SIXTH ANNUAL
UNDERGRADUATE RESEARCH
EXPO 2019
Acknowledgements

The Office of Undergraduate Research gratefully acknowledges the assistance of all LU faculty and staff involved in this expo.

Creative Activity showcase if directed and performed by the Advanced Directing class taught by Associate Professor of Acting Joel Grothe, M.F.A.

Cover page of this program is designed by Ms. Brittany Bennett, a student of ARTS 4333- Brand Identity taught by Assistant Professor of Graphic Design Sherry Freyermuth, MFA

The monetary award for students are provided by:

Center for History and Culture
College of Engineering
College of Fine Arts and Communication
Lamar University Literary Press
Reaud Honors College
Welcome to the Lamar University Sixth Annual Undergraduate Research and Creative Activities EXPO. This event is organized and hosted by the Office of Undergraduate Research with the goal of inspiring undergraduate students from all majors to explore their field of interest and engage in research and/or creative activity. Since 2013, the interest and dedication of LU undergraduate students and faculty in research and creativity has increased each year in both quantity and quality. This is demonstrated in the numerous posters and oral presentations scheduled for this event. This is a very exciting moment for undergraduate research and creative activities at the university, since we are becoming an example for many regional and national institutions following in our footsteps. This event is like none other as a unique opportunity for our students and faculty mentors, to present the results of months of hard work. Make the most of this experience and thank you for your involvement.

Message from President

It is my pleasure to heartily welcome you at the 6th Annual Undergraduate Research EXPO organized at Lamar!

EXPO is now a well-established event, where undergraduate students from all disciplines and majors at Lamar can present their research findings. The event is organized by the Director of OUR, Dr. Kumer Das and his team, and for this year it includes 74 papers, with 42 posters and 32 talks distributed in two breakout session blocks.

The EXPO event proves again that the Office of Undergraduate Research, which was created nearly six and a half years ago through Dr. Das’ enthusiastic initiative, become now a robust platform for promoting undergraduate student research at Lamar. The Office of Undergraduate Research provides now UG research awards which are run during the regular semesters, SURF fellowships for summer, and student travel grants.

I invite everyone to acknowledge the research efforts of our student presenters and to visit their posters or attend the breakout sessions offered throughout the day. I encourage everyone to be part of this special day when we celebrate the thirst of knowledge and the stimulating interest in finding answers to various research inquiries.

I wish you, all to enjoy this year’s EXPO event!
April 30, 2019
Dear Students, Colleagues, and Guests,

I would like to welcome you to the Sixth Annual Undergraduate Research and Creativity Expo.

Today, more than 90 undergraduate students from various areas ranging from Humanities and Sciences, to Nursing and Engineering, will present their scholarly accomplishments done at Lamar, with an enthusiasm characteristic to their apprentice role in research and creative activity, thus showing their efforts to become good professionals in their field of interest. Their presentations will give to everyone great opportunities to show the potential Lamar has now to offer research facility and support which is competitive at national and international level. Although most of the papers will present results never presented before to similar events, some of the papers will display findings reported to recent conferences organized outside Lamar, such as the 2019 Undergraduate Research Day at the Capitol in Austin and the Great Plains Honors Conference. These papers will highlight the impact done by Lamar students’ research to regional or national level.

Students, today is your day for a celebration of your scholarly accomplishments. I would like to thank all the students and their faculty mentors for taking the time to share their work with the university community.

I want to thank the keynote speaker Mr. C.L. Ross. Many thanks go to Dr. Kenneth Evans, LU president and Dr. James Marquart, LU Provost and VPAA. My special thanks to all deans and chairs. I could not have done this without the support of the OUR Advisory Committee. Finally, I would like to express my deepest appreciation for the time, energy and dedication that my colleagues Drs. Catalina Castillon, Cristian Bahrim and Mr. Nirmal Gope give toward the success of this Expo.
C. L. Ross is an aerospace engineer and most recently appointed to the NASA Johnson Space Center (JSC) Safety and Mission Assurance Directorate Management Staff. As the previous Quality and Flight Equipment Division Chief. His Division ensures that safety, reliability and quality meet all requirements at JSC, in JSC government furnished equipment, extravehicular activity, JSC payloads, International Space Station, Orion, commercial crew, and advance exploration systems. His mission is to identify, characterize, mitigate and communicate risk by implementing an efficient and effective assurance model that is of value to customers.

Ross graduated from Lamar University in 1983 with a bachelor’s degree in mechanical engineering. Since his start in 1984, he has earned the Center Director Commendation Award, Innovation awards for Electronic Data System process implementation, Manned Flight Awareness, Outstanding Service Team Award, Group Achievement Award, Sustain Superior Performance awards, and NASA HQ Commendation for support to USA (Boeing) FEPC contract management. He has developed and implemented international bilateral agreements with Canadian Space Agency, European Space Agency and NASA GFE contractors. Ross was appointed to the ISS Safety Review Panel, where he represented the NA directorate as a voting member.

Ross’s extensive leadership training and his skills in safety and quality assurance have allowed him to maintain the quality of JSC. He has been Chief of his Division since 2013, and recently been appointed to the Safety & Mission Assurance Directorate’s management Staff. Ross continues to work to improve NASA JSC and the field of Safety, Reliability & Quality engineering.

