

**Keynote Address**  
**Radford Auditorium: 9:00 a.m. – 10:00 a.m.**

**Dr. Joel Brant (2022 E.E. Hall Scholar)**

*Ecological Investigations into the Vertebrate Fauna at  
Firebase Libby*

*Ecologists seek to understand how living things operate in their world. Often, we must travel to where the organisms are to conduct our investigations. Access to habitat is often the limiting factor for ecological research. In 2014, Reverend Bill Libby donated his 160-acre property to McMurry University to be used as a field station for biological research. Rev. Libby's generosity has provided us with an opportunity to gain a deeper understanding of the life in the Big Country of Texas. Dr. Brant will discuss his efforts to characterize the vertebrate communities (mammals, reptiles, amphibians, & birds) at Firebase Libby. These investigations have touched on the ecological topics of biodiversity, competition, population responses to environmental change, and habitat selection.*

**Break**  
**10:00 am – 10:30 am**

## **Student Oral Presentations**

### **Concurrent Session Times: 10:30A - Noon**

#### **Session A – Old Main 206**

**OP-A1- Lyndsey Kaufmann** (Mentor: Ann-Marie Lopez) *There are Too Many Words on the Page: Reading through a Child's Eyes* (10:30A)

**OP-A2- Eowyn Stewart** (Mentor: Ronnie Rama - Abilene Christian University) *A Royal View: Gardens as the Architecture of Luxury at Katsura Imperial Villa and Château d'Ancy-le-Franc* (10:50A)

**OP-A3- Hannah Grace Wilson** (Mentor: Lawrence Bonds) *A Group of Crows is Called a Murder: Birds and Their Influence on Revenge Literature* (11:10A)

**OP-A4- Jack Miller** (Mentor: Robert Wallace) *Wrongful Conviction and the Death Penalty: The Racial Effect* (11:30A)

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#### **Session B – Old Main 207**

**OP-B1- Anthony Avina** (Mentor: Philip LeMasters) *Building the Kingdom* (10:30A)

**OP-B2- Jade Dickens** (Mentor: Philip LeMasters) *Exploring the Divergent Views: Baptist and Protestant Perspectives on Baptism* (10:50A)

**OP-B3- Anyah Campbell, Tryelle Schilling, Adriana Ortega, Aidyn Camacho, Emilee Dominguez, Kendall Bearden** (Mentor: Philip LeMasters) *Comparing the Gospels* (11:10A)

**OP-B4- Gabriel Pyenta, Jackson Benard, Montgomery Cortez, Raul Gamez, Sunshyne Gwinn** (Mentor: Philip LeMasters) *Jesus: The Unexpected Messiah* (11:30A)

**OP-B5- Kaylee Worth, Halee Avant, Lillian Contreras, Alexandria Flores, Abagayle Haynes, Keatyn Lessner** (Mentor: Philip LeMasters) *Exploring the Parallels Between Martyrs and Monks* (11:50A)

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#### **Session C – Old Main 208**

**OP-C1- Luke Mendez** (Mentor: Philip LeMasters) *Liturgical Effectiveness: A Critical Analysis of Worship and Formation in the Episcopal Church's Holy Eucharist Rite II* (10:30A)

**OP-C2- Miguel Varelas** (Mentor: Philip LeMasters) *Active Participation: How The Word and The Sacraments Work Together* (10:50A)

**OP-C3- Yordanos Ayelework** (Mentor: Philip LeMasters) *Women in the Leadership of Orthodox Christian Worship* (11:10A)

**OP-C4- Jackson Young** (Mentor: Philip LeMasters) *Atonement Theory in Church Music* (11:30A)

**OP-C5- Melissa Stevenson** (Mentor: Philip LeMasters) *Methodist Communion: A Comparison* (11:50A)

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### **Session D – Old Main 107**

**OP-D1- Bridgette Fly** (Mentor: David Wahl) *The World of Sex Trafficking Compiled into a Website* (10:30A)

**OP-D2- Jackson Young, Luke Mendez** (Mentor: Mark Waters) *The Dangers of Christian Nationalism* (10:50A)

**OP-D3- Melissa Stevenson, Caleb Bush, Destiny Mathews, Dominic Carroll, Faez Mufti, Jasmine Hunter, Phoenix Jordan, Rylee Coleman, Presley Wilson** (Mentor: Mark Waters) *We Haven't Killed Each Other: Dialogue Across Difference* (11:10A)

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### **Session E – Science 105**

**OP-E1- Reid Brock** (Mentor: Bradley Blackwell) *Bioaccumulation and environmental transport of mercury in Alaskan salmon* (10:30A)

**OP-E2- Megan Keller** (Mentor: Joel Brant) *Effects of snake venom on types of mammalian blood.* (10:50A)

**OP-E3- Isaiah Alvarez, Kane Strohman, Matthew Pyle** (Mentor: Tikhon Bykov) *Nonlinear effects in vibrating strings observed through numerical analysis.* (11:10A)

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### **Session F – Cooke 204 (Entrepreneurship Projects)**

**OP-F1- Alysha Semien** (Mentor: Kevin Phillipson) *Empowering Educators, Saving Lives* (10:30A)

**OP-F2- Maxwell Roberts** (Mentor: Kevin Phillipson) *Drippin' Pour Pods* (10:50A)

**OP-F3- Jaxon Batten** (Mentor: Kevin Phillipson) *An Innovative Direction: Geo-Dome Homes*  
(11:10A)

**Break**  
**12:00 pm – 1:00 pm**

**Student Poster Presentations**  
**Finch Gray Science building 1:00 pm – 3:00 pm**

**Break**  
**3:00 pm – 3:30 pm**

**Three Minute Thesis Competition (3MT)**  
**Old Main 206 - 3:30 pm – 4:00 pm**

**3MT-1- Caitlin Baker** (Mentor: Jori Sechrist) *America's Collective Conscience* (3:30P)

**3MT-2- Aubrey Batten** (Mentor: David Wahl) *The Stigma Surrounding Stigma: Examining Social Disapproval and its Consequences* (3:40P)

**3MT-3- Melissa Stevenson** (Mentor: Mark Waters) *Constructive Criticism: How Not to Cry*  
(3:50P)

**Fine Arts Performances  
Ryan Fine Arts Building**

'Tis Not Me She Loves

10:30 am

**Zain Hargrove, Gabe Pyenta, Quinn Griffin, Rudy Flores, Mason Scott, Cassidy Cudd,  
Evelyn Van Houten, Babak Akavan, Trent Allen (Mentor: Neena McLain)**

Accents, Inc.

10:50 am

**Abigail Ewing, Gabriel Pyenta, Luis Rueda (Mentor: Neena McLain)**

Some Assembly Required

11:10 am

**Suellyn Hunter, Ayden McKinney, Cassidy Cudd, Lee Neighbours (Mentor: Neena McLain)**

The Bargain

11:30 am

**Sean Schaefer, Abigail Brown, Babak Akavan, Alexis Sanchez (Mentor: Neena McLain)**

Under The Floorboards

1:00 pm

**Abigail Brown, Lauren Scott, Evelyn Van Houten, Bethany Guzman (Mentor: Neena McLain)**

PG

1:20 pm

**Joe Caton, Grant Pike, Mason Scott, Tashaja Gonzales, Wesley Horn (Mentor: Neena McLain)**

The Chocolate Affair

1:40 pm

**Nathaniel Griffin, Babak Akavan, Alexis Sanchez, Evelyn Van Houten (Mentor: Neena McLain)**

All About Biffo

2:00 pm

**Luis Rueda, Wesley Horn, Mason Scott, Grant Pike (Mentor: Neena McLain)**

**McMurry University Department of Music Honors Recital  
Ryan Fine Arts Building - 11:00 am - Noon**

**Aaron Brokovich, Freshman, Bachelor of Music Education, Minor in Physics**

**Gabrielle Estes, Sophomore, Bachelor of Music Education**

**William Marshall, Sophomore, Bachelor of Music Education**

**Lance Tinkle, Junior, Bachelor of Music Education**

## Abstracts

### Oral Presentation Abstracts

**Reid Brock** (Mentor: Bradley Blackwell) OP-E1

*Bioaccumulation and environmental transport of mercury in Alaskan salmon*

Mercury bioaccumulates in aquatic food webs, and fish consumption is the primary route of mercury exposure for humans. Alaska provides a unique region for studying mercury because many areas remain untouched, so most mercury will be naturally occurring or from the atmosphere. Samples of Chinook, chum, and pink salmon were collected from Baranof Island, Alaska and analyzed using a direct mercury analyzer (DMA-80). Mercury concentrations were compared to fish sex, length, weight, and age. Nitrogen stable isotopes were used to determine trophic level and explore whether trophic level influences mercury concentrations in Chinook. Additionally, mercury transport from salmon migrating from the ocean ecosystem to headwater streams was calculated. Even though mercury was present, Alaskan salmon have a low amount of mercury and are relatively safe to consume.

**Hannah Grace Wilson** (Mentor: Lawrence Bonds) OP-A3

*A Group of Crows is Called a Murder: Birds and Their Influence on Revenge Literature*

This literary analysis explores how media, literature, and fairytales use avians as symbols of revenge and allows readers to categorize their presence into three separate groups of characters: conscious actors, divine actors, and moving actors. These categories impact how characters acknowledge and react to the revenge birds enact upon them, going as far as to determine the nature of the story and its deeper meaning or main idea. Furthermore, in the case of conscious actors, avians can also provide a deeper examination into the mindset and psychological basis for which a bird's decisions are made. By taking a closer look at "The Juniper Tree," "The Rose Bush," Stardew Valley, "Olga of Kyiv," "Rime of the Ancient Mariner," "The Birds, the Beasts, and the Bats," and "Philomela the Nightengale," these categories reveal the true importance of bird symbolism in the concept of revenge and how the presence of avians can change the perception and meaning of revenge literature.

**Megan Keller** (Mentor: Joel Brant) OP-E2

*Effects of snake venom on types of mammalian blood.*

One of the most dangerous snakes found in Texas is the Western Diamondback Rattlesnakes, *Crotalus atrox*. As part of the pit viper family their venom contains hemorrhagic proteins that gives it a higher mortality rate than the other snakes in Texas. In the United States, about 150,000 dogs and cats are bitten by venomous snakes each year. With 20% of dogs, and 10% of cats dying due to hematologic complications, yet humans still use horse blood to manufacture antivenom. The experiment was designed to observe any differences between the efficacy *Crotalus atrox* venom has across the three mammalian species. This study collects and analyses data using centrifuged and lyophilized venom reconstituted to mimic the real potency of a snake bite(112.5mg/ml), and introducing it in vitro to the blood of animals at rates varying by body mass. Complete blood counts and blood smears were made every 30 minutes for a 5-hour duration, and compared using a mixed methods statistical analysis. Negative control uses no venom and the positive control uses three times the testing concentration. Results show under normal testing conditions that horses, while they might develop severe thrombocytopenia within the first hour, handle the venom the best showing the least amount of cell death overall. Dogs showed the highest level of red blood cell crenation and excretion of proteins into the interstitial fluid, thereby effecting the serum protein levels the greatest. Cats showed the most cell death with white blood cells reducing over 57% two hours post inoculation. These findings are meant to better inform those in the veterinary medicine careers, but are just a small piece to a very large study, and require more testing exchanging methods or materials until there is the least amount of variance or confounding variables present.

**Isaiah Alvarez, Kane Strohman, Matthew Pyle** (Mentor: Tikhon Bykov) OP-E3

*Nonlinear effects in vibrating strings observed through numerical analysis.*

This study explores the nonlinear effects in vibrating strings through numerical methods, specifically the Runge-Kutta (RK45) method. Nonlinear phenomena in vibrating strings are of significant interest due to their diverse applications in various fields such as engineering, physics, and music. By employing the RK45 numerical method, using MATLAB programming language, this research aims to accurately model and analyze the behavior of freely vibrating strings as well as vibrations under the influence of external driving force. The results are then compared to approximate analytical models. The study investigates the influence of frequency of external force, and material properties on the nonlinear behavior of vibrating strings. Transverse waves on a string exhibit an elliptical pattern. That pattern is precessing with time. By further investigation, a nonlinear resonance curve for amplitude vs. external angular frequency is formed signifying the existence of a steady and non-steady state. Through comprehensive simulations and analysis, insights into the complex dynamics of nonlinear vibrating strings are gained, contributing to a deeper understanding of their behavior and potential applications in the scientific and musical realm.

**Anthony Avina** (Mentor: Philip LeMasters) OP-B1



### *Building the Kingdom*

The Christian Protestant Reformation resulted in the creation of various denominations of Christianity throughout history. Every denomination has a different way of practicing their beliefs and interpreting the Bible. The most universal aspect of these denominations is the inclusion of worship in their faith. In 1 Corinthians the Apostle Paul talks about the spiritual gifts God uses to bless individuals and how they manifest themselves in everyone's lives. We will discuss how the Methodist Church utilizes these gifts that individuals within congregations are blessed with and how they utilize them to continue building up the Kingdom of Heaven on Earth.

