaths of those few people who managed to get through my bubble of isolation. My own contemplations of self-harm and suicide as well as my own depression are topics I've never felt comfortable sharing with others. But I believe I'm ready to tell my story now. Without lying, or putting on my mask of indifference, hatred or anger. Through three spoken word poems; Someone Who Knows, The Weeping and Gnashing of Teeth and Broken Nightmares, as well as a short story entitled A Leap of Faith, I hope to finally share that story. Thank you.

Harriet Wilson's "Our Nig" and Women's Spiritual Empowerment

Amirah Muhammad

ADVISOR Kathryn Pratt Russell | *English*

Harriet E. Wilson's *Our Nig: Sketches from the Life of a Free Black* is a sentimental novel of the late 19th century and the first novel published by an African American woman. Its sincere emotions, sensational style, and compassionate language are what appealed to women readers of that period (Beaty 1014). Wilson suggests that the "Cult of True Womanhood" is not meant for African American women in 19th century America due to class partiality and racism. The brutal treatment of the young African American woman Frado by Mrs. Bellmont and her daughter Mary, as well as Frado's inability to support herself, exposes the flawed concept of the Cult of True Womanhood in antebellum America because the idea denied to African American women the privileges of being pious and honorable. Therefore, Frado creates her own standards of value through unconventional spiritual means and female empowerment to allow her eventual independent status in a world she must reside in.

"You Gotta Deal With It": The Post-Postfeminist Heroine

Princess Sampson

ADVISOR Khalilah Ali | *English*

The media of the early 1990s and 2000s dealt with whether feminism was still relevant, and whether it had altered women's place in society for better or worse. Ultimately, the protagonists in these works still fit nicely into traditional ideas about both femininity and a woman's role in a story, especially a fantasy story. However, by the 2010s, media aimed toward children began to outpace adult media in terms of diversity and complexity. At a time when young girls are pushed toward participation in STEM and sports, it is only natural for a certain type of fictional heroine to rise in parallel. This is especially prevalent in the action-adventure genre. Three female protagonists from this genre will be examined: Avatar Korra from *The Legend of Korra* (2012), Rey from *Star Wars: The Force Awakens* (2015), and Moana from *Moana* (2016). The shared traits of these heroines are indicative a new archetype for female characters in mainstream science fiction and fantasy.

Genre Analysis

Lela Gray

ADVISOR Christopher Ritter | *English*

Digital literacies are becoming equally as important to understand as written literacies. Being able to understand how to create digital literacies will help to analyze them. I will be presenting my research on YouTube videos that analyze films. There are multiple conventions necessary to mastering this genre that I will discuss.

No Suffrage Crusade Here

Melvin Moore

ADVISOR Marko Maunula | *Social Sciences*

My presentation is based on the lawyer that originally took on the South Carolina Klu Klux Klan Trials of 1871 in York County. David T. Corbin. My thesis will show that Corbin used this trial as a political jump start instead of the crusade for suffrage and trying to make the world a better place for the disenfranchised. Mr. Corbin did accomplish a great deal but it was more for personal gain than what it originally seemed.

School to Prison Pipeline

Charese Griffin

ADVISOR Joshua Meddaugh | *Social Sciences*

The school to prison pipeline has detrimental effects on minorities and children of color. Constant criminalization of children of color and governmental sanctions and lawmakers, coupled with public school administrations zero-tolerance policies within the school systems, this pipeline was created and fueled. The paper answers the superlative question of how a child can enter school for an education and leave with a criminal record. Zero tolerance policies became one of the main contributing factors which funneled children out of schools and into prison. Along with discussing zero tolerance, this paper will also introduce and discuss other factors which aided in fostering this type of school to prison pipeline and why policies which should protect school children are ultimately causing more damage than good and is discusses measures that can be put into place to aid in eliminating strict disciplinary practices.

Life as a Legislative Intern

Matt Trice, Alexis Shoats

ADVISOR Joshua Meddaugh | *Social Sciences*

A detailed discussion of the life of a legislative intern.