Mr. Ross resides in Pearland Texas with his daughter and son. He is an active member of the Silver Lake Church, Omega Psi Phi Fraternity Inc., Pearland Special Olympics organization and member of the NASA mentoring program.
Monday, April 29, 2019

1:00PM – 5:00PM
REGISTRATION @ SSC Live Oak Ballroom

3:00PM – 5:30PM
POSTER SETTING UP @ SSC Live Oak Ballroom

Tuesday, April 30, 2019

7:30AM – 8:00AM
POSTER SETTING UP @ SSC Live Oak Ballroom

8:00 AM - 9:15 AM
POSTER EXPOSITION I @ SSC Live Oak Ballroom

9:30 AM – 11:00 AM
ORAL PRESENTATION – SESSION I
@ Neches, Trinity, Cypress I & II, and San Jacinto

11:10 AM – 11:25 AM
Lunch (Box lunch) @ SSC Live Oak Ballroom

11:25 AM – 11:55 PM
WELCOME CEREMONY @ SSC Live Oak Ballroom
Dr. Kumer Das
Director, The Office of Undergraduate Research
Dr. Kenneth Evans
President, Lamar University
Dr. James Marquart
Provost and VPAA, Lamar University

11:55 PM – 12:10 PM
PICTURE In front of Setzer Student Center

12:10 PM – 1:00 PM
POSTER EXPOSITION II @ SSC Live Oak Ballroom

1:10 PM – 2:30 PM
ORAL PRESENTATION – SESSION II
@ Neches, Trinity, Cypress I & II, and San Jacinto
2:30 PM – 5:30 PM  
BREAK (Please prepare to return by 5:30 pm for the Closing Ceremony)

5:30 PM – 7:30 PM  
Banquet and Closing Ceremony  
@ SSC Live Oak Ballroom

- Creative Activity Showcase: Excerpts from *12th Night* by William Shakespeare, directed and performed by the Advanced Directing class.
- Dinner
- Keynote Speaker: 
  Clarence L. Ross, Jr.  
  Aerospace Engineer  
  NASA Johnson Space Center
- Award Ceremony
  **Awardees Picture**
The Search for Baryon Resonances – the Excited States of Protons
Alek Hutson - Physics and Mathematics
Mentor: Dr. Phillip Cole
Presentation will begin at 9:30 AM

Structural and Mechanical Characterization of High Entropy Alloy Coatings Fabricated by Reactive RF Magnetron Sputtering
Tyler Martin - Mechanical Engineering and Physics
Mentor: Dr. Keivan Davami
Presentation will begin at 9:50 AM

Cassie-Baxter Transition: Gibbs Energy Analysis and CFD Simulations Using Newly Developed, Validated Algorithms
Chae Rohrs and Arash Azimi - Mechanical Engineering
Mentor: Dr. Ping He
Presentation will begin at 10:10 AM

Risk Evaluation of Frequently Transported Chemicals in Ports of Gulf Region
Dikshant Singh - Chemical Engineering
Mentors: Dr. Berna Eren Tokgoz and Dr. Cagatay Tokgoz
Presentation will begin at 10:30 AM

J.R.R. Tolkien, The Political Scientist: How Tolkien’s Political Ideology and Views Represent Themselves in His Works
Govin Kaggal - Political Science
Mentor: Dr. Nicki Michalski
Presentation will begin at 9:30 AM

Overcoming the Journey to Mordor: A Look of How J.R.R. Tolkien Wrote to Process War Trauma
Aurora Maldonado - Social Work
Mentors: Dr. Nicki Michalski and Dr. Kevin Dodson
Presentation will begin at 9:50 AM

Racism in the Works of J R R Tolkien
Katey McCall - Political Science
Mentors: Dr. Kevin Dodson and Dr. Nicki L. Michalski
Presentation will begin at 10:10 AM
SESSION 1C 9:30 AM – 11:00 AM
CHAIR: Dr. Robert Worley Cypress I & II (Setzer-127 &125)

The Reagan Era: Rise of Conservatism, Reaganomics, and U.S Foreign Policy
Natalia Calderon- Political Science
Mentor: Dr. Gwinyai P. Muzorewa
Presentation will begin at 9:30 AM

Alienation of Migrants and Gregor from The Metamorphosis
Himani Vithanage- Political Science
Mentor: Dr. Shannon Joffe
Presentation will begin at 9:48 AM

The Democratic Response to “Tough on Crime”: William Clinton’s Crime Bill
Himani Vithanage- Political Science
Mentor: Dr. Gwinyai P. Muzorewa
Presentation will begin at 10:06 AM

An Attempt to Investigate Bias through Shifting Group Boundaries
Arthur Davis- Social and Behavioral Sciences
Mentor: Dr. Jeremy Shelton
Presentation will begin at 10: 24 AM

The Effect of Formal Resolutions or Statements given by Nations and Concerning the Israeli-Palestinian Conflict: Who Helps Most?
Ali Hamza- Political Science
Mentor: Dr. Terri B. Davis
Presentation will begin at 10: 42 AM

SESSION 1D 9:30 AM – 11:00 AM
CHAIR: Dr. Mamta Singh San Jacinto (Setzer-218)

History and Legacy of Herbicide Use during the US-Vietnam Conflict
Julianne Haidusek- History
Mentor: Dr. Rebecca Boone
Presentation will begin at 9: 30 AM

The Fall of the Berlin Wall and What it Meant for Communism and the Cold War
Angela Hutson- History
Mentor: Dr. Gwinyai P. Muzorewa
Presentation will begin at 9:48 AM