**Jade Dickens** (Mentor: Philip LeMasters) OP-B2

### *Exploring the Divergent Views: Baptist and Protestant Perspectives on Baptism*

Baptism is a central sacrament in Christianity, but different denominations hold diverse beliefs and practices regarding its significance, mode of administration, and theological implications. Protestantism encompasses a broad spectrum of beliefs, including various views on baptism. Within this context, Baptist theology stands out distinctively with its own set of beliefs and practices regarding baptism. Understanding the differences between Protestant beliefs on baptism and Baptist views provides insight into the diversity within Christianity.

**Anyah Campbell, Tryelle Schilling, Adriana Ortega, Aidyn Camacho, Emilee Dominguez, Kendall Bearden** (Mentor: Philip LeMasters) OP-B3

### *Comparing the Gospels*

This presentation will examine key differences and similarities in how the four gospels of the New Testament portray the life and teachings of Jesus. While Matthew and Luke both describe Jesus' birth, each provides distinctive details not found in the other account. Matthew and Luke include different genealogies for Jesus, while Mark and John do not present his family tree or describe his birth. Luke, as a Gentile, especially emphasizes how Jesus ministered to those considered outsiders. John presents a similar theme in his description of Jesus' interaction with the Samaritan woman at the well in their conversation about "living water" in contrast with the Pharisee Nicodemus' inability to understand what it means to be "born again." The presentation will examine these and other points of similarity and difference between the gospels in how they describe the good news brought by Jesus.

**Gabriel Pyenta, Jackson Benard, Montgomery Cortez, Raul Gamez, Sunshyne Gwinn** (Mentor: Philip LeMasters) OP-B4

### *Jesus: The Unexpected Messiah*

The gospels of the New Testament describe Jesus as being a different type of Messiah than the Jews of first-century Palestine expected. This presentation will identify how Jesus did not fit dominant expectations for the ministry of the Messiah by drawing on several passages from the gospels. For example, he was not a military leader focused on delivering Israel from Roman occupation, but a gentle teacher of forgiveness and peace who died on a Roman cross. He ministered not only to his fellow Jews but also to healed Gentiles. He did not focus on blessing those considered righteous and law-abiding Jews but associated with tax collectors and sinners. He went against the legalism of the Pharisees by healing on the Sabbath. He also presented himself as the Son of God by forgiving sins and referring to himself as “Lord of the Sabbath,” which went against the belief that the Messiah would be merely a holy and powerful human being. This presentation will develop these points to show how Jesus defied many preconceptions about the identity and actions of the Messiah.

**Kaylee Worth, Halee Avant, Lillian Contreras, Alexandria Flores, Abagayle Haynes, Keatyn Lessner** (Mentor: Philip LeMasters) OP-B5

### *Exploring the Parallels Between Martyrs and Monks*

In the early years of Christianity, martyrdom and monasticism emerged as two powerful expressions of faithfulness to Jesus Christ. Often revered for their unwavering commitment to their faith even in the face of persecution and death, martyrs embody the ultimate sacrifice for their beliefs. Meanwhile, monks utilized a different form of sacrifice—renunciation of worldly pleasures to pursue divine communion by living an ascetic lifestyle. The profound connection between martyrs and monks within the realm of religious devotion and sacrifice demonstrates how faith was most important to these groups. Their acts of self-sacrifice and reliance on divine providence emphasize their unwavering faith, even when presented with challenges like temptation or death. Despite their apparent difference in how these individuals practiced, martyrs and monks share commonalities in their commitment to self-sacrifice, pursuit of spiritual excellence, and inspirational impact on others. The accounts of the martyrdom of Polycarp, Perpetua, and Felicitas all demonstrate that even when faced with death because of their faith, they would not back down. Polycarp would not speak ill of Jesus Christ and thus was killed by the sword for his faith. Perpetua and Felicitas are other examples of martyrs who faced brutal persecution, including imprisonment and eventual execution in the arena; however, they stayed loyal to their faith. Similarly, the ascetic lifestyle that the monks endure of willingly embracing hardships as a means of drawing closer to God can be related to that of the martyrs. The Desert Fathers taught how to resist temptations and that seeking out God will make those temptations feel simpler. Overall, martyrs and monks dedicated their entire lives to God and the salvation of others. Both martyrs and monks embody religious virtues, regardless of the outside forces or challenges they were presented with.

**Luke Mendez** (Mentor: Philip LeMasters) OP-C1

*Liturgical Effectiveness: A Critical Analysis of Worship and Formation in the Episcopal Church's Holy Eucharist Rite II*

This research project explores the effectiveness of worship in conveying the comprehensive narrative of God's story and ensuring correct spiritual formation within the primary worship service of a church, focusing on the Episcopal Church's Holy Eucharist Rite II. The guidelines for this research are based on literature read and discussed in Dr. LeMasters' "Worship and Liturgy" class. Prompted by critical reflections on liturgy as discussed in Simon Chan's "Liturgical Theology," and Robert E. Webber's book "Ancient-Future Worship," the study aims to evaluate how well the Holy Eucharist Rite II achieves its intended purposes of spiritual formation, realization of the church's mission, and glorification of God. The anticipated outcomes include a comprehensive criterion to evaluate the worship service, and a detailed critique of the Holy Eucharist Rite II, aiming to enhance understanding and practices within the Episcopal tradition.

**Jackson Young** (Mentor: Philip LeMasters) OP-C4

*Atonement Theory in Church Music*

How often do we think about the theology of the songs we sing in church? Do we analyze the lyrics of the songs we sing, and think about the impact they have on our theology? Most of the time the answer to this question will tend to be no. No one is necessarily at fault for this, it is pretty normal to sing what we're told on Sunday and move on with our lives. However, the theology we receive at Church (through music or preaching) has a big impact on our thinking. This presentation will focus on atonement theology in church music. Our theology of the atonement is crucial because Jesus' death and resurrection can be thought of as the climax of the Christian story. This is where atonement theories come in, as they try to answer this question: Why did Jesus die? While it is more agreed upon that Jesus lived and died, his purpose for doing so is more widely debated. The most common atonement theory found in church music is Penal Substitution. Penal Substitution argues that Jesus' death on the cross satisfied God's requirement for justice. According to this theory Jesus suffered the wrath of God the Father as a payment for humanity's sins. While Penal Substitution is a widely held theory, it can be quite problematic theologically. It paints the picture of God the Father as an angry deity that requires a payment for the sins of the world. This presentation will present a view of several different atonement theories, such as Christus Victor and Moral Influence. Other Atonement theories that are healthier do appear in church music as well, even if it isn't as common. By looking at how widespread Penal Substitution has become in church music we can start identifying it and resisting against it.

**Melissa Stevenson** (Mentor: Philip LeMasters) OP-C5

### *Methodist Communion: A Comparison*

Communion is an activity, a holy sacrament, that Methodists of all different styles participate in the first Sunday of every month. It is very clearly defined and written out in our *Book of Worship* and the *United Methodist Hymnal*. By writing very specific instructions for Communion and other services and sacraments, the *Book of Worship*, according to the Methodists in 1964's *Book of Worship*, is "designed to provide significant structure for the worship of the Church. It is not intended in any way to fetter the spontaneity or reject the reliance upon the Holy Spirit which have characterized United (and other) Methodist worship throughout its history". They cite the very specific instructions sent by John Wesley himself to early American Methodists in his book *The Sunday Service of the Methodist in North America* written in 1784. The 1964 Methodist *Book of Worship* goes on to say that this has made us "heirs of the deeply meaningful historic forms of devotion of the universal church". That what we do today for the Service of Holy Communion echoes what Methodists have been doing since 1784. But how have these liturgies changed over the years? Have we only changed the language to a more modern "You" instead of "Thou"? Or are the changes more fundamental to who we are as Methodists? This paper will demonstrate the differences and similarities between John Wesley's original instructions with the Methodist communion liturgy (prior 1965), to the United Methodist Communion liturgy of 1989, to what current Global Methodist churches are practicing today. These comparisons will shed light on where we have been and how that reflects on where we are today.

### **Yordanos Ayelework** (Mentor: Philip LeMasters) OP-C3

#### *Women in the Leadership of Orthodox Christian Worship*

While the role of women in Christian worship has become less restricted over the centuries, there are still limitations placed on the extent of their participation. In the Orthodox and Catholic Church, for instance, the ordination of women to the priesthood is prohibited. This research aims to explore these limitations in the context of the Orthodox Church and worship leadership roles, examining the theological, social, and cultural factors that contribute to the marginalization of women. It will focus on the rationale for the limitations of women's participation in worship leadership and the different interpretations of scripture that inform these attitudes.

### **Miguel Varelas** (Mentor: Philip LeMasters) OP-C2

#### *Active Participation: How The Word and The Sacraments Work Together*

The modern church is growing increasingly farther from the liturgical style of worship that the early Christian church practiced. With large emphasis on spontaneity and entertainment, a large part of liturgical worship has been lost and ignored in the modern church. Within the

context of worship within the church, the word and the sacrament work together to fulfill the “fullness” of liturgical worship. This is demonstrated in the way that the word “tells” the church what to do and the sacrament is the “doing” by the church. Contrary to individualistic worship, liturgical worship brings the church together to fulfill part of its purpose which is to worship and be in communion with God. Under this understanding, active participation in liturgical worship is crucial for the fullness of the word and sacrament to be fulfilled. One may know the word without doing the sacrament while alternatively, one may do the sacrament without knowing the word. This does not bring the fullness of what the wholeness of church worship is to look like. Instead, there should be a focus on the attitude of the individual to be in the role of a part of the church instead of the church being a part of the individual's worship. When the word is understood and the sacrament is done with understanding, the fullness of liturgical worship in the church will be fulfilled.

**Lyndsey Kaufmann** (Mentor: Ann-Marie Lopez) OP-A1

*There's Too Many Words on the Page: Reading through a Child's Eyes*

Reading lays the foundation for a child's overall academic achievement and lifelong learning. It is a unique skill, a gateway that exposes new realms of knowledge, fosters critical thinking, and nurtures emotional development in young minds. Current statistics indicate, however, that 50% of children from low-income households begin first grade with a two year learning deficit and 90% of those will struggle with reading by the end of the fourth grade (Admin par. 5). Early elementary represents a pivotal stage in cognitive development, making it an opportune time to instill a genuine desire for reading. When a child actively reads, they are more inclined to explore diverse topics and embrace new ideas, fostering a continual progression in their intellectual development. This presentation provides an overview of the importance of reading in elementary schools, addressing how socioeconomic disparities and psychological factors, such as cognitive development and self-esteem, influence a child's engagement in literacy. It outlines the impact a child's motivation can have in their learning, as well as helpful strategies that promote the drive to read, including proven instructional methods integrating the fine arts. This discussion concludes with case studies that encourage educational equity, helpful intervention, enhanced learning conditions, and positive role models. America has shaped “a culture of reading poverty in which a vicious cycle of aliteracy has the potential to devolve into illiteracy for many students” (Miller 107). Urging educators, policymakers, and caregivers to prioritize effective reading strategies in a child's formative years has the potential to change lives.

**Alysha Semien** (Mentor: Kevin Phillipson) OP-F1

*Empowering Educators, Saving Lives*

“Empowering Educators, Saving Lives” is a specialized CPR Training company dedicated to equipping educators and student within school districts with the essential skills to respond confidently and effectively in emergency situations. Our comprehensive curriculum goes beyond basic CPR techniques, incorporating AED usage, first aid skills, and tailored emergency response protocols for school environments. With certified instructors, hands-on training, and interactive learning experiences, we ensure participants feel prepared and empowered to act as first responders when every second counts. Our focus on school safety, community engagement, and innovative training methods sets us apart, fostering partnerships with educational institutions, local authorities, and parent-teacher organizations. Through our commitment to excellence and continuous support, we aim to make CPR training accessible, impactful, and lifesaving for educators and students alike. Join us in our mission to create safer school communities and save lives through proper CPR training "Done Right."

**Maxwell Roberts** (Mentor: Kevin Phillipson) OP-F2

### *Drippin' Pour Pods*

“Drippin’ Pour Pods” is a unique business concept that’s introducing a solution, focused on resolving the issue of lengthy waiting times around dispensing adult beverages at professional venues and events. The innovative solution relies on leveraging current technological advancements to manufacture, state of the art, automated drink dispensing machines, as well as to develop a platform that’s centered around revolutionizing operations, and enhancing customer driven convenience. The signature “Drink Pods” will deliver improved operations through enabling, verified, online In-app Purchases that are redeemed in person, streamlining transactions through an automated system which, in turn, significantly reduce wait times. Unique value of the concept and product lies within the adaptability, mobility, and efficiency all while catering to the main issue of lengthy waiting times dispensing adult beverages at professional venues and events. Experience the convenience of tomorrow’s beverage service today through joining “Drippin Pour Pods” in revolutionizing event hospitality.