An in-depth look at the relationship between movie ticket prices and box office performance

Shonda Finney, Joshua Washington, Denise Goodman, Danielle Arnold

ADVISOR Reza Kheirandish | *MBA*

The film industry is a major contributor to our economy, and we understand that the ability to predict movie success rates is of great importance to the entertainment industry. According to one New York Times analyst, people are less likely to go to the movies because they think tickets are overpriced. The purpose of our paper is to explore the relationship between movie ticket prices, and box office revenue. Our paper will present a detail study examining multiple factors that play a role in box office successes. We will present regression models and other data sets using historical, and current data from various journal and verifiable source; as well as factors that may impact Total Revenue, and financial risk management. Georgia has quickly become a movie making haven, we hope our research contributes to the continued success of the film industry in our state.

The Inelasticity of NBA Ticket Sales

Charlotte McCormack, Marcus Polnett, Darnell Brown, Ebony Carter-Moore, Benjamin Straker

ADVISOR Reza Kheirandish | *MBA*

This study examines the elasticity of NBA ticket sales with respect to ticket prices, income, population, and race. Using the Census and sales reports from each of 32 teams we establish whether or not demand for NBA tickets is inelastic. It is generally accepted that no matter what, fans will attend NBA games. It is also accepted that price and buyer income level, will impact a consumer's decision to purchase. This study determines how much of an impact price and income have on NBA ticket sales and compares this relationship across teams in different cities. It is known that the number of buyers, and preferences of buyers, will impact demand. By comparing cities with varying population levels, we determine if higher populations coincide with greater inelasticity of NBA tickets. As it is assumed that consumers of different races have different preferences, we explore whether or not a higher population of certain races leads to greater inelasticity of NBA tickets in that location.

Salary Disparities Between Black and Non-Black Head Coaches in NCAA Sanctioned Division I Men's Basketball Programs

Alisha Filmore, Joshua Ifill, Brandon Marshall, Crystal Stagg

ADVISOR Reza Kheirandish | *MBA*

So we want to look at the salaries of black and non-black head coaches in men's Division I collegiate basketball programs. We believe that black coaches are being paid less than their non-black counterparts. We will collect publically available data on NCAA sanctioned Division I men's basketball coaches' salaries and using regression analysis we will look into salary differences

Cultural Competence in Business

Jordan Gibbs

ADVISOR Mario Norman | *Management*

As college classrooms continue to diversify, so will the workforce. Given the demographic changes of our society, it has become increasingly important that business educators develop skills to manage multicultural issues and interactions inside of the classroom to model and prepare future leaders for a diverse workforce. Developing multicultural competence is essential for future business leaders who are likely to work with other people, many of which may come from different backgrounds. Cultural competence has received much attention in several disciplines such as nursing, education, and psychology; however, cultural competence has received limited attention in the field of business. This research will discuss the need for cultural competence in business, specifically in marketing and management.

Troubles at H&M

De'Quan Marshall, Kierra Evans, Cashery1 Flint

ADVISOR Carin Lighter-Laws | *General Business*

In this presentation we will go in depth on the retail company of H&M. we will discuss the new things that they are working towards and we will also talk about there leadership team and how they became they company they are today. the main topic we will discuss will be on the bad publicity they company has received and how it affected there company.

Intel Company

Cieria Moore, Winston Wills

ADVISOR Carin Lighter-Laws | *Management*

We will be talking about the company Intel and how they are on the Top 25 supply chain list.

The Look into the World of Starbuck

LaMarcus Smith, Yvonne Baker, Erica Stevenson, Shannias Weems

ADVISOR Carin Lighter-Laws | *Supply Chain Management*

It is no surprise that when people think about a great place to go for good coffee, Starbucks comes to mind. With stores in over 76 countries, Starbucks has quickly become a global phenomenon in just a few short years. Starbucks strives to put its customer first by offering a relaxing and social atmosphere, all while providing high quality products and delivering top notch customer service. Although the company continues to flourish by improving ways to expand their market, it's important to remember that the company came from humble beginnings.

POSTER PRESENTATIONS

Explaining the Chemistry of Bioactive Molecules through Infographics

Vanessa Okechuku, John Meyers

ADVISOR John Meyers | *Chemistry and Physics*

In order to effectively communicate and promote the underlying chemistry of selected every day events to members of the general public, infographics were created. An infographic contains figures and facts that simplifies topics, such as complex chemical concepts in this case. In addition to the infographic, a short research paper was written to summarize the technical chemistry. Commonly encountered topics of interest that were covered in infographics include antidepressants, neurotoxins, and an anticancer agent.