A Comparison between Mental Insanity and Maniacal Madness: Comparing Edgar Alan Poe’s “The Tell-Tale Heart” and Charlotte Perkins’ “The Yellow Wallpaper.”
Morgan Martin- Biology and English
Mentor: Dr. Shannon Joffe
Presentation will begin at 10: 06 AM
Parts of the Whole: The Divine Proportion and Red Carnations in the Novel *Mrs. Dalloway*

*Jenny Wilson* - English
*Mentor: Dr. Amy Smith*
*Presentation will begin at 10:24 AM*

The American Woman's Fight for Voice

*Hallie Merrell* - History
*Mentor: Dr. Gwinyai Muzorewa*
*Presentation will begin at 10:42 AM*

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**SESSION 2A**

1:10 PM – 2:30 PM

**CHAIR:** Dr. Dorothy Sisk

Neches Room (Setzer-120)

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Analyzing the Phases of the Moon

*Jessica Getz, Michaela Garlaska, and Brittany Bricker* - Teacher education
*Mentor: Dr. Mamta Singh*
*Presentation will begin at 1:10 PM*

Addressing Special Needs within the ARTS Classrooms

*Katie Gibson, Chaston Miller, and Rebekah Moreau* - Teacher education
*Mentor: Dr. Mamta Singh*
*Presentation will begin at 1:26 PM*

Study Systems! Which One Works Best for You?

*Bonnie Holt and Ashley Broussard* - Teacher Education
*Mentor: Dr. Mamta Singh*
*Presentation will begin at 1:42 PM*

Student Career Preparation: Interactions with the Deaf Community

*Baron Douglas Kane* - Deaf Studies & Deaf Education
*Mentor: Dr. Laura Maddux*
*Presentation will begin at 1:58 PM*

Intellectual Benefits: Perspective Lens of a Learner

*Tamera Thigpen and Shaderika Grant* - Teacher Education
*Mentor: Dr. Mamta Singh*
*Presentation will begin at 2:14 PM*

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**SESSION 2B**

1:10 PM – 2:30 PM

**CHAIR:** Dr. Catalina Castillon

Trinity Room (Setzer-227)

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Undergraduate Research from Boremont to Beaumont

*Andrea Bru* - Biology
*Mentor: Dr. Katherine Hoerth*
*Presentation will begin at 1:10 PM*

Poetry: Culture of Louisiana

*Kimberly Schexnider* - English
*Mentor: Dr. Katherine Hoerth*
*Presentation will begin at 1:30 PM*
The Nature of Evil in Middle - Earth
Kalan Bonnette- Mathematics
Mentors: Dr. Kevin Dodson and Dr. Nicki L. Michalski
Presentation will begin at 1:10 PM

Fantasy, Morality, and Philosophy: The Value of Mythical Storytelling in Tolkien
Kaily Garcia- English
Mentor: Dr. Nicki Michalski
Presentation will begin at 1:30 PM

Feminisms: The endless fight against sexism: Sur Span Peninsular Lit I
Guadalupe Gomez-Angeles- Sociology
Mentor: Dr. Jaime Retamales
Presentation will begin at 1:50 PM

Heroism in the Works of J.R.R. Tolkien
Emily McCall-Biology
Mentors: Dr. Nicki L. Michalski & Dr. Kevin E. Dodson
Presentation will begin at 2:10 PM

Effect of Statuary and Regulatory Protection in Investment Decision in Argentina, Chile, Mexico and Venezuela.
Alexis Granados- Finance & Economics
Mentor: Dr. Gevorg Sargsyan
Presentation will begin at 1:10 PM

Point Cloud Mapping Using LiDAR with Application to Robotics
Juliana Silva, Juan Vaca, Lauren Watts and Melanie Olvera- Electrical Engineering
Mentors: Dr. Cagatay Tokgoz and Dr. Hassan Zargarzadeh
Presentation will begin at 1:30 PM

Studying the Effects of Catalysts on Ammonia Borane-Polyethylene Oxide Composites for Hydrogen Fuel Cells
Emily Ingram, Caitlyn Clark, and Krishna Karel- Chemistry & Chemical Engineering
Mentor: Dr. Ozge Gunaydin-Sen
Presentation will begin at 1:50 PM
SIXTH ANNUAL
UNDERGRADUATE RESEARCH EXPO 2019

Poster Session Chairs:

- Dr. Gina Hale, JoAnne Gay Dishman School of Nursing
- Dr. Ping He, Department of Mechanical Engineering
- Dr. Matt Hoch, Department of Biology
- Dr. Sujing Wang, Department of Computer Science
Poster Directory

1
Research Expo 2019: Hyperconjugation-Assisted Ring Expansion of Acylcyclopropanones
Nathan Abshier - Chemical Engineering
Mentor: Dr. Christopher Martin

2
Iron Biogeochemistry and Microbiology in Natural and Dredged Material Restored Salt Marsh Sites in Southeast Texas
Shannon Adams and Emily J. Smith - Biology
Mentor: Dr. Matthew Hoch

3
Status of Women of Color in the Dental Field
Samira Ahmed and Umera Ahmed - Biology
Mentor: Dr. Natalie T.J. Tindall

4
A Programing Academy to Increase Middle School Students’ Interests and Knowledge
Madison K Boudreaux - Computer Science
Mentors: Dr. Sujing Wang and Dr. Cheng-Hsien Lin