**Jaxon Batten** (Mentor: Kevin Phillipson) OP-F3

### *An Innovative Direction: Geo-Dome Homes*

House and rent prices are dramatically rising, creating an opportunity for something innovative to take the market. With this in mind a very old housing concept might be solution. A geo-domestic dome is a collection of triangles put together to create a dome structure that is superior in many aspects. These homes are designed to be both elegant yet simple. The unique dome structure not only adds aesthetic appeal but also offers practical advantages such as increased energy efficiency, durability, and strength. The dome model proposed is set apart by its external insulation that doubles as roofing material. Through their unique in design and

construction, these geo-domestic dome homes offer a sustainable alternative to traditional housing.

**Eowyn Stewart** (Mentor: Ronnie Rama - *Abilene Christian University*) OP-A2

*A Royal View: Gardens as the Architecture of Luxury at Katsura Imperial Villa and Château d’Ancy-le-Franc*

During the 17th century, gardens were the architecture of the wealthy, a method of aestheticism, display, and control well suited to palaces. In the Katsura Imperial Villa, traditional Japanese architectural methods drew on ancient poetry and history to create a palace of natural beauty and royal legacy through its gardens. Its rooms bleed into gardens focused on the seasons and the landscape, creating a palace whose outer boundaries connect with its surroundings. Through its gardens, the Villa sparked a Japanese “renaissance” of ancient form and function in architecture. At the Château d’Ancy-le-Franc, complex and structured gardens create a set of “rooms” in which wealth and power can be displayed, and nature can be controlled. Through classical motifs and exotic plants, the garden as a location of curation in this palace shows the political and cultural extensions of French nobles. Both palaces utilize their gardens as a facet of architecture that enhances the building while reinforcing the narratives of power surrounding their residents.

**Bridgette Fly** (Mentor: David Wahl) OP-D1

*The World of Sex Trafficking Compiled into a Website*

This honors thesis is a combination of topics within the fields of Computer Science and Criminology. I developed a website with the capability to pull data from a database that I created and filled with relevant data that can be displayed for the user to view. The database was created using the MySQL Workbench using the language MySQL while the website itself was created using features from the languages HTML, CSS, JavaScript, and PHP. Each page of the website contains links to and from other pages to allow the flow of the website to make sense and allow for a pleasant user experience. For the Criminology section of my thesis, I decided to research the world of sex trafficking. Human trafficking is a violation of human rights and awareness of this crime is crucial for more than just punishing perpetrators of the crime. The identification of victims, social supports for vulnerable populations, and the educated creation of legislation are just a few things that would benefit from the spread of awareness about human trafficking as a whole. Spreading knowledge about sex trafficking is what my thesis is aimed to do. Combining the website that I created with all of the information I gathered, I made a site that contains comprehensible information about a dense and heavy topic so that the user is able to find all of the information in one place.

**Jack Miller** (Mentor: Robert Wallace) OP-A4

*Wrongful Conviction and the Death Penalty: The Racial Effect*

McMurry University Professor Robert Wallace asks us to consider the case of the Central Park Five, in which four young black men and one young Latino man were accused of murder and rape. They were sentenced to prison in 1989 because they all confessed their guilt. After thirteen years in prison, they were proven innocent in 2002. Wallace, an expert in wrongful conviction, takes the broader sociological “public issue” of this case and flips it on its head. These wrongful convictions are even more problematic if the sentence involves capital punishment. American sociologist Michael Radelet asks us, “The question people have been asking for 30 years is ‘Who deserves to die?’ The more important question is ‘Who deserves to kill?’ We make so many mistakes that the only clear lesson is that we do not deserve to kill” (Marshall 2009:3). Radelet’s research also shows that when you intersect the use of capital punishment and race, it is even more problematic. Leading civil rights expert Charles J. Ogletree describes the connection between race and capital punishment, stating, “In the modern era, many have characterized the use of capital punishment in America as ‘legal lynching,’ due to its historical inseparability from the issue of race” (Ogletree 2006:55). Sociologically speaking, “legal lynching” is clearly a public issue. Drawing on Ogletree’s research, criminologist David Garland (2007: 445-446) states that “race, social class, and the quality of legal counsel are the chief factors that structure outcomes, with the result that poorly represented blacks, convicted of atrocious crimes, against white victims, are the group most likely to be sentenced to death.” Garland also describes the “steep descending order of death sentence probability,” which indicates that if a white person murders a black person, the odds of capital punishment are much less than if a black murders a white.

**Jackson Young, Luke Mendez** (Mentor: Mark Waters) OP-D2

*The Dangers of Christian Nationalism*

Christian Nationalism is the idea that Christianity should dominate society. It places the Christian God as the ruler over the government, with his followers doing his will in different areas of society. Christian Nationalism is rooted in the 7 Mountain Mandate, which states that Christians aim to take over the 7 spheres of influence in our society: Religion, Family, Education, Government, Media, Arts and Entertainment, and Business. This isn’t just an ideology, but there are also real implications to this line of thinking that must be looked at critically. Education, for example, under Christian Nationalist rule would look quite different. Prayer would look different in schools and curriculum would likely shift to cater toward Christian teaching. It is important to note that Christian Nationalism does not represent all of Christianity. Rooted in Dominionism (A movement from the 1970s), Christian Nationalism is a fundamentalist movement. This distinction is important because it shows that it isn’t all Christians who want governmental power, but instead it’s a smaller minority of Christianity. Christianity is very internally diverse, and while there is a smaller group supporting Christian Nationalism, around



80-90% of Christians still reject it. Christian Nationalism is growing and is still relevant today. It is dangerous, and therefore it is very important for people to be informed about it and be able to see it in our government today. A great example of Christian Nationalism today is Donald Trump's "God Bless the USA Bible." The current relevance of Christian Nationalism is why this presentation is important, and in it Christian Nationalism will be looked at critically from a theological and practical perspective.

**Melissa Stevenson, Caleb Bush, Destiny Mathews, Dominic Carroll, Faez Mufti, Jasmine Hunter, Phoenix Jordan, Rylee Coleman, Presley Wilson** (Mentor: Mark Waters) OP-D3

*We Haven't Killed Each Other: Dialogue Across Difference*

Our group met together for Dialogue with the Other with Dr. Waters this semester. The members of our class are very different from one another, with differences in age, sexual orientation, gender identity, race, socioeconomic status, and family history. Our current political, racial, and economic climate says that these differences should pull us apart, creating canyons that we are unable to cross to find common ground. Our presentation will demonstrate that these differences not only make dialogue more interesting, but that they also give us room to grow and learn from one another, making us better students and better human beings. Our differences give our topics a richer understanding of the world whether we're talking about the death penalty, abortion, or simply if the world is a meeting pot, a salad or combination of the two. But the civil discourse of the outside world would tell us that our differences should not only make us dislike each other, they should make us distrust each other and make honest conversation an impossibility. But those differences can spark constructive problem-solving skills by allowing us to see other perspectives and create new pathways in life. We shall discuss and show our differences by expressing who we are and how we work together to discuss topics in a respectful and positive way.

**Performance Abstracts**

**Abigail Brown, Lauren Scott, Evelyn Van Houten, Bethany Guzman** (Mentor: Neena McLain)

*Under the Floorboards*

Under the Floorboards is an adaptation of Tell-Tale Heart by Edgar Allen Poe with a twist! We enter the narrator's mind as she seeks deliverance from 'the eye' that has dominated and abused its privilege for far too long. A murder has been committed. You know who did it. So do I. Let them tell you about it. This is a story told from the perspective of the narrator's inner world set in the modern world. We are able to hear the inner workings of the marginalized. A one act play suitable for stage or visual media – it deals with power, retribution, dominance and justice.

**Aubri Prestridge** (Mentor: Neena McLain)

*Role of a Stage Manager in a Performance*

Stage management is a crucial aspect of theater. It involves overseeing and coordinating all stage production aspects and ensuring everything runs smoothly and according to plan. Stage managers work closely with directors, producers, designers, and other production staff in pre-production to plan and organize rehearsals, schedules, and technical requirements. Stage managers create and maintain prompt books containing detailed notes about blocking, cues, and other important information. Prompt books are used throughout the show's process to help maintain the organization of the show. During the rehearsal process, stage managers help facilitate the director's vision by ensuring that actors are in the right place at the right time, managing props and set pieces, and recording any changes or notes made during the process. They also coordinate with technical teams to integrate lighting, sound, and other elements into rehearsals. Stage managers oversee technical rehearsals, the time when all technical elements (such as lighting, sound, and special effects) are integrated into the performances. They ensure that cues are executed correctly and that everyone is clear on responsibilities. During performances, stage managers call cues, ensure actors and crew members are ready, and deal with unexpected issues. They communicate with backstage crew members via headsets or other communication devices to keep the production running smoothly. After performances, stage managers may lead post-show discussions, provide feedback to the production team, and assist with strikes (the process of dismantling the set and cleaning up the performance space). Overall, stage management requires excellent organizational, communication, and problem-solving skills and the ability to remain calm under pressure. Stage managers ensure that productions and events are successful and enjoyable for performers and audiences.

**Joe Caton, Grant Pike, Mason Scott, Tashaja Gonzales, Wesley Horn** (Mentor: Neena McLain)

*PG*

A freshly deceased woman suffers the shock, horror, and incompetence of a hastily-ordered fate after breaking several movie theater taboos. Under the decree of three shadowy individuals, her past crimes are recalled and amends are attempted in this comedy about posthumous consequences, illicit sweets, and the mother of a Very Important Prophecy.

**Sean Schaefer, Abigail Brown, Babak Akavan, Alexis Sanchez** (Mentor: Neena McLain)

*The Bargain*

When you sell your soul, Dan is the demon who comes to collect. But things aren't as simple as that - especially if evil coworkers object to working overtime, people don't respect a cool trench coat, and worst of all, the doomed mortal has a cat.

**Nathaniel Griffin, Babak Akavan, Alexis Sanchez, Evelyn Van Houten** (Mentor: Neena McLain)

*The Chocolate Affair*

The Chocolate Affair by Stephanie Alison Walker Beverly checks herself into a seedy motel room to be alone with a plastic pumpkin filled with Halloween candy in this ten-minute comedy about body image, motherhood and one woman trying desperately to "have it all."

**Abigail Ewing, Gabriel Pyenta, Luis Rueda** (Mentor: Neena McLain)

*Accents Inc.*

A snotty dialect coach guides students through an unorthodox training session in accents. This bombastic teacher uses irregular teaching methods as memory techniques to retain information in this high-energy comedy.

**Luis Rueda, Wesley Horn, Mason Scott, Grant Pike** (Mentor: Neena McLain)

*All About Biffo*

(Comedy, a nod to "All About Eve," a young, brash clown threatens the alpha status of an older clown.)

**Zain Hargrove, Gabe Pyenta, Quinn Griffin, Rudy Flores, Mason Scott, Cassidy Cudd, Evelyn Van Houten, Babak Akavan, Trent Allen** (Mentor: Neena McLain)

*Tis not me she loves*

"Tis Not Me She Loves" by Steven Stack and directed by Zain Hargrove – The Feud between the Hatplains and the McCroys has been in a slump. Both families agree to reignite the feud by creating a forbidden love between Julia and Romero. However, they are not in love. It is a melodramatic comedy that's half Romeo and Juliet and half Hatfields and McCoys.

**Suellyn Hunter, Ayden McKinney, Cassidy Cudd, Lee Neighbours** (Mentor: Neena McLain)

### *Some Assembly Required*

A 10-minute play written by Ruben Carbajal. It's about a couple who are trying to build an IKEA desk. But even though there are instructions, IKEA audibles, and customer service at their disposal. One mistake could end in deadly disaster when their 'desk' turns into a killer robot.