Commercial Vitamin Supplement Analyzed Via IR

Jit Patel, Nikki Sawyer

ADVISOR Nikki Sawyer | *Biology*

Vitamins are essential organic compounds which help sustain biochemical processes involving lipids, carbohydrates, and proteins. Healthy diets contain necessary ratios of these life drivers. Our question: Are the nutritional label claims provided by vitamin companies authentic? An IR analyzed Multivitamin, Vitamin-C, Turmeric, and Vitamin A/D supplements out of the bottle. Tumeric matched Curcumine (HQI of 85.15); Vitamin C matched ascorbic acid (HQI of 95.59); Vitamin A/D's highest HQI matches included cholesterol free fish oil (99.52), soybean oil (99.43), and flaxseed oil (99.26); The Multi-Vitamin also had several matches, but highest HQI matched Spectravite Performance Vitality Formula Multi-Vitamin/Mineral (96.52). Here, we have presented that these Vitamin C, Tumeric, Vitamin A/D, and Multi-Vitamin supplements contain what they claim on the nutritional label. Further studies would provide more detailed reports of isolated compounds from specific brands.

Heart Rate Response to Submaximal Cycling Test

Moroni de Moors, Mathew Smith, Thomas Andre, Hae Chung, Melanie Poudevigne

ADVISOR Melanie Poudevigne | *Health and Fitness Management*

This study examined the impact of a submaximal cycling test (SCT) on Heart Rate (HR) in sedentary and physically active (PA; [>150 minutes of weekly exercise]) adults. Weight and fitness level were used to determine the testing protocol. During the SCT, Sedentary [$n=17$; 23.35 ± 2.9 years; $BMI=23.55 \pm 4.2$ kg/m², $FM=25.6 \pm 6.6\%$] and PA [$n=25$; 27.42 ± 7.9 years; $BMI=26.31 \pm 4.9$ kg/m²; $FM=23.5 \pm 7.4\%$] adults' HR was recorded every minute. Ratings of perceived exertion (RPE) were recorded at baseline and every three minutes. SCT was terminated when HR reached 80% of the maximal HR. There was a significant difference in HR between sedentary and PA groups in the first minute of the first stage and at 2-minutes post-exercise ($p<0.05$). The initial HR response during SCT was lower in PA than in sedentary individuals, and their HR returned to homeostasis quicker which was expected. These results confirm that PA adults have a better stress response to moderate stressors such as a submaximal exercise.

The Impact of Mentors for Young Black Boys in Today's American Society: (Youth Domestic Terrorism, Single Parent Households & Racial Disparities)

Theophilus Pogue

In our social society, misunderstood youth of every race and ethnicity, culture and creed are prevalent in the United States today. A great part of the decisions made by young people are directly made due to the people that they see, hear or are exposed to during their adolescent years. This research will focus on one race, one creed and one gender.

This paper will show the parallel between young black boys ages 8-18 that are either successful or non-successful due primarily to mentorship. The comparative states are Georgia and Alabama and the target cities are Anniston, Alabama and Atlanta, Georgia along with their surrounding metropolitan cities. Research will also show the correlation between youth domestic terrorism, single parent households and racial disparities as it relates to the effects of mentorship and finally offering quantitative analysis to support the research.

Pinky or index fingers in pushups' position: which one is more effective for strength?

Mathew Smith, Moroni de Moors, Thomas Andre, Hae Chung, Melanie Poudevigne

ADVISOR Melanie Poudevigne | *Health and Fitness Management*

The aim of this study is to measure the EMG signals of Triceps Brachial (TB), Pectoral Major (PM) and Anterior Deltoid (AD) while performing pushups in two different hand positions. 42 subjects were recruited to perform push-ups on two separate occasions: 17 sedentary [23.35 ± 2.9 years; BMI=23.55 ± 4.2 kg/m², FM=25.6 (±6.6)%] and 25 physically active [27.42 ± 7.9 years; BMI=26.31 ± 4.9 kg/m²; FM=23.5 (±7.4)%] adults. The 2 different hand positions were dictated by the index or pinky alignment. The mean of peak EMG signals to exhaustion was analyzed. A trend was discovered in the muscles; there was greater activation using the index finger position in the TB muscle and the pinky finger position for the PM and AD muscles. On average subjects performed 31 pushups in the index finger position, and in comparison subjects performed 28.1 pushups using pinky position (p<0.05).