5
Autonomous Vision Based Object Classification
Steven Boudreaux - Electrical Engineering
Mentor: Dr. Cagatay Tokgoz

6
Embracing and coming out as LGTBQ
Kelli Breaux - Social Work
Mentor: Bonnie K. Loiodice, LMSW

7
Expressive Art and Stress Levels in Nursing Students: A Mixed Methods Study
Kimberley Brooks - Nursing
Mentors: Dr. Cynthia Pipkins, J.T. Seaman, Rebekah Seymour

8
The Cultural Revolution of Traditional Gentrification in the Community of South Park: A Social Work Research Case Study
Jordan Bryant - Social Work
Mentor: Dr. Ginger Gummelt

9
En Route to Glucaric Acid from Glucose: Synthesis of Copper-Doped and Imprinted Polymers for Efficient Copper-Catalyzed Oxidation Reactions
Marina Cernik - Chemical Engineering
Mentor: Dr. Gino Canlas

10
Synthesis of C2-Symmetric Diazadienes and Imidazolium Salts: N-Heterocyclic Carbene Metal Complexes for Catalysis of Organic Catalytic Reactions
Emily Ochoa - Chemical Engineering
Mentor: Dr. Gino Canlas

11
Pervious Concrete Pre-Treatment to Prevent Deicer Attacks: Exploratory Phase
Mateo Chevasco, Jarod Jantz, Nara Almeida - Civil & Environmental Engineering
Mentor: Dr. Liv Haselbach

**Thermo-Optical Characterization of Organic Verdazyl Biradicals**  
*Caitlyn Clark, Emily Ingram, and David Brook- Chemistry*  
Mentor: Dr. Ozge Gunaydin-Sen

Mentor: Dr. Ozge Gunaydin

**Customer Perceptions about Caribbean Cuisine in the US**  
*Odalys Colon-Rentas- Hospitality Administration*  
Mentor: Dr. Eunjin Kwon

Mentor: Dr. Eunjin Kwon

**Computational Study of the Effect of Substituents on the [2+2] Cycloaddition of Alkylated 3(2H)-furanones**  
*Madison V. Demel- Chemical Engineering*  
Mentor: Dr. Christopher B. Martin

Mentor: Dr. Christopher B. Martin

**Voice Characteristics during face-to-face vs Telephone Conversation**  
*Caitlin Eakin- Speech and Hearing Sciences*  
Mentor: Dr. Nandhu Radhakrishnan

Mentor: Dr. Nandhu Radhakrishnan

**Mutational and Binding Analyses of the Bacterial Protein Hfq**  
*Amanda Essoh- Chemistry & Bio-Chemistry*  
Mentor: Dr. Maxim Soukhodolets

Mentor: Dr. Maxim Soukhodolets

**Role of Statistics in the Fight against Alzheimer’s disease**  
*Grace Granger- Mathematics*  
Mentor: Dr. Jasdeep Pannu

Mentor: Dr. Jasdeep Pannu

**Development of Novel Techniques for Tissue Engineering Applications**  
*Omar Hamza and Alexus Locke- Chemistry & Mechanical Engineering*  
Mentors: Dr. Ian Lian and Dr. Ping He

Mentors: Dr. Ian Lian and Dr. Ping He

**Potential of Virtual Reality for Industrial Construction: Design and Field Operation**  
*Mason Harris and Shawn Miller- Construction Management*  
Mentor: Dr. Seokyon Hwang

Mentor: Dr. Seokyon Hwang

**Vocal Fry: Extent of Pathology and Tolerance among Listeners**  
*Hope Hardin- Speech and Hearing Sciences*  
Mentor: Dr. Nandhu Radhakrishnan

Mentor: Dr. Nandhu Radhakrishnan

**Systematic Approach for Quality Level Assessment of Steel Products**  
*Jason Higgins, Ana Moreno, Jesus Perez, and Manuel Martinez- Industrial Engineering*  
Mentors: Dr. Berna Tokgoz and Dr. James Curry

Mentors: Dr. Berna Tokgoz and Dr. James Curry

**Necessary Improvements in Records and Possible Bias toward Different Races in Jefferson County**  
*Lillian Hill- English*  
Mentor: Dr. Jerry Bradley

Mentor: Dr. Jerry Bradley

**Analyzing the Incidence Rates of Gonorrhea, Syphilis, Chlamydia, and HIV in Port Arthur, Texas**  
*Afsana Islam- Biology*  
Mentor: Dr. Ashwini Kucknoor

Mentor: Dr. Ashwini Kucknoor
Effects of Varying Cell Culture Conditions in SKNO-1 Acute Myeloid Leukemia (AML) Cells  
Cade Johnson and Carlo Vanz- Biology  
Mentors: Dr. Ian Lian and Dr. Chun-Wei Yao  
25

The Effects of Society on the Female Body Image  
Fizzah Noor Khan- Psychology  
Mentor: Dr. Raymond Doe  
26

The Risk-Need-Responsivity Model and Its Effectiveness with At-Risk Youth  
Zoe Lovett- Social Work  
Mentor: Ms. Lori Wright  
27

Negative Effects of Over-Compacting Asphalt Concrete Pavement on Roadway Surfaces  
Ryan Malone and Charlie Kappelman- Construction Management  
Mentor: Dr. Seokyon Hwang  
28

Triboelectric Nanogenerators as an Alternative Power Source  
Tyler Martin Mechanical-Engineering and Physics  
Dr. Cristian Bahrim  
29