### **Poster Presentation Abstracts**

**Garrison Shin** (Mentor: Tina Bertrand) [Not Present]

#### *Pakistan vs. India: A Comparative Analysis of Military Coups*

The divergent political trajectories of India and Pakistan, particularly in the domain of civil-military relations, offer a compelling study of how foundational post-independence decisions influence long-term national stability. This research analyzes why Pakistan has experienced multiple military coups while India has not. Employing a Most Similar Systems (MSS) design, this study scrutinizes the influence of civil-military relations and political institutional development on the incidence of military coups. India and Pakistan, nations carved from the same colonial legacy, embarked on distinct political paths since their independence in 1947. India established a democratic framework with civilian control over the military, fostering a political culture resilient to military intervention. In contrast, Pakistan's unstable political history, characterized by frequent leadership changes and delayed constitutional establishment, created conditions conducive to military coups. This analysis draws upon comparative historical analysis and content analysis of legal documents, military communiqués, and governmental records to trace the evolution of civil-military relations and political institutions in each country. Preliminary data suggest that India's emphasis on economic liberalization and political stability underpins its democratic resilience, while Pakistan's political instability and external pressures have facilitated recurrent military interventions. This study posits that robust, inclusive political institutions and strong civilian control over the military are crucial for democratic stability and are potential buffers against military coups. The findings underscore the significance of economic stability and external security environments in shaping civil-military dynamics, offering insights into the conditions that either prevent or precipitate military interventions. This comparative analysis not only deepens our understanding of South Asian political systems but also contributes to the broader discourse on civil-military relations and democratic resilience in post-colonial states.

**Zachary Rivera** (Mentor: Tina Bertrand) P1

#### *Argentina & Brazil: A Comparative Analysis of Educational Reform and Resulting Outcomes*

This paper explores the varying outcomes of educational reforms in Brazil and Argentina, analyzing how similar reforms have led to different educational outcomes in terms of quality and accessibility. By examining a range of socio-economic, political, and historical factors, this

study provides a comparative analysis of the two countries' approaches to educational reform and their respective successes and challenges. In Brazil, educational reforms have predominantly focused on expanding access, motivated by the goal to democratize education and address the needs of a rapidly growing population. However, these reforms have often been hampered by political instability and economic challenges, which have resulted in inconsistent implementation and persistent disparities in educational quality and accessibility. This inconsistency is evident through continued struggles with funding, quality of teacher training, and infrastructural deficiencies, leading to an educational system where access does not always equate to quality. Conversely, Argentina's educational reforms have shown a stronger emphasis on enhancing quality alongside increasing access. With a history of more stable governance in terms of educational policy, Argentina has made significant investments in teacher training and curriculum development. These efforts have generally translated into improved educational outcomes, marked by better academic achievements and infrastructure compared to Brazil. Yet, socio-economic disparities, especially in rural areas, remain a challenge, impacting the universal applicability of these improvements. The comparative study highlights the influence of external factors such as economic stability, policy continuity, and government investment in shaping the effectiveness of educational reforms. It underscores the complex interplay between these factors and educational outcomes, suggesting that the success of similar reforms in different settings depends significantly on tailored approaches that consider unique national contexts. This analysis draws upon various scholarly sources, including assessments of educational reforms in Latin America, which collectively suggest that while both countries face similar educational challenges, the outcomes of their reforms are distinctly shaped by their respective historical, socio-economic, and political contexts. This study contributes to the broader understanding of educational reform impacts and may guide future policy decisions in similarly diverse educational landscapes.

**Darian Neff** (Mentor: Tina Bertrand) P2

### *Comparative Analysis of Thailand and Viet Nam*

Thailand and Viet Nam, despite having vastly different histories, are remarkably similar in terms of their current regimes. To understand these regimes, an analysis of both regime type and stability will be conducted using a variety of quantitative data. Evaluating the historical development of these regimes involves analyzing literature on the presence of colonial legacies throughout their histories and geopolitical influences during the Cold War Era. The significance of this era is underscored by the concept of state-making through conflict theory and its intersection with colonialism, particularly evident in the Vietnam War. Additionally, it aims to discern how Western interventions during the Cold War Era, despite differing forms, contributed to the development of authoritarian regimes in both Thailand and Viet Nam. This analysis will utilize the research approach of the most different systems and apply concepts such as postcolonial authoritarianism, neocolonialism, historical institutionalism, and conflict theory.

**Neikol Cruz** (Mentor: Tina Bertrand) P3

*Comparativist View Between Guatemala and Costa Rica*

Why does genocide occur in some countries but not in others? When we are referring to Latin America the number one marginalized group is the indigenous population. The United Nations (UN) mentions that indigenous people participate in the Permanent Forum of Indigenous Issues (PF) based on colonization, decolonization, victim, actor, traditional, modern, global, and local issues. Around 44% of Guatemala's population is indigenous. Costa Rica has a much smaller indigenous population of 2.4%. It is notable that there are differences between these correlations. It is also important to note that Guatemala had Marxist affiliations after World War II which happened to get the United States involved with their politics. The communist party was favored by the large indigenous population, but had been abolished by the United States which had turned Guatemala into a strict military dictatorship following the 1954 CIA invasion. This allowed for the mass amount of killings from 1970 to 1995 to be conducted (Guatemala Timeline, 2019).. In comparison to Costa Rica, it was not largely involved with communist affiliations. Therefore, the United States did not take the steps to prevent communist rule in Costa Rica. In identifying the major causes of genocide, it can be analyzed that external influence as well as the allowed military dictatorship can cause a country to unsuccessfully develop.

**Caitlin Baker** (Mentor: Tina Bertrand) P4

*Women's Rights in Saudi Arabia and Türkiye*

Much has been written about the struggles of female empowerment and gender equality. Employing a comparative analysis approach, this research investigates the influence of legal structures and Islamic interpretations on women's rights in Saudi Arabia and Turkey, two countries with predominantly Sunni Muslim populations. Saudi Arabia's adherence to conservative interpretations of Sharia law and its social and governmental adherence to conservative Islam have contributed to entrenched gender disparities and limited progress in advancing women's rights. In contrast, Turkey's historical commitment to European legal interpretations supported by social and governmental secularism has facilitated greater gender equality, although challenges are reemerging due to the resurgence of conservative ideologies. Through a comprehensive examination of these factors, the paper sheds light on the complex interplay between religion, law, and societal norms in shaping women's rights, providing valuable insights into the dynamics of gender inequality in Islamic societies.

**James Behrens** (Mentor: Tina Bertrand) P5

*China vs. Japan: The Post WW2 Transformations of China and Japan under U.S. Influence.*

The post-World War Two era saw a significant transformation in the countries of China and Japan. These changes that the two countries underwent were heavily influenced by the United States of America. This research seeks to explore some of the main reasons as to why these countries, both having outside influence from the United States, took completely different paths following the Second World War. By using the Most Similar Systems design, this study looks at all the contributing factors such as government, history prior to post-World War Two, and several other factors. Following the Second World War, both Japan and China were completely changed from that they were before the end of the war. One of the first differences between the two countries was how they were influenced by the United States. Japan was occupied by the US, which gave them complete control in rewriting laws and rebuilding the war-torn country. China on the other hand, was not physically occupied, but the US still tried to incorporate themselves into the government. The issue was that China had two separate parties fighting for political power, and the Chinese Communist Party took control. This completely erased the possibility that the United States could influence them any longer. During occupation of Japan, the United States was able to rebuild Japan into a powerful democracy and helped it become the successful nation that it is today. China, however, became controlled by a communist party and turned into a global superpower as well.

**Lydianna Biggs** (Mentor: Tina Bertrand) P6

#### *Ecotourism in Kenya, and Tanzania*

Majority of the literature provides substantial evidence as to why ecotourism is not improving the quality of life for the majority of citizens in Kenya, nor Tanzania, despite Kenya having a larger scale of tourism. Ecotourism has been popular for a while, but it really started to grow in popularity in the late 20<sup>th</sup> century. Ecotourism became something Kenya, and Tanzania are wanting to utilize as a tool to grow as a country, and hopefully foster more sustainable development within Kenya, and Tanzania. Both Kenya, and Tanzania have developed different laws, and rules to help conserve and regulate a responsible ecotourism. In Kenya they have a well-established reputation for ecotourism. They have done so by having excellent marketing. Kenya promotes their ecotourism more than Tanzania, and they pursue opportunities to entice travelers to come visit Kenya. Tanzania has steadily been trying to improve their marketing, and to establish tourism within the country more. Both, Kenya, and Tanzania are, and have been structuring tourism activities that stay within the guidelines of being a part of the responsible ecotourism industry. Kenya, and Tanzania like many countries in Africa struggle with waste, water usage, hosting tourists, and overall facilitating the ecotourism within their countries. Both, Kenya, and Tanzania are struggling to distribute the benefits of ecotourism across all populations, and demographics. I conclude that Kenya, and Tanzania will continue to struggle with disturbing the ecotourism industry income, and benefits throughout their country because they lack the ability to facilitate distribution among the citizens, tribes, and communities.

**Noah Biggs** (Mentor: Tina Bertrand) P7

### *The Christian Democratic Parties of Germany and Italy*

Much of the literature on the Christian Democratic parties of Italy and Germany attributes the differing focuses of the parties to several factors. These include authoritarianism in both countries, suppression of churches, both country's participation in WWII, and religion. Both parties emerged directly after WWII with the similar goal of stabilizing their country in the aftermath of the war although they both would go about their goal quite differently. Both parties had Catholic influences but the Italian party was directly related to the Catholic church and backed by the Vatican. The German party, on the other hand, was a mix of Protestants and Catholics. The Italian Party was an instrument of the Vatican to keep Catholics in power and keep communism at bay, while the German party focused on promoting federalism and having a strong relationship with the West. Churches were suppressed in Germany during WWII so when it ended there was a wide resurgence of churches and this helped boost the Christian Democratic Party of Germany. However, there was no suppression of churches in Italy under Mussolini because the Catholic church retained quite a bit of power under his rule. In this paper, I examine the roles religion, authoritarianism, and WWII played in influencing and cementing the differing views held by the Italian and German Christian Democratic parties.

**Alexander Lasserre** (Mentor: Tina Bertrand) P8

### *Belarus and Ukraine How did the fall of the USSR affect their economies.*

After the fall of the United Soviet Socialist Republic (USSR) in 1991 many of the different states when though economic changes I will be looking at 2 of these counties Belarus and Ukraine between the years of 1991 and 2014 and using the Most Different Systems (MDS) as the research design model which will lead to the following questions. How did the economies of Belarus and Ukraine recover after the collapse of the USSR? Did the collapse of the USSR curve poverty. What were the food supplies like for each of them and were they self-sustaining? Did they make any market reform and if so, it how severe and in what ways? And, how was there relationship with Russia after the collapse was it good or bad and way.

**Victor Leos** (Mentor: Tina Bertrand) P9

### *Exploring the Economic Trajectories Between Iran and Iraq*

This paper aims to analyze the economic trajectories and development of Iraq and Iran, and it will focus on their dependency on oil and the impacts of geopolitical and economic pressures. Both nations have heavily relied on oil, which has significantly shaped their economic landscapes. Since the 1970s oil boom, Iraq has faced economic challenges, including heavy reliance on oil exports, leading to an enclave economy with low employment and insufficient non-oil revenue sources. When we turn to Iran, which peaked economically in 1976, it has also



faced challenges from global market shifts, political upheaval, and sanctions, impacting its oil revenue and overall economy. The study utilizes a Mixed-Strategy Study (MSS) approach, combining quantitative and qualitative data to examine how oil dependency, geopolitical tensions, internal conflicts, and international sanctions have influenced Iraq and Iran's economic development. The findings highlight Iraq's vulnerability to oil market fluctuations and Iran's efforts toward economic diversification despite facing geopolitical tensions and sanctions.

**Kendrick Hoster** (Mentor: Tina Bertrand) P10

### *Colombia and Venezuela*

Colombia and Venezuela are two very similar countries but are also very different. Venezuela is struggling with the economy, political corruption, and poor management of their energy sector. These problems are holding Venezuela back from developing into a stronger nation. Colombia on the other hand is handling the problems that are holding Venezuela back, very well. They have developed their energy sectors by producing higher numbers of natural gas and oil than Venezuela even though they have far less deposits. Colombia has even solved the problem of political opposition from within its countries by signing peace deals with the FARC group and making strides to end that conflict peacefully. It is no surprise as to why Venezuela is so low on the fragile state index since they have poor governance and are not utilizing the vast oil deposits that are at their disposal. In this paper, I examine how two very similar countries have different forms of development. I will go into depth about what has caused the decline of Venezuela and the rise of Colombia.

**Brooke Boyer, Abigail Barzyk, Lorin Mow, Morgan Mehaffey** (Mentor: Bradley Blackwell) P11

### *How Infidelity of Female and Male Birds Influences Fitness*

The fitness of birds and how they interact via mating was simulated by students, half being male and half being female. The males each possessed 20 beads, which acted as their "gametes" and a female chose a random male to mate with each turn. When a male had given out their 20 beads, the mating ended. The number and color of beads that each female had were counted and the sum and fitness were calculated. This process was repeated 3 times, each time changing slightly. The first trial had no specific pattern or rules. In the second trial, the females became more focused on obtaining the most beads possible but still did not have a specific pattern for choosing a mate. The final and third trial is when cheating was introduced. Females had to turn, back to the males each go around. If the female with the specific-colored bead of a male caught the males giving their bead to another female, they were able to call to them. This resulted in the bead being taken out completely. The results from the final trial proved the hypothesis that infidelity reduces the fitness of the male and female birds.