Cygnus x1 brightness comparison

Samuel Scimeca

ADVISOR Bram Boroson | *Chemistry and Physics*

The presentation will be over one of the first known star that appears to be next to a black hole. It will go over the type of equipment I used, learning how to work the campus telescope, and the usefulness of certain online telescopes to get better results, will have compare and contrast photos to show the difference in brightness error in pictures with better resolution.

A Physical and Computational Study of Brownian Motion in Undergraduate Physics Laboratory

Tommy Stell, Tatiana Krivosheev

ADVISOR Tatiana Krivosheev | *Chemistry and Physics*

This project was designed to study the Brownian motion through physical and mathematical methods and provide a potential pedagogical experiment for physics teaching labs. Brownian motion experiments were considered for the use in physics teaching labs as a demonstration of statistical physics, a pillar of thermodynamics and quantum mechanics. Physically, the Brownian motion was modeled through the addition of a sodium sphere to a body of water and mathematically through a computer simulation model. The experiment was then evaluated for use in undergraduate teaching labs.

The Odors of Herbs

Patrick Foster, Antavious Billings, Gabrielle Knot, Allyson Walton

ADVISOR Barbara Musolf | *Biology*

Callosobruchus maculatus, commonly known as cowpea weevils, are a pest that parasitize cowpeas. This presents a yield problem for cultivators of cowpeas. Cultivators search for cost effective and natural remedies that deter this pest while maintaining the peas flavor. In our experiment, there were two main treatments: the bean with herbal odor vs the bean without herbal odor. Each test had two outcomes, the beetle selected the chamber with the herbal odor or without the herbal order. We hypothesized that odor affects mated female dispersal beetles bean selection. We predicted that if herbal odor affects mated female dispersal morph cowpea selection then they will select the control treatment (cowpea with no herbal odor). The purpose was to test if herbal odors repel or attract mated female dispersal beetles when selecting cowpeas. Our findings could be used to prevent the colonization of female dispersal morph on a farmer's cowpeas in order to harvest bigger and tastier yields.

Synthesis of Sulfa Drugs

Laurie'l Latimer, Caroline Sheppard

ADVISOR Caroline Sheppard | *Chemistry and Physics*

Sulfanilamide is an organic compound that is metabolized from Prontosil in animals and has antibacterial properties. Sulfanilamide is a competitive inhibitor for the active site of a crucial enzyme in bacteria. The presence of this sulfa drug prevents the bacteria from carrying out necessary chemical reactions. This research involved the synthesis of two sulfa drugs, sulfanilamide and its derivative sulfathiazole from p-amidobenzenesulfonyl chloride, which was synthesized from acetanilide. The products of the sulfanilamide and sulfathiazole syntheses were characterized by determining physical properties and IR and NMR spectra, and this data was compared to literature data.

The effect of change on stride length on muscular activity and energy cost during walking

Travet Witherspoon, Jr., Moroni DeMoors

ADVISOR Hae Ryong Chung | *Health and Fitness Management*

Human bipedalism is a unique locomotive form in the terrestrial environment and can be performed for a prolonged period of time. To maintain this form of locomotion humans have adopted physiological and mechanical strategies to minimize and conserve their stored energy. The self-selected locomotive pace in humans is that at which the most efficient energy cost can be maintained. The purpose of the study is to see the effects of change stride length on the electromyographic (EMG) activity of the quadriceps muscle group and hamstring muscle group and oxygen consumption.

5 male subjects were recruited for the study, and height, weight, and body composition were measured. Stride length was measured by calculating the average length of heel to heel on the right side. Subjects were instrumented with EMG electrodes on the surface of their skin over right quadriceps muscle group and hamstring muscle group to record muscle activity, heart rate, and oxygen consumption(VO_2) were measured.