Rhomboid Gene silencing using siRNA transfection in Trichomonas vaginalis, a human STI causing pathogen.  
Emily McCall, Guadalupe Cisneros, Haya Alani, and Katelyn Meaux-Biology  
Mentor: Dr. Ashwini Kucknoor  
30

Optimization in Hardware Design and Algorithm for Improving Computer Motherboard Architecture  
Trinity Morris-Physics  
Mentor: Dr. Cristian Bahrim  
31

Does Diversity on College Campus Influence Student Success and Retention among College Students?  
Vishal Mundodi- TALH (Liberal Arts)  
Mentor: Dr. Jasdeep Pannu  
32

Fabrication and Characterization of Metal-Coated Mechanical Metamaterials  
Nguyen Nguyen  
Dr. Keivan Davami  
33

How Children Perceive Violence  
Shadye Nolan-Vaughns  
Dr. Virginia Gummelt  
33

Workshops to Increase Middle School Students’ Interests and Knowledge  
Ann Chapple and Madison K Boudreaux- Computer Science  
Mentor: Dr. Sujing Wang  
35

Preparation & Characterization of Electrospun Algal EPS/PVA Nanofibers  
Zhen Wei Ooi, Adarsh Bafana, and Shishir Kumar- Chemical Engineering  
Mentor: Dr. Clayton Jeffryes  
36

Development of an Algal-based Landfill Leachate Treatment System  
Burgaundy Petri and Kyleigh L Dixon Civil Engineering -  
Mentor: Dr. Thinesh Selvaratnam
Implementing Solar Energy into Southeast Texas with Efficient Solar Cells
Daniel Quispe- Mechanical Engineering and Physics
Mentor: Dr. Cristian Bahrim

Cost-Benefit Analysis of Harvesting Solar Energy at Home-Scale in Southeast Texas
Erik Rodriguez and Pedro Escamilla- Construction Management
Mentor: Dr. Seokyon Hwang

Use of Dredge Material for Construction Purpose: Pollution Treatment and Financial/Environmental Impact
John Reichard and Chris Albright- Construction Management
Mentor: Dr. Seokyon Hwang

Literature Review of Malignant Hyperthermia: Pathophysiology, Treatment and Preparedness
DaShonda Shepard- Nursing
Mentor: Dr. Gina Hale

Sediment Porewater Salinity versus Sulfide: Which Affects Deterioration of Salt Marsh Health?
Jordan D. Snowden, Emily J. Smith, and Carrie A. Martin- Biology
Mentor: Dr. Matthew P. Hoch

Mechanically Durable Nanocomposite Superhydrophobic Coating on Aluminum Substrate
Stacy Towers- Mechanical Engineering
Mentor: Dr. Chun-Wei Yao

Beta-Amyloid’s Antibacterial Effects on Alzheimer’s Disease
Paityn Warwick and Kelsey Tran- Biology
Mentor: Dr. Maryam Vasefi

Mechanical Characterization of Graphene-Hexagonal Boron Nitride Nanocomposites
Quintin Williams and Michael Munther- Mechanical Engineering
Mentor: Dr. Keivan Davami
Hyperconjugation-Assisted Ring Expansion of Acylcyclopropanones

Nathan Abshier
Mentor: Dr. Christopher Martin

Theoretical calculations on a number of substituted acylcyclopropanones were carried out in order to determine its chemical behavior as a function of the size of substituents attached. Acylcyclopropanones are highly unstable organic compounds known in chemical literature to exist as an intermediate in a number of chemical reactions. One such reaction involves the photoisomerization of 3(2H)-furanone, a class of molecules found in anti-tumor pharmaceuticals, to form 2(3H)-furanone. The acylcyclopropanone intermediate exhibits the capability of rearranging via ring expansion to form the 2(3H)-furanone isomer, or decarboxylate yielding an alkene. According to literature, this behaviour is determined by the size of chemical substituents attached to the acylcyclopropanones. However, our theoretical calculations showed that a “no bond resonance” effect known as hyperconjugation acted as the main driving force behind the observed chemistry. Hyperconjugation was found to assist a number of substituted acylcyclopropanones in achieving the geometry required to ring expand, while those unable to gain hyperconjugative stability were found to decarboxylate.

Iron Biogeochemistry and Microbiology in Natural and Dredged Material Restored Salt Marsh Sites in Southeast Texas

Shannon Adams and Emily J. Smith
Mentor: Dr. Matthew Hoch

Marshes are experiencing subsidence and sea level rise that can cause detrimental effects to plant and animal life. Beneficial use of dredged material (BUDM) restoration of Chenier Plain coastal marshes helps mitigate the impacts of subsidence and seawater level rise on marsh health. Understanding changes in biogeochemistry and microbiology of iron and sulfur cycling microbes in declining sites versus BUDM restored marsh sites is important in understanding what aspects may influence marsh health. Marsh sediment cores and porewaters were sampled at stable, unstable, and BUDM restored sites and analyzed for a variety of geochemical parameters, as well as iron cycling bacterial taxa using 16S rRNA metagenomic sequencing. Iron levels for both Fe2+ and Fe3+ were found to be lower in unstable sites compared to stable and BUDM restored sites. Geobacter and Acidithiobacillus were the dominant iron reducing bacterial genera, however Geobacter predominated in BUDM restored sites, averaging at 85.8% out of the total iron reducing taxa. Acidithiobacillus had very low relative abundance in restored sites but composed 52.4% of the iron reducing taxa in stable sites and 43.9% in unstable sites. Leptothrix and Mariprofundus were the dominant iron oxidizing bacterial genera, with Leptothrix composing 69.9% of the iron oxidizing taxa of unstable sites and 41.8% of the iron oxidizing taxa of stable sites, and Mariprofundus composing 41.2% of the iron oxidizing taxa in BUDM restored sites. Gaining a better understanding of the biogeochemistry and microbiology in marshes can give a better perspective on how to improve attempts to restore marshes.