**Robert Albin, Bryana Corral, John Michael Angeles, Ken Hancock** (Mentor: Bradley Blackwell)  
P12

*Fitness Among Birds*

For this year's research project, we conducted an experiment to show the fitness of the mate's choice over the female. Throughout the trials, the bird's fitness was determined by the likelihood of reproduction via the number of "eggs" each female bird would produce per trial. The overall purpose of this experiment was to measure the fitness of female and male birds. The hypothesis put forth was the idea that infidelity would lead to a decrease in fitness through the "cheater" rule implemented in the third trial. The males would start at the feeding grounds after determining their nest. The females would approach and choose the male they wished to mate with. After the egg was created the female would enter a simulated incubation period of 1 minute before returning to the feeding grounds. There were 3 trials, the first being an introductory one where the simulation's general rules were identified. The second trial consisted of strategizing for the most efficient mating cycles. The third trial introduced a new rule regarding infidelity. This was called the "cheater rule". In completion of the experiment the fitness of each male and female would be calculated based on the most to least successful in mating.

**Chloe Valenzuela, Dianney Ortiz, Emilee Dominguez, Marleen Vega Guerrero** (Mentor: Bradley Blackwell) P13

*The Reproductive Relationship Between Birds*

In this experiment, it involves the findings of males and females interacting in a specific way to simulate a reproductive scenario. Within the experiment nesting grounds were constructed with male birds being chosen by female partners due to attractive characteristics such as the distance from the feeding grounds, whether the male was remaining monogamous, or based off just chance in being able to successfully reproduce.

**Tioluwalope Abdul, Khi Bruce, Ashley Smith, Anthony Oglesbee** (Mentor: Bradley Blackwell)  
P14

*Bird Reproduction and Fitness*

Fitness is a relative value comparing the reproductive output of the most successful individual to the other individuals in a group. To measure fitness and sexual selection among birds, we ran an experiment with three (3) different trials; we changed some activities in each. The class was divided into equal halves, with the first half males and the second half females. In this experiment, the males had to compete for their nest and attract females with various behaviors to mate with them. Our hypothesis was that females would most likely choose their mate based

on the distance of the male's nest from the mating ground. Because the nature of the experiment was for each female to select a male from the nesting ground and receive a bead, "an egg," when both birds get to the male's nest, most females chose the males very close to the nesting ground because of distance. This experiment went on until the male ran out of the twenty (20) beads, "eggs", allocated to them initially. In the last two trials new rules to the mating process were added. In the second trial the males now know that the males with the closest nest to the mating ground will be most successful to take one female bird eggs completely. So, the male birds that were nested closer to the mating grounds received more of the female eggs than the male birds farther from the mating grounds. Once the third trial began a new rule was added; stating that other males could steal and mate with more than one female, but they could not get caught or the egg trying to be stolen would be eradicated from the trial. So, in the end the results of the last trial concluded in the male bird that remained loyal mated all eggs - producing more of their offspring, than the male birds who cheated with other birds.

**Melinda Siebert, Reese Stephens, Davidpaul Salazar, Dude West, Jordan Katende** (Mentor: Bradley Blackwell) P15

### *Reproduction and Fitness in Birds*

In Biol. 1107, we experimented to determine the effect of selective mating between female and male birds. Our hypothesis we constructed was that the closer the male was to his nest to the mating ground, the more often he would be selected. During the trials, the female would walk around the courtyard, pretending to search for a mate. The male would try to attract the female with the rattling of beads. Those who got picked would take the female back to their nest and give them a bead. After the female received a bead, they would walk over to the other side of the mating ground and wait 30 seconds, then be allowed to be released again. Once one male ran out of beads, the trial was stopped. We conducted this 3 separate times. The first trial was more of a practice trial, the results went haywire, and in the end, multiple people emptied their bead holders. In the second round, the females created a stronger strategy of choosing the male closest to the nest. Few males emptied their bead holders. During the final trial, we added the infidelity rule where you cannot cheat, and if you do, you lose your bead. Females and males still were being cheated, but our director informed us that we couldn't watch the males while waiting to be released. In conclusion, depending where the nest was, the determining factor of the infidelity and competition, and the loyalty of the female birds, each trial ended differently; but our hypothesis was correct.

**Robert Albin** (Mentor: Bradley Blackwell) P16

### *Evaluating Crayfish as a Bio-indicator of Mercury Contamination*

This project examined mercury bioaccumulation in crayfish and evaluated using crayfish as bioindicators of environmental mercury contamination. Crayfish were trapped and collected from Cedar Creek at Kirby Park in Abilene. Crayfish were measured before the tail muscle was extracted and analyzed for mercury. Data were examined to establish a relationship between crayfish size and mercury concentrations with the hypothesis that the larger crayfish will have greater concentrations of mercury. By examining the relationship of crayfish size to mercury concentration, future studies can use crayfish to assess mercury contamination in aquatic ecosystems.

**Jacob Wooten** (Mentor: Terrence Boyle) P17

*Arachnid diversity at Firebase Libby*

The purpose of this study is to acquire an identification of the diversity of arachnids at Firebase Libby. Pit-fall traps, flip traps, and opportunistic catches were used at different times of the day in order to find and collect specimens for identification. Literature searches indicate there are an estimated 70 different species of arachnid present. So far only 9 species have been identified from Firebase Libby. This study will continue as more collections are needed.

**Samantha Hamilton** (Mentor: Terrence Boyle) P18

*Exploring the Impact of Salinity Levels on Food Consumption in the invasive crab species, *Rhithropanopeus harrisi**

The invasive crab species *Rhithropanopeus harrisi* has been found in various locations with diverse temperatures and salinities. Given the species' invasiveness, understanding how different habitats and their characteristics affect the food consumption of *R. harrisi* is critical. This research aims to investigate the possible relationship between habitat salinity and food consumption. Approximately 100 crabs will be collected from Hubbard Creek Lake and transported to our laboratory, where they will be distributed into six tanks: three containing only male specimens, three containing only female specimens, with one tank allocated for each sex used as a control. After each of the twelve salinity adjustments consisting of six different salinity acclimation and feeding periods, the crabs will be weighed collectively and compared to their initial and previous weights. I hypothesize that as salinity increases, there will be a decrease in food consumption.

**Caleb Dale** (Mentor: Joel Brant) P19

*Small Mammal Populations at Firebase Libby*

Understanding biodiversity in a region is an important aspect of ecological studies. Firebase Libby is a property owned by McMurry University where we have the ability to sample the local fauna to answer ecological questions. Since 2019 we have been sampling rodents at Firebase Libby using two 160-trap arrays sampled two nights each month for a total of 7680 trap nights per year. Results have shown *Peromyscus attwateri* to be most abundant within the forest, with *Peromyscus leucopus* following behind. The grassland biome showed a denser population of *Reithrodontomys montanus*, with *Reithrodontomys fulvencens* having a less dense, but still present population. This season we have an outlier, as in just a handful of weeks we have caught and released three specimens of *Chaetodipus hispidus* which in the past have been a much rarer occurrence.

**Sunshyne Gwinn** (Mentor: Joel Brant) P20

*Herptile Survey of Firebase Libby in Callahan County, Texas*

Herptiles, comprising reptiles and amphibians, play integral roles in ecosystem dynamics. Utilizing a combination of visual encounter surveys and trapping methods, we assessed species richness, abundance, and habitat preferences of herptiles in 2023. Our results revealed a diverse herptile community consisting of 12 species across the population of Firebase Libby in Callahan County, TX. Commonly encountered species included *Acris blanchardi* and *Sceloporus consobrinus*, while less frequently observed species included *Scincella lateralis*. Future research should focus on long-term monitoring to assess population trends and responses to environmental changes, thereby aiding in understanding the property's ecological makeup.

**Glenda Parra** (Mentor: Joel Brant) P21

*Using Fluorescence Tracking to Determine the Preferred Micro-Habitat to Rodents*

The study took place in three different areas of the Southern Rolling Plains of Texas. Using the method of fluorescent pigment tracking allows us to observe how the individual travels within its micro-habitat. Knowing the habitat selection of a rodent species is a crucial component of understanding the ecology of the area. Our results concluded that a total of 26 individually captured and tracked rodents, with a diversity of 8 different species. It was strongly inferred that *Peromyscus maniculatus* preferred dense cactus vegetation, while the rest of the species tended to prefer grassy vegetation.

**Julia McClung** (Mentor: Ryan Dalton) P22

*The effects of core strength training on lower body velocity compared to traditional lower body velocity exercise.*

For many years core strength benefited people's physical health, and fitness. Studies have shown that core strength and stiffness has a positive correlation with dynamic postural control, coordination, and balance. This is seen specifically in sports like gymnastics. Studies have also found a strong relationship between core strength and upper body velocity that can be seen in sports like baseball, and softball. The purpose of this study is to determine if core strength will affect lower body velocity compared to traditional lower body velocity exercises. A significant gap exists in the research regarding exercises that will increase lower body power and force production. There is also a shortage of research to explain the best ways to implement core training to maximize athletic performance. This study will attempt to determine if core strength will positively impact lower body velocity. **METHODS:** In order to compare core strength training to traditional lower body velocity exercise, the research team will recruit approximately 20 participants between the ages of 18 and 40 who are apparently healthy to perform 3 repetitions of a vertical jump, squat jump, back squat jump, and a power step up. A PUSH velocity tracker and a muscle contact grid will be used to measure the movements velocity, power and height. Once all the data is gathered the team will be randomly assigned to either group 1 or group 2. Group 1 will perform the core strength training exercises and group 2 will perform the traditional lower body velocity exercise. The groups will perform their respective 15 minute exercise routines 4 times a week, for 4 weeks before returning for the last testing session. In the last testing session the groups will perform the same exercise and measure them with the same instruments. The results will be analyzed to compare differences between vertical jump height, velocity and power for the four different movements.

**Emma Nance** (Mentor: Ryan Dalton) P23

*Does Calisthenic Exercise Increase Math and Memory Performance and Decreased Reaction Time in Young People?*

Exercise has often been associated with increased cognitive functioning and decreased reaction times. Primarily, it has been aerobic and strength training exercises that have been studied for cognitive functioning and reaction times. The effects of calisthenics on cognitive functioning and reaction time is rarely studied, but the studies that have been conducted were on the elderly population. The purpose of this study is to determine if there is an effect on cognitive function and reaction time in young people who complete calisthenic exercises. **Methods:** Each participant will complete a rest trial, exercise trial, and maximal testing session. The rest trial and exercise trial will be randomly assigned as to which will be first and which will be second. The exercise trial contain a warm-up and a calisthenic exercise, while the rest trial will be complete rest. Before both trials, we will measure height, weight, blood pressure, heart rate, O2 saturation and conduct pre-trial testing. After both trials, we will measure blood pressure, heart rate, O2 saturation and conduct post-trial testing. The testing will include a math test, memory test, and reaction time test. The trials will be conducted on different days so that there will not be any overlap from the reaction of the other trial. We will compare the pre-testing and post-testing scores for both the exercise trial and the rest trial. The math and memory tests will be scored based on the time it takes to complete the test, along with how many mistakes were made while completing the test. After both trials have been conducted, maximal testing of

pushups, squats, and a plank will be conducted in order to determine the fitness level of the individuals. We will use the fitness levels to determine if there is a difference in the testing due to the calisthenic workout. After all tests have been completed, the data will be analyzed using an ANOVA with repeated measures.

**William Edwards** (Mentor: Ryan Dalton) P24

*The effects of unilateral training vs. combining unilateral and bilateral training on athletic performance and power output by measuring vertical jump and repeated sprint tests.*

Previous research indicates that unilateral training demonstrates superiority over bilateral training specifically in terms of single-leg movements and running performance. There are only a few studies conducted that measured unilateral training and hybrid training. The results of that study concluded that hybrid training was better or equal to unilateral training in most parameters such as sprinting and jumping. By comparing these different training modalities, I aim to find the optimal training method for enhancing athletic performance. My intention in this study is to see if these findings are consistent, and I aim to see if bilateral deficit or facilitation has any effect on either training method since no current study has measured these parameters beforehand. The methods include measuring baseline and post-intervention for vertical jump and sprint performances for both groups. This study is a randomized control trial so participants will be randomly assigned to groups. There will be around 10 participants in the 18-40 years of age. I will measure if the participants are bilaterally deficient or facilitated by measuring their one rep max on leg extensions. They will perform their one rep max on leg extensions bilaterally and then unilaterally. The standardized tests such as the squat jump will be employed to measure vertical jump and a 40-yard sprint to measure sprinting. Participants have two attempts at running 40 yards and two attempts for vertical jump. Vertical jump measurements will be conducted on an RSI grid. The unilateral training group will undergo a structured training program focusing on unilateral exercises such as single-leg exercises. The experimental group will engage in both unilateral and bilateral exercises. The participants will undergo these exercises three times a week for two weeks.