Status of Women of Color in the Dental Field

Samira Ahmed and Umera Ahmed
Mentor: Dr. Natalie T.J. Tindall

Every year, about 12,000 applicants apply for slots in the 65 U.S. dental schools (Wancheck et al., 2017). In 1970, one percent of dental school applicants were women, and in 2016, about 50% of the applicant pool identified as female (Slaper et al., 2018). While the ratio of female-to-male dentists and dental students has increased, the ratio and presence of women of color in the profession and in dental school are not evident. The experiences of women of color who are currently dentists or who are in students in dental school have not been explored in depth, which provides a unique niche.
for this research endeavor. The purpose of this qualitative research project is to explore the lives of current women of color dental students and as well as those women already in the field and see what experiences, motivations, and expectations they had before, during, and after their entry into the dental field. We will conduct qualitative interview with women of color in and out of dental school. Ultimately, we wanted to see how they faced challenges for who they were and how they came over it.

**The Nature of Evil in Middle - Earth**

*Kalan Bonnette*

*Mentors: Dr. Kevin Dodson and Dr. Nicki L. Michalski*

Beginning in 1937 with the publication of *The Hobbit*, the world was exposed to the vivid imagination of J.R.R Tolkien. In the years that followed, many found his Middle – Earth to be a mysterious land with problems similar to our own; one such problem being the nature of Evil. This paper examines two common ideas of Evil, the Manichean and the Augustinian, the former portraying Evil as something in and of itself and the latter as a falling away from an intended “goodness”. Through literary evidence from *The Silmarillion, The Hobbit*, and *The Lord of the Rings*, this paper asserts that Tolkien represents evil in the latter, as evidenced by many evil characters possessing a “fall” from Goodness to Evil, the ability to choose between Good and Evil, and the ability to recover from a “fall” (as demonstrated by Ossë). Each of these are defining characteristics of an Augustinian view of Evil, many of which are represented in Tolkien’s creation myth itself. This paper addresses common counter-examples and, through examining the nature of Orcs, the Silmarills, and the One Ring, proves these examples false thus providing a greater understanding of Evil and its role in Tolkien’s Middle – Earth.

**A Programing Academy to Increase Middle School Students’ Interests and Knowledge**

*Madison K Boudreaux*

*Mentors: Dr. Sujing Wang and Dr. Cheng-Hsien Lin*

This project presents material that increases interest in computer science by teaching Programming fundamentals via game programming with Scratch, a free drag and drop programming platform developed by MIT. The materials consist of 5 number of different modules. Each module contains a lesson power point that covers a few programming fundamentals each, follow along hands on exercises, and ending project that encapsulated the new skills that were taught. These materials were used to teach computing concepts to middle school students in three different venues in summer of 2018. Formal assessments found that the students experienced a significant increase in knowledge in computing and an increased interest in computing and likelihood of taking computing courses in the future.

**Autonomous Vision Based Object Classification**

*Steven Boudreaux*

*Mentor: Dr. Cagatay Tokgoz*

Autonomous navigation is a hot research topic that is becoming increasingly more popular. Navigation in unfamiliar or unknown environments such as battlefields or other planets like Mars is very challenging, and requires robots with the capability of autonomous navigation. For instance, a team of astronauts given a mission to explore Mars can be considered. The scope of their mission can be to collect unique artifacts using an autonomous robot. These artifacts are supposed to be returned to a mothership that will be sent back to the Earth to be studied. Avoiding obstacles such as rocks will be required, because they may prevent the robot from successfully completing the mission. In this project, an autonomous robot with vision based capabilities has been designed and is being implemented. Most structural components of the robot have been fabricated using a 3-D printer. A camera has been mounted on the robot to determine its location in a given environment based on lights and other identifiers at specific locations, search for and identify certain objects, determine their locations with respect to the robot, pick the identified objects based on the information on their locations, determine the location of a mothership where they will be placed, and place them inside their assigned slots in the mothership while avoiding certain objects. Image processing algorithms have been being developed using
Google’s TensorFlow machine learning libraries to identify objects, obstacles, lights and mothership, and for localization based on images from the camera.

Embracing and coming out as LGTBQ
Kelli Breaux
Mentor: Ms. Bonnie K. Loiodice, LMSW

Visibility Management is an ongoing dynamic process by which the LGTBQ youth make careful and planned decisions about disclosing their sexual orientations to whoever, if ever, they decide to disclose it to, and how they continue to monitor their sexual orientation in different social and economic environments. The Visibility Management scale is a series of questions that participants answered about their sexual orientation. The series of question are on a scale from 1 (strongly disagree) to 5 (strongly agree) about their feelings on disclosing their sexual orientation and when they choose not to disclose this information. The stage of this research is still in the beginning phase as my mentor and I are waiting for IRB approval. This research must be done so we as a whole can understand the affects of our decisions when faced with things that are unknown or under informed.