**Morgan Mehaffey, Lorin Mow** (Mentor: Ryan Dalton) P25

*Athletic Movements and Their Correlation with Agility Performance*

Athletic ability is measured in many different movements, and athletes who compete in different sports are more experienced with the movements that they use within their sport. Agility is a skill that is needed in many sports and will help an athlete improve their overall athletic ability. When observing data collected from athletic movements, strength, speed, and power movements correlate with overall agility. The purpose of this study is to examine the performance tests that were run for strength, speed, and power, and compare them to agility tests that were run to see which test correlates the most. We hypothesize that speed will have

the most correlation with agility, followed by power and then strength. Methods: Using a randomized cross-over design, 8 healthy men and women (4 men and 4 women) were tested over many days. One-rep-max was found for squat and deadlift to be used as the strength tests, a 60-meter and 100-meter sprint test was used as the speed test, and a vertical jump test using a Vertec jump trainer and Contact Grid were used for the power test. The tests that had many different trials/attempts, the best attempt was used for each person. A correlation test was run between each of the tests back to two agility tests (CODAT test and 5-10-5).

**William Edwards, Trey Castillo** (Mentor: Ryan Dalton) P26

*The Influence of Strength on Power and Speed for Athletic Performance*

The purpose of this study is to determine how physical strength can influence other parameters in athletic performance, such as power and speed. Previous studies have shown the correlation that strength is a key factor in producing more power output and increasing speed. For example, many studies have shown that stronger athletes are faster sprinters and have a higher power output. Research also shows that faster sprinters need strength for speed. The more strength a person has, the higher the power output, which enables them to run faster. Methods: For this research project, we had four males and four females put through a combination of strength, speed, and power tests. They were tested on their one rep max for barbell back squat and conventional deadlift. We measured each participant's length at the hip so everyone would squat the same amount of distance. For measuring speed, they were timed on 60 and 100-meter sprints. Every 20 yards their time was measured to see any changes in acceleration or velocity during the sprints. Each participant ran 60-meter and 100-meter sprints twice. The standardized tests we used to measure power consisted of a countermovement jump and a drop jump. The countermovement jump was performed by each participant performing a brief countermovement by flexing the knees and hips and then jumping as high as possible. The drop jump was performed by each participant stepping off a platform of a predetermined height and immediately jumping once they landed. As a class, we used an RSI contact grid to measure vertical jump. Each participant had three trials for the counter movement and drop jumps.

**Chloe McLellan, McKenna Standifer** (Mentor: Ryan Dalton) P27

*Body Composition Effects on Power Output in Vertical Jump and Short-Distance Sprints*

There is evidence that power output is strong in jumping and short-distance sprints. Power, which requires both velocity and force, is necessary for peak performance in sports. Body composition, the percentage of bone, fat, and muscle in your body, can affect daily life. Multiple studies have documented that power is a key factor in a higher vertical jump. Other studies have shown that power is important in faster short-distance sprint times. This study consists of a body composition test, multiple trials of a 60-meter short-distance sprint, and



multiple trials of a vertical jump test. This study aims to measure how body composition affects power output in a vertical jump and a 60-meter sprint. It is known that body composition can affect how high one may get in a vertical jump or how fast one can be in a short-distance sprint, for our purpose, we want to examine how body composition affects the power output when participating in a vertical jump or short-distance sprint.

Methods: In this study, 8 apparently healthy participants (4 men, and 4 women, ranging from 19-40) had the circumference of their ankles, wrists, neck, waist, and hip taken. Then, the same 8 participants completed a 60-meter sprint where the times were recorded every 20 meters. After every participant had completed the test, another trial was done. Then, a vertical jump test was completed, and the jump at the highest point was recorded. After each participant had gone, two more trials were completed. Data was analyzed by a One-Way ANOVA.

**Caleb Kwiatkowski, Christopher Baker** (Mentor: Ryan Dalton) P28

*Does the FMS test/show athleticism and improve power output/correlate to acceleration?*

Functional movement screens are used by examiners from various backgrounds such as athletics and Clinical uses. The use of FMS is a way to determine the risk of injuries in patients and allows the practitioners to determine what exercises to use. The FMS includes seven tests such as Overhead squat, Inline lunge, Hurdle step, shoulder mobility, straight leg raise, push up and rotary. All these tests are scored from 0- 3 with the highest score being a 21. In our research we only decided to use four tests out of the seven and the test where OH squat, Inline lunge, Rotary, and Hurdle step. The reason why those four were selected was because the majority of athletes have some type of movement similar to those four tests. In the end the purpose of this study is to correlate if the four-test selected from the FMS can also test athleticism in athletes like an agility test and the vertical jump test. Methods: Within our class pool, 8 healthy students (4 males, 4 females; Ages 19-23, and 40) performed a functional movement screen (FMS), CODAT, 5.10.5, SEMO, and T-test along with several power output tests such as counter-movement jumps (CMJ), vertical, and drop jump, after the completion of a dynamic warm up before the agility test. The functional Movement Screen Test Kit was used to perform and record the FMS, including measuring device, hurdle and stick, and cones were set at specific measurements using measuring tape for each agility test. The overhead squat, inline lunge, rotary, and hurdle step were the selected screens used to see if there is a correlation in these tests. Times were tracked and recorded during each agility test, and the FMS was screened and scored by members of the class and power output was tracked and recorded during our CMJs. Each student performed each agility test twice, with rest times being as other students performed their trial. Males' vs females will be compared for the FMS, and for each agility or CMJ test as it relates to the FMS.

**Danielle Armstrong, Chase Burke, Aiyana Collins, Braydon Durst, Jorge Garcia, Khoen Gregory, Mateo Herrera, Abigail Huffhines, Michael Ramis, Kalce Richardson, Eric Rios, Albany**

**Rodriguez, Hailey Soto, Abigayle Stubby-Kern, Isabella thames, Lainey Townsley, Alondra Vargas, Kaylee Worth** (Mentor: Matt Draud) P29

*'Rules of Monogamy'* influence reproductive success in a lek simulation.

This study investigates the effects of mating system rules on reproductive success in a simulated lekking system of birds. Lekking is a social structure where males congregate to compete for female attention, leading to a skewed mating success with few males dominating the majority of matings. Females, on the other hand, have a more even distribution of mating opportunities. The study simulates a polygynous system, where males compete for nest sites at varying distances from the lek, influencing female choice based on the proximity of the nest to the lek, which allows for quicker egg deposition and return to the lek. Two hypotheses were tested: (1) variability in reproductive success would be less among females than males in polygynous simulations, but more similar under monogamy rules; (2) males with nests closer to the lek would accumulate more eggs than those with distant nests in polygynous simulations, with this effect diminishing under monogamy rules. Three simulations were conducted. The first two simulations, under polygyny, showed significant variation in male reproductive success and a preference for males with nests closer to the lek. The third simulation introduced a penalty for "cheating" (switching mates), simulating monogamy. Results indicated no significant difference in reproductive success variability between males and females, and nest site distance was not a determinant of female mate choice under monogamy. The study concludes that the introduction of monogamy rules can alter female mate selection criteria and reduce the reproductive success disparity between males. It also suggests that monogamy rules can diminish the advantage of having a nest close to the lek, leading to a more even reproductive success distribution among males.

**Kiya Oleru, James Bell, Jade Dickens, Sarah Fry, Madilyn Guess, Kayla Hicks, Jadyn Martin, Breonna McCarthy-Reese, Jessica Shaffer, Beth Welshimer** (Mentor: Yelena Kosheleva) P30

*Cognitive and Emotional Functioning as a function of Sleep*

Participants recorded their amount of sleep and activities that they were doing before going to bed over the course of about six and a half weeks. They were instructed to record data no more than two times a week and to be as accurate as possible. Subjects were also instructed to report how the amount of sleep, put into two categories; not enough sleep and enough sleep, affected the subjects attention span, mood, difficulty concentrating, and if they found themselves falling asleep during this time. The correlation between each of the subjects were highly similar in just about every recollection. The quantity and the quality of sleep was a high correlation that affected how the next day on these categories was altered.

**Jennika Willis, Travis Alonge, Angel Alonso, Gabriel Aragon, Destinee Daniels, Joshua Dyer, Kathleen Hale, Richard Hernandez, Leo Hernandezgarza, Caleb Kwiatkowski,**

**Jordan McDaniel, Roman Perez, McKenna Standifer, Hunter Thompson, Adam Trevino, Kole Verdadero, Grayson Winter** (Mentor: Janet McMurray) P31

*A Comparison of Diaphragmatic Breathing and Rolling Patterns on FMS Scores*

Functional movement is the ability to produce and maintain an adequate balance of mobility and stability along the kinetic chain while integrating fundamental movement patterns with accuracy and efficiency. Diaphragmatic breathing assists with posture and spinal stabilization, allowing for controlling dysfunctional movements caused by abnormal breathing habits. Rolling is a movement pattern which combines the use of the upper extremities, core, and lower extremities in a coordinated manner. Rolling is a basic demonstration of motor control and segmental sequencing. Rolling may be utilized to assess bilateral symmetry while affecting dysfunction of the upper quarter, core, and lower quarter. Functional Movement Screening (FMS) is a valuable tool for assessing movement patterns and identifying potential asymmetries or limitations in functional movement. Theoretically, rolling will improve the participants mobility and stability thereby improving FMS scores. Incorporating diaphragmatic breathing and rolling patterns to improve functional movement has gained attention for their potential to enhance movement quality and stability. This study aims to evaluate the effects of diaphragmatic breathing and rolling patterns on FMS scores, shedding light on their efficacy in optimizing movement performance. Methods: The FMS includes the overhead squat, hurdle step, in-line lunge, shoulder mobility reach, active straight leg raise, trunk stability pushup, and rotary stability patterns. Each student was screened and scored for the listed seven movement patterns. The second FMS screen was performed following diaphragmatic breathing for two minutes. The third FMS screen will take place after rolling patterns are completed. One group will perform a supine-to-prone movement (start face up), and another will perform a prone-to-supine movement (start face down). Each of the two groups will perform five reps on the left and right side of the upper extremity-focused rolling patterns and five reps on the left and right side of lower extremity-focused rolling patterns. Participants will choose the left or right and complete upper and lower extremity rolling. After the participants complete the upper extremity rolls, they will complete the lower extremity rolls. The FMS scores will be used to accurately assess the rolling patterns' effectiveness. The scores from the first (controlled) FMS were compared to the second (diaphragmatic breathing) and third (rolling patterns) FMS scores.

**Yordanos Ayelework** (Mentor: Aravind Mohan) P53

*Health Informatics Platform to Understand the Impact of Insulin to Control Diabetes Using an Object-Oriented Approach*

Insulin Dependent Diabetes Mellitus (IDDM), commonly known as Type 1 Diabetes, is a chronic and critical condition that occurs when the pancreas produces little to no insulin, resulting in elevated blood glucose levels (hyperglycemia), which can in turn cause blindness, kidney failure, heart disease, and even death. Consequently, the treatment of IDDM is mainly concerned with administering insulin to lower the blood glucose level to as close as possible to normal. The goal of this research is to identify the level of impact that the administration of different types of insulin and the dosage units has on blood glucose levels and how it can help manage diabetes. This research extracts real-world Multivariate, Time-Series Diabetes patients' dataset from the publicly available UC Irvine Machine Learning Repository. We implemented our data model and algorithm using Java programming language in an object-oriented approach and grouped the blood glucose levels into different impact groups such as low, normal, and high, assuming typical meal ingestion and exercise levels. The preliminary experiments conducted using our tool is helpful to understand the impact of insulin types and dosage units to control diabetes.

**Shannon Baldwin** (Mentor: Aravind Mohan) P54

#### *Finding User Sentiments Using Youtube Comments*

In the big data era, social media platforms like YouTube have emerged as massive repositories of information and opinions, reflecting the diverse voices and perspectives of users worldwide. Amidst this wealth of data, understanding user sentiment becomes paramount for organizations and individuals alike, serving as a compass for navigating the digital landscape and informing strategic decision making processes. By discerning the prevailing sentiments expressed within the vast array of social media content, stakeholders can refine content strategies, tailor marketing approaches, and anticipate trends with greater accuracy. Addressing the challenge of extracting valuable insights from public opinions shared through social media platforms presents a multifaceted research endeavor. At the forefront of this inquiry lies the critical question of how to effectively harness the power of social media data to gain actionable insights. One promising avenue for exploration involves connecting topics to YouTube videos and conducting sentiment analysis on the accompanying comments. By categorizing sentiments as positive and negative, researchers can capture the prevailing public opinion on distinct topics and themes discussed in YouTube videos, providing a better understanding of audience perceptions and preferences. This entails extracting specific comments on topics of interest, ensuring a targeted and focused analysis. Using advanced natural language processing (NLP) techniques implemented in the Java programming language. By advancing our understanding of user sentiment on social media platforms like YouTube, this research aims to empower individuals and organizations with actionable insights for informed decision-making and strategic planning. We can unlock the full potential of social media data as a valuable resource for understanding human behavior, societal trends, and consumer preferences in the digital age.

**Logan Schneider** (Mentor: Aravind Mohan) P55

## *A Scheduling Platform for Computing Big Data in the Cloud*

The era of big data has started. Over the past decade, the digital revolution has resulted in three major challenges that define big data. The large volume, variety of types, and velocity of data generation make an arbitrary dataset be classified as big data. On the other side, computing big data is presented with the grand challenge of transforming billions of bits and bytes into insights in a timeeffective manner. One solution to this problem is to represent computation as a directed acyclic graph called workflow and use the cloud for allocating tasks in the graph to a computational resource that is more suited to the task. This solution allows the effective use of computational resources through scheduling and provides a framework for data to be processed more quickly. In this research, a popular scheduling algorithm known as Heterogenous Earliest-Finish-Time (HEFT) algorithm was implemented to solve the issue of computing big data in a usable and scalable manner using the Java programming language in an object-oriented approach. An important part of this algorithm is to rank the tasks in the workflow based on their computational and data transfer time. The HEFT algorithm prioritizes the task with the highest upward rank value at each computational step and applies a series of rules to identify the best processor for the task based on their computational and transfer time. The preliminary experiments conducted in this research are instrumental in understanding existing research and thinking of new ways to solve the important problem of computing big data effectively in the future.

**Nathaniel Pyenta, Jessica Gribble, Ofeh-oseh Uzumefume** (Mentor: Paul Pyenta) P32

*Extraction and evaluation of gaillardin as an HDAC inhibitor in A375 and MDA-MB-231 cancer cell lines.*

Histone deacetylase (HDAC) inhibitors are widely used in cancer treatment; they target HDAC proteins, which are over-expressed in cancer cells. Gaillardin, a compound extracted from the flower *Gaillardia pulchella*, has been observed to be a naturally occurring HDAC inhibitor. In this project, we wish to identify which part(s) of the plant express gaillardin and demonstrate efficient methods to best isolate gaillardin. Once isolated and characterized, the efficiency of gaillardin as an anti-cancer agent will be measured as an EC50 value and compared to that of suberoylanilide hydroxamic acid (SAHA), a known and FDA-approved HDAC inhibitor. We collected *Gaillardia pulchella*, which grows well in west Texas, dried the samples, and separated the different parts of the plants. Compounds were extracted from each group and introduced to cultures of growing cancer cells; cell lines used include MDA-MB231 and A-375, which are breast and skin cancers, respectively. Cell viability after incubation was tested with water-soluble tetrazolium salt (WST1) assays. Crude extracts of compounds that exhibited induced cell apoptosis were further separated using column chromatography to further isolate gaillardin in preparation for characterization and additional testing with cancer cells. Initial results show production of gaillardin within the leaf, flower heads with petals, and flower heads with fruit. Thin layer chromatography indicated that gaillardin is more highly polar than initially predicted

in comparison to other compounds present in the extracts. Further testing is needed to determine best methods of separation. Future work will characterize the purified compound and measure EC50 values in various cancer cell lines.

**Matthew Pyle** (Mentor: Timothy Renfro) P33

#### *Weather Detector Device*

A unique design has been proposed and a prototype has been built for a device that allows for easy detection of electrostatic potential differences in the atmosphere. The device has four points in the shape of four pronged forks, which detect charge on the rotating cylinder and pinwheel. Depending on the shape, the pinwheel fans, or a side of the cylindrical shape act as capacitors, and when high angular velocity is achieved charge dissociation occurs. This provides a pulsing electric potential to the device. To test this device, discharges created with a Van De Graph Generator were used. Once an alteration of electric potential occurs in the atmosphere, the device detects this discharge and voltage is plotted using an Elvis II National Instruments data acquisition computer interface and an oscilloscope for verifying the relationships on the "NI LabView 64 Bit" voltage readings. The resulting graph indicates a square wave function. Once the cylindrical capacitors have changed, the graphical representation changes to a "sawtooth graph". The device is quite sensitive and may serve as a detector to observe potential storms and electric discharges in the environment, whether man made, or natural. As a result, this device, because of these findings, is properly named a "Weather Detector."

**Elijah Gregory, Jaumarian Barnett, Zarius Garcia, Victor Huerta** (Mentor: Timothy Renfro) P34

#### *Detecting Radioactive Uranium Traces in Oil Drilling Equipment*

The investigation of gamma ray spectrum of different elements and the detection intensity relationship to distance and mediation was completed utilizing gamma ray spectroscopy with Spectrum Techniques Equipment. Additionally, a supplementary analysis was conducted on a radioactive west Texas drilling pipe. The examination of the pipe material unveiled the presence of radioactive isotopes of uranium elements. This can be used in shedding light on potential environmental and health implications on drilling sights.

**Christiana Perez, Dylan Abbott** (Mentor: Greg Schneller) P35

#### *Assessing for Classically Conditioned Responsiveness to Social Media Notification Tones*

This study was aimed at assessing whether individuals learn to have a subtle nervous system response to the Snapchat notification tone. Previous research establishes that cell phone over-usage correlates with nervous system activity and that complexity of auditory stimuli elicits

varying magnitudes of autonomic response. We hypothesized that there will be a stronger response to the Snapchat notification tone rather than the neutral notification tone (telegraph) regardless of sex/gender. We measured subject responsiveness using Galvanic Skin Response, a device that detects small changes in the skin's sweat gland activity. Results will be analyzed using change scores which represent the duration of the participant's autonomic response.

**Abby Barzyk, Angelica Abila, Sunshyne Gwinn, Bandar Alanizi** (Mentor: Hyunshun Shin) P36

*Properties Found During the Synthesis of Ethyl-3, 5-Dichloro-4-((6-Ethoxy-6-oxohexyl) oxy) Benzoate, Histone Deacetylase 1 Inhibitors*

A new histone deacetylase 1 (HDAC 1) will be created in the lab and tested on cancer cells to see if the new HDAC 1 will be effective in deteriorating cancer cells. Enzyme inhibitors reduce the rate of enzyme-catalyzed reactions within the body while preventing enzymes to work in a normal manner such as blocking or slowing enzymatic functions. The objectives of this experiment are to synthesize ethyl-3, 5-dichloro-4-((6-ethoxy-6-oxohexyl) oxy) benzoate as a target enzyme inhibitor and ovarian cancer. Ovarian cancer is one of the deadliest resulting diseases in gynecological cancers. This is because the signs and symptoms are not caught until it is too late and the cancer has spread throughout the body. Histone modification can impact or completely halt the processes of transcription and translation. Histone regulatory enzymes are capable of manipulating gene expression. This study will examine HDAC1 and the risks it may pose in cancer cases, specifically ovarian cancer, while also studying the potential it has in treatment plan. In preparation for both approaches, a phenoxide ion was formed by mixing ethyl3,5-dichloro-4-hydroxybenzoate with acetone and potassium carbonate. The approaches differed when ethyl-6-bromohexanoate was added. In the traditional approach, two cycles of stirring were performed, with one including a hot bath. The microwave assisted approach utilized a vessel, which led to higher yields within shorter reaction times. IR spectra can be used to compare products, and NMR can be implemented to evaluate the extent of reaction or purity of the inhibitor product. The synthesized compound will help provide the insights to develop new histone deacetylase 1 as a target in ovarian cancer.

**Brooke Boyer, Isabella Sanchez, Eduardo Garcia, Ofeh-Oseh Uzumefune** (Mentor: Hyunshun Shin) P37

*Synthesis of the Histone Deacetylase 2 Inhibitor for Oncogenes*

This research will consist of synthetization of the histone deacetylase 2 inhibitor, also known as HDAC-2 inhibitor. The work done will allow for the analyzation of the uses and effects of the HDAC-2 in the expression and activation of oncogenes and tumor-suppressing genes in the human body. Positive effects of HDAC-2 inhibitors include acting as a general anticancer agent and playing a role in T-cell development and differentiation, which underlies the effectiveness of HDAC inhibitors in T-cell lymphoma. It is also shown to be necessary for DNA replication and

initiating the immune control of T-helper cells and CD4+ T-cell activation. One of the major negative effects of HDAC-2 is the overexpression of the enzyme leading to cervical and gastric cancers. Mutations of the HDAC-2 in sporadic tumors have begun leading to the loss of HDAC-2 expression and activity, which in turn, results in the increase of oncogenes. In this experiment, the reactants of 2-chloro-5-hydroxypyridine and ethyl-6-bromohexanoate will be synthesized to form the HDAC-2 inhibitor via a microwave synthesis and a conventional synthesis. The reactants stated above will then be analyzed via TLC plates for both the microwave and traditional method in three different eluting solutions. The same reactants will then be analyzed via IR and H-NMR spectrums. This same process will be repeated for the product, ethyl-6-((6-chloropyridin-3-yl) oxy) hexanoate, that is synthesized, which will then be purified via automated flash column chromatography. These results will be recorded and will provide insight into the development of the new HDAC-2 inhibitors as a oncogene suppressor, as well as identifying the best way to synthesize the product.

**Jose Pena, Nathaniel Pyenta, Ansynn Franklin, Samantha Hamilton, Trista Brown** (Mentor: Hyunshun Shin) P38

*Synthesis and Bonding Affinity of ethyl 3,5-dichloro-4-((7-ethoxy-7-oxoheptyl)oxy) benzoate with Metallo Beta-Lactamases as an inhibitor.*

Certain bacteria have evolved to use a compound known as Beta-Lactamase, which inhibits beta-lactam antibiotics. This creates a problem when trying to eliminate a bacterial infection. Metallo beta-lactamases (MBLs) possess a Zinc ion that serves as a potential target bonding site for an inhibitor with a polar negative end. By bonding to this site, the enzyme would be unable to perform its function. Typically, suberoylanilide hydroxamic acid (SAHA) is used as this inhibitor, however the compound also has ill effects on human health. In this project, a new compound, ethyl 3,5-dichloro-4-((7-ethoxy-7-oxoheptyl) oxy) benzoate, was synthesized by both a traditional method using reflux conditions and by microwave-assisted synthesis. The products were isolated and characterized using IR and HNMR spectra. The bonding affinity of the compound and SAHA with MBLs (PDB Code: 7AYJ) was predicted using Chimera and Autodock Vera, showing that the synthesized compound had a higher bonding affinity.

**Robert May, Reagan Owen, Mason Scott, Olivia Valdovinos, Jerry Sullivan** (Mentor: Hyunshun Shin) P39

*Synthesis of Beta-Lactamase Inhibitor: Synthesizing the unique Inhibitor Ethyl7(6-chloropyridin-3-ol) oxy) Heptanoate.*

Modern medicine practices that intend to attack bacteria-based infections have become far more difficult to combat. Medicines that are directed to fight bacterial infections specifically target the Metallo beta-lactamase enzyme in the bacterial walls to eliminate cellular growth. Over the past few decades, common bacterial infections have become



more resistant to predominant antibiotics due to the mutations of the Metallo beta-lactamase enzyme. The formation of a new inhibitor must be determined to combat the mutated bacterial cells. The following experiment includes the synthesis of a Beta-Lactamase inhibitor between the molecular reactants 6-chloropyridin-3-ol and ethyl 7-bromoheptanoate to form the inhibitor, ethyl 7-(6-chloropyridin-3-yl)oxy heptanoate. There were two methods that took place to obtain the product, using a conventional method and the microwave-assisted synthesis method. The formation of the product with the reactants was conducted followed by a TLC analysis to illustrate the presence of a new compound. The HNMR and the IR spectrums of the product were analyzed to confirm the possibilities that a new molecule was synthesized. The total crude and pure theoretical yields were 0.833g of the Beta-lactamase inhibitor. The actual yield for the microwave analysis was calculated to be 0.436g giving a percent yield of 50.34%. Therefore, the most efficient technique used in this experiment was the microwave-assisted synthesis method.

**Jordan Flores** (Mentor: David Upshaw) P40

*Reverse Engineering and 3D Solid Modeling of a Wind Turbine*

Using SolidWorks CAD software package, I generated a solid model of a wind turbine. Utilizing existing wind turbine designs, I was able to reverse engineer and incorporate a complex blade design geometry for use in my own wind turbine design. The next step in my project will be to rapid prototype a scaled down model of my wind turbine. I will then test the design in a controlled environment (wind tunnel), refining and reiterating the design based on the results.