Expressive Art and Stress Levels in Nursing Students: A Mixed Methods Study
Kimberley Brooks
Mentors: Dr. Cynthia Pipkins, J.T. Seaman, Rebekah Seymour

Expressive art (EA) interventions have been well documented for decreasing the levels of biophysical markers [heart rate (HR) and respiratory rate (RR)]. Stress is a common psychological factor that affects physiological factors in college students. EA interventions have been researched as a positive cathartic effect on the “emotional process”. The purpose of this mixed method study was to explore the effects of EA on stress physiological and psychological factors in practicum nursing students. This study utilized a convenience sample of nursing students attending a post-practicum conference. Participants (n = 47) provided self-reported quantitative responses to demographics and the Perceived Stress Scale (PSS-10). Additionally, the biophysical markers (HR and RR) and psychological marker (Perceived Stress Level [PSL]) prior to and after the EA session were collected. Finally, participants were asked to describe how the EA session impacted their stress and describe their EA project. Preliminary results were calculated using IBM-SPSS® 24. Overall participant scores on the PSS (M = 20.8; "moderate stress") correlates with the PSL pre-intervention (M = 5.0; "moderate stress level"). The overall PSL score from the EA pre-intervention (M = 5.0) to post-intervention (M=3.4) decreased from a "moderate" to "mild" stress rating. The participants (n = 29) reported pre-intervention to "have never used EA as a stress management therapy" (No [82.8%] and Yes [17.2%]) to post-intervention of "I would use EA..." (Yes [n = 24; 82.8%] and No [n = 5; 17.2%]). The results provide preliminary data supporting the development of stress management interventions using EA for practicum settings utilized by nursing students.

Undergraduate Research from Boremont to Beaumont
Andrea Bru
Mentor: Dr. Katherine Hoerth

Beaumont is culturally defined and vibrant with city life, despite what people think. I have tackled the ins and outs of what is part of Southeast TX by using free verse poetry. The subject matter begins by admitting Beaumont is a boring town and how it lacks definition, but goes on to state there is more than meets the eyes. The last poem uses the five senses to define Beaumont as a whole place and gives a visual sense of what it’s like to see the city as home. The purpose of these poems is to shed light against people’s darkened opinion of Beaumont. These confessional poems are excellent for newcomers to Beaumont.

The Cultural Revolution of Traditional Gentrification in the Community of South Park: A Social Work Research Case Study
Gentrification is the improvement of a community to conform to middle-class standards. Private sectors and states often seek to aid in the process of gentrification without the input of current residents. Over the past several decades, the community of South Park in Beaumont, Texas, has declined due to lack of resources and gentrification is crucial for its survival. In this study, I used a qualitative research method to investigate the factors of a gentrification process that uses a community foundation made up of residents instead of a private sector or state in order to better understand how to effectively grow the socioeconomic status of the community. Findings in this study expressed the need for community engagement and revitalization. Data from the residents of South Park suggested that the community is suffering economic decline due to the lack of goods and services in the community. Resident data also expressed the concern of increased migration of individuals from South Park moving out to other areas because of increased crime rates, illicit drug activity, and gang affiliations. Community leaders and residents both understand the current socioeconomic climate of their community. Both groups feel the only solution to save South Park from total socioeconomic collapse is to invest in the youth and educate them on the resources and skills that are needed to bring back the once southern boomtown.

**The Reagan Era: Rise of Conservatism, Reaganomics, and U.S. Foreign Policy**

*Natalia Calderon*

*Mentor: Dr. Gwinyai P. Muzorewa*

On January 20, 1981, Ronald Reagan took up the presidency for the United States. Reagan became the new face of the growing conservative party in the United States. Throughout this era, there were many Americans who normally voted Democrat supported Ronald Reagan and his ideas. Ronald Reagan had many events that occurred throughout his presidency that will be discussed in this paper. In this paper, a few sources that were used came from *The Unfinished Nation*, as well as other scholarly journals. Therefore, this paper will be about the era of Ronald Reagan, focusing on the rise of conservatism in the country at that time, the issue with Reaganomics, and U.S foreign policy in countries such as Africa, Latin America, and the Middle East.

**En Route to Glucaric Acid from Glucose: Synthesis of Copper-Doped and Imprinted Polymers for Efficient Copper-Catalyzed Oxidation Reactions**

*Marina Cernik*

*Mentor: Dr. Gino Canlas*

Copper complexes are well known to catalyze various oxidation reactions, and in our quest to selectively oxidize $D$-glucose to $D$-glucaric acid, we are continually trying to find highly-selective catalysts that are recoverable from the reaction mixture. Taking inspiration from our previous work on zinc- and cadmium-imprinted poly-[vinylpyridine-co-(ethylene dimethacrylate)], we have created similar copper-based imprinted polymers by changing the linker to diethylene glycol dimethacrylate and/or equivalents of the monomer, in anticipation of the catalytic activity of the polymer-immobilized copper ions in the presence of other oxidants. We have tried using this polymer for the oxidation of benzoin to benzil with aqueous hydrogen peroxide or oxygen gas at room temperature; however, we did not observe any visible production of benzil. On the other hand, we also synthesized copper-doped polyaniline, a dispersible, conductive polymeric complex, which may act as an electroactive polyelectrolyte catalyst for bulk electrolysis. We envision that this catalytic system may allow us to perform the anodic oxidation of some organic substrates, and later on, glucose to their more oxidized counterparts.