**Samantha Ford** (Mentor: David Upshaw) P41

*Reverse Engineering and Solid Modeling of a Surfboard*

I generated a 3D solid model of a surfboard in SolidWorks CAD software using image references from existing products on the market. The type of surfboard I modeled is referred to as a "gun." It is called this because these types of boards are used to "hunt" the big waves. I followed engineering design methodology as the structure for my project. Future work includes modeling the fins, leash, leash plug, and traction plate. Then, I will rapid prototype a scaled-down model of the surfboard, followed by test and evaluation of the design for structural integrity and aesthetics to aid in further design development.

**Celdon Gooch** (Mentor: David Upshaw) P42

*Reverse Engineering and 3D Solid Modeling of an Analog Wall Clock*

In this project, I created a solid model in SolidWorks CAD software using reverse engineering methodology. I started by researching and comparing various analog clocks to find a suitable design. Then, I took precise measurements of a clock in our classroom using digital calipers and modeled each of the individual components that comprise the clock assembly. Future work includes rapid prototyping for testing and evaluation of fit, form, function, and aesthetic appeal.

**Jackson Harris** (Mentor: David Upshaw) P43

*Engineering Design and 3D Solid Modeling of a Family Crown*

Using SolidWorks CAD software, I designed and generated a 3D solid model of a family crown. To generate ideas for this project, I researched various crown design worn by kings and queens throughout history. I took measurements of my head to drive the design for my custom fitted crown. The assembly consists of multiple parts including the shell, headpiece, and precious gems. The next step in this project will be to rapid prototype a wearable model of my family crown. Rapid prototyping will allow for quick and cost-effective test fitting and size customization.

**Daniel Mora** (Mentor: David Upshaw) P44

*Reverse Engineering and 3D Solid Modeling of a Collegiate Discus*

I reverse engineered a collegiate discus and generated a 3D solid model in Solidworks CAD software. To accomplish this, measurements were taken of the disassembled discus using digital calipers. A solid model of each part was generated in SolidWorks and combined into an assembly model. Future work includes rapid prototyping of the assembly, followed by testing to ensure that the 3D-printed discus will withstand the impact and force exerted on it during normal operating conditions in competition and practice.

**Alex Smith** (Mentor: David Upshaw) P45

*3D Solid Modeling and Rapid Prototyping of The Project Requiem Decapitator*

Using the SolidWorks CAD software, I designed, modeled, and rapid prototyped my conceptual mechanized military vehicle "The Project Requiem Decapitator". The design is self-standing and fully articulating. I rapid prototyped my design and intend on testing the assembly to assess structural rigidity and mobility, upon which further design improvements can be made. Future work includes design and development of hardpoints, to which weapons and auxiliary equipment can be mounted.

**Dustin Volk** (Mentor: David Upshaw) P46

*Design and Development of a 3D-Printed Protective Case for Wine Bottle Storage and Transportation*

Have you ever had an incident of wine-bottle-breakage? My design of a wine bottle carrier is to facilitate bottle protection during transport and storage. This idea came about from an unfortunate incident where a bottle of wine fell over in my trunk and broke, spilling its contents. After this unfortunate incident, I began researching for some way to safely transport wine and the only thing available was an “egg crate” style container that was both not appealing visually and offered very minimal protection. I designed and modeled the case using SolidWorks computer-aided design (CAD) software. This design is in the early stage and will require further testing to identify possible product improvements.

**Corbin Stulir** (Mentor: Brooke Wright) P47

*Review of Cancerous Agents in Firefighting*

Firefighting is a job that demands a large amount of risk and demands both physically and mentally. There are many dangers that firefighters face in their daily work. But what about the long-term effects of their job? Cancer caused 66 percent of the career firefighter line-of-duty deaths from 2002 to 2019, according to data from the International Association of Fire Fighters (IAFF). And in 2016 only, cancer caused 70 percent of the line-of-duty deaths for career firefighters. There are a wide variety of cancerous agents found in the line of firefighting. Firefighters have a 9 percent higher risk of being diagnosed with cancer and a 14 percent higher risk of dying from cancer than the general U.S. population, according to research by the CDC/National Institute for Occupational Health and Safety (NIOSH). With this information, cancer is the most dangerous threat to firefighter health and safety today. Although there is a wide range of research on the topic of cancer as well as firefighting, the possible solutions for the risk of cancer in firefighting are lacking and limited. This paper analyzes the reported research on the cancerous agents found in firefighting and presents possible solutions to decrease the risk of cancer in firefighters.

**Gerald Porter** (Mentor: Brooke Wright) P48

*Tracking fecal contamination patterns in Urban Parks: A look at Abilene, TX*

Urban parks and green spaces are vital recreational areas within cities that offer opportunities for leisure activities and safe places to play for children. However, the fast pace of urbanization

often alters natural landscapes into impermeable surfaces such as concrete sidewalks and parking lots that naturally disrupt water flow and degrade water quality in urban ecosystems. This study investigates the presence and distribution of *Escherichia coli* (*E. coli*) bacteria as an indicator of fecal contamination in standing water collected from various locations within two local parks in Abilene, TX. The samples were taken from different parts, including grass, sidewalks, street gutters, and parking lots, utilizing IDEXX Quanti-Tray/2000 with the Colilert Reagent method from several ground puddle sites on Rose Park and Redbud Park. *E. coli* and coliform bacteria were found through an incubation process involving fluorescence detection methods. The objective was to examine how *E. coli* is distributed across different surfaces and evaluate its probable threat to children's playground equipment or other types of surfaces they come into contact with. All the samples tested positive for coliform bacteria, which showed fluctuation levels for *E. coli* across sites. In Rose Park, Grass samples exhibited significantly higher levels of *E. coli*, which exceeded 35 cfu/100mL, the EPA standard value. Also, some areas, like Parking Lot 2 in Rose Park or Sidewalk 2 in Redbud Park, surpassed the EPA standard for *E. coli* contamination. Surprisingly, temperature fluctuations during daytime did not correlate with changes observed in *E. coli* levels but could have affected numbers belonging to this group. These findings highlight the need to control fecal pollution within urban environments to protect public health, especially among kids who are most susceptible to infections due to their low immune system development. Understanding contamination dynamics and identifying high-risk zones can contribute to targeted management approaches for mitigating waterborne disease risks in urban parks.

**Abby Barzyk, Brooke Boyer** (Mentor: Brooke Wright) P49

*What Effects Does the Gut Microbiome Have on Human Health?*

The gut microbiome is essential to a person's health and well-being. It provides immune function and nutrients to the gut which help it retain its homeostatic balance. The human gut microbiome plays a huge role in providing healthy bacteria to support overall wellness. The gut microbiota in humans evolved throughout life and appears to play a pivotal role in both health and disease. "A dysbiosis state of the gut microbiota is becoming recognized as an environmental factor that interacts with a host's metabolism and has a role in pathological conditions, both systemic—obesity, diabetes, and atopy—and gut-related IBS and IBD" (Bull and Plummer, 2014). The gut microbiome is affected by irritable bowel syndrome (IBS) and in patients that have an appendectomy. This study will go in depth about the microbiome and how it works, as well as how it is affected by certain things. It will tell people the best way to take care of their gut microbiome to keep it happy and healthy.

**Daniel Morey** (Mentor: Brooke Wright) P50

*Presence of Coliform Bacteria in Rainwater Puddles in Hospital Parking Lots*

This study investigates the presence of Escherichia coli (E. coli) in rainwater puddles within hospital parking lots, which could potentially be environmental contamination risks in healthcare settings. Utilizing the IDEXX Quanti-Tray/2000 method with Colilert Reagent, samples were collected from various locations around McMurry and Abilene hospitals, including hospital parking lots and emergency bays, to detect E. coli and coliform bacteria. The results indicated that all sampled locations were positive for coliform bacteria, with varying levels of E. coli. The study found no significant effect of daytime temperature on bacterial presence. The presence of coliform bacteria, often linked to fecal contamination, suggests potential health risks, particularly in areas frequented by hospital staff, patients, and visitors. This underscores the importance of including external areas in hospital hygiene protocols to mitigate the risk of hospital-acquired infections. The variability in E. coli levels across different locations points to differences in environmental or human factors influencing water quality. The study recommends further investigation into specific causes of contamination and highlights the need for environmental hygiene practices in healthcare settings.

#### **Ofeh-oseh Uzumefune (Mentor: Brooke Wright) P51**

*The Bite That Kills: Understanding Sleeping Sickness and Its Impact on Human Health.*

Human African Trypanosomiasis (HAT), also known as African Sleeping Sickness, is a vector-borne parasitic disease primarily affecting rural communities with limited access to healthcare and resources in Sub-Saharan Africa. There are two clinical variants of HAT, the West African form caused by *Trypanosoma brucei gambiense* (abbreviated to T. b. gambiense) and the East African form caused by *T. b. rhodesiense* parasites. In Humans, it is caused by the protozoan parasite *Trypanosoma brucei gambiense* and transmitted by the bite from an infected tsetse fly species *Glossina palpalis*. Humans are the most important reservoir of infection, although the parasite can sometimes be found in domestic animals. African trypanosomiasis is fatal due to the absence of both a vaccine and a suggested treatment for prevention. This disease in humans induces a fatal sleep disorder and is characterized by episodes of nocturnal insomnia and daytime somnolence; Hence, the name "Sleeping Sickness." This research aims to provide insights into the epidemiology, pathogenesis, and control measures of African sleeping sickness.

#### **Taya Bridges (Mentor: Brooke Wright) P52**

*Why are women more prone to ACL tears than men?*

Anterior Cruciate Ligament (ACL) injuries have been seen in millions of people around the world, but there is a significant difference in how much more women are prone to tearing their ACL than men. Even though you can perform the same movement why it that women get injured more? There are multifactorial causes that deal with biomechanical differences as well as hormonal differences. In this research it has been found that there is not just one answer to

why, such as having wider pelvises, estrogen fluctuations that may cause ligament laxity, and many more factors that can play a role in why.

### **Three Minute Thesis Competition Abstracts**

**Caitlin Baker** (Mentor: Jori Sechrist) 3MT-1

#### *America's Collective Conscience*

In an era defined by heightened divisions and escalating rhetoric, social scientists grapple to dissect the influence of political polarization on the American psyche. Guided by Durkheim's theory of collective conscience, this thesis examines the evolution of America's shared values. While this paper does hypothesize a bifurcated collective conscience, by reorienting the typical framework utilized by social scientists from one of division toward focusing on the ideals and beliefs shared among the people, it illuminates the intricate web of connection that unifies our society. From the seismic shocks of the Trump era to the disruptive waves of the COVID-19 pandemic, the study uncovers the fault lines of American unity while highlighting institutional inertia and policy divergence's role in exacerbating societal fragmentation. As the nation grapples with its fractured soul, this research provides a clarion call for unity, resilience, and reimagining a collective American narrative.

**Aubrey Batten** (Mentor: David Wahl) 3MT-2

#### *The Stigma Surrounding Stigma: Examining Social Disapproval and its Consequences*

Stigma is a word used frequently in our society to describe negative social attitudes and consequences towards certain behaviors, sexualities, religions, people groups and more. In academic context it is essential to raise awareness around topics where stigma is harmful, whether towards people, or towards research regarding said people. This presentation will argue that stigma is a necessary tool in society to discourage anti-social or morally unacceptable behaviors. In addition to this, the line between stigma that is harmful to society and stigma that is helpful to society is unclear. This presentation will explore some of the factors that potentially determine the difference between these two things. In this process examples will be explored where stigma was removed or alleviated from a topic, and the consequences for f this removal.

**Melissa Stevenson** (Mentor: Mark Waters) 3MT-3

#### *Constructive Criticism: How Not to Cry*

Constructive Criticism or Feedback is defined as the artform of providing feedback to someone in order to better their performance. But when we receive feedback, for example on a paper we wrote, or a performance of a musical piece, or how we might have lost the big game, how does it feel? Constructive feedback should be about the immediate project, it should be ways to improve, not just ways things are wrong. It should not be personal or involve past or future projects that do not have a bearing on the immediate project. But even when criticisms follow all these expectations or rules, they can still be devastating to our emotional wellbeing, our confidence, and our overall happiness. This presentation will demonstrate healthy and helpful ways to combat those feelings to use Constructive Criticisms in a positive way. In an article for the American Psychological Association, Dr. Naomi Winstone noted that “people were far more likely to recall evaluative feedback—feedback about something they have already completed—than feedback on how they could improve on a future task, also known as directive feedback”. For example, I was given Constructive Criticism for this event last year, but unfortunately do not remember any of it for the event this year. But if we were given feedback after our presentations today and then allowed to redo them, the feedback would be much more effective. This shows the value of Constructive Criticism, so eliminating it from society is not the answer. That begs the question, how can I use what someone else is telling me I did wrong without getting emotionally hurt? We will discuss how getting past the initial hurt to being able to ask questions can help us make a better project or product making it a win for everyone.