**Workshops to Increase Middle School Students’ Interests and Knowledge**

*Ann Chapple and Madison K Boudreaux*
This project presents material that increases interest in computer science by teaching programming fundamentals via game programming with Khan Academy and Code.org along with two technical talks about Cyber Security, a growing interest topic. The materials consist of a hands on activity about permutations and combinations, a hands on activity describing mathematics in animation, an online project for students to take home to complete about game design, an online project for students to take home and design a website, and a hands on activity that demonstrated the importance of having a secure password. These materials were used to teach computing concepts to middle school students in three different venues in December of 2018 and February of 2019. Observations showed that students experienced a significant increase in knowledge in computing and an increased interest in computing and likelihood of taking computing courses in the future.

Pervious Concrete Pre-Treatment to Prevent Deicer Attacks: Exploratory Phase
Mateo Chevasco, Jarod Jantz, Nara Almeida
Mentor: Dr. Liv Haselbach

Pervious concrete is mainly used as the top layer of permeable pavement systems, allowing the rain water to pass through its structure, which might mitigate floods, by reducing the runoff. However, in cold climates, deicers applications for preventing or melting ice on the pervious concrete pavement surface might decrease the material strength, since there are evidences that traditional impermeable pavements have been damaged by those deicers. This research aims to verify the efficiency of chemicals that might pre-treat pervious concrete, to prevent specific deicers attack. The method consisted of the application of a pre-treatment solution on a group of 10 pervious concrete specimens and tap water on another set of 10 specimens, every day, for 10 days, letting them dry in between, at room temperature. Daily, before the water or solution application, the specimen’s masses were verified. After concluding this process and when the specimens have gotten sufficiently dry, they were subjected to a compressive strength test (ASTM C-39). Results denoted that both groups of specimens may have gained mass by the same rate, over the 10 days of application. Also, the pre-treated specimens’ compressive strength seemed to decrease with statistical significance, since a 95% confidence interval hypothesis test was performed, and the null-hypothesis was rejected (p-value = 0.02499). Although this decrease in strength, the pre-treated specimens seem to have gained flexibility, due greater strain values during the compressive strength test. Sample size should be enlarged to statistically validate this gain in flexibility.

Thermo-Optical Characterization of Organic Verdzayl Biradicals
Caitlyn Clark, Emily Ingram, and David Brook
Mentor: Dr. Ozge Gunaydin-Sen

Recently, biradicals have become a crucial topic attributing from their unique properties. Early studies show that magnetic properties found from these systems on the molecular level could be used extensively in the electronics, computer technologies, and renewable energy fields. More recently, the magnetic-effect of photocurrents gives great insight into using singlet-triplet excitations in manufacturing and developing organic solar cells, and while understanding their photophysical properties, it can also lead to the manufacturing of other new organic magnetic materials. Unlike previously studied model biradicals, which are stable only at low temperatures, these biverdazyl biradicals are stable at room and higher temperatures. This allows experimentation to be done at ease above room temperature. Being able to study these biradicals will accurately translate their structure-property relationships and establish their excitations. Specifically, we collect and analyze the data utilizing thermo-optical spectroscopy to evaluate the spin gap between the singlet ground state and triplet excited state of two biverdazyl biradicals via Curie-like population analysis. Switching between these states allows for a change in color in this model, and this can lead to an improved understanding of their interactions via change in temperature and possibly with the magnetic field.

Customer Perceptions about Caribbean Cuisine in the US
Despite the geographic proximity to USA, the Caribbean cuisine has received little research attention. We propose to explore customer perceptions about Caribbean cuisine, and the influence of such factors on the marketability of independent ethnic restaurants within the US. To accomplish our purposes, we have developed a questionnaire examining the demographics, perception about food attributes, and experience with Caribbean food of potential customers. It also includes scales to measure food neophobia, food literacy, power of food, and willingness to try. Approximately 180 US customers will be recruited for an online survey on Qualtrics. The data will be analyzed through descriptive statistics, t-test, factor analysis, and regression analysis. Results will demonstrate how food-related factors and potential consumers’ idiosyncratic characteristics are related to customers’ willingness to try Caribbean cuisine. Findings of this research can help restaurants understand common and unique characteristics of Caribbean food by providing practical implications for Caribbean food restaurants’ marketing strategies.

**Computational Study of the Effect of Substituents on the [2+2] Cycloaddition of Alkylated 3(2H)-furanones**

*Madison V. Demel*

*Mentor: Dr. Christopher Martin*

A study of alkylated 3(2H)-furanones is currently underway to determine if the size of substituents on the 5-membered ring have a significant effect on the ability of the molecules to undergo photochemical [2+2] cycloaddition to form a dimer, or if exposure to UV radiation results in beta cleavage followed by rearrangement. Experimental results obtained in our lab along with those reported in the chemical literature indicate that smaller groups such as -H and -CH₃ (methyl) result in addition, whereas larger groups like -CH₂CH₃ (ethyl) and -C(CH₃)₃ (tert-butyl) proceed along the beta cleavage pathway. Using computational methods in Gaussian 16 software, potential energy hypersurfaces of the reaction pathways with various alkyl substituents can be created to determine the energy barrier that must be overcome for dimer creation, and therefore establish a maximum energy threshold for the cycloaddition pathway to occur. Current progress has generated results for the unsubstituted variation, which reports an activation energy of 1.1 kcal/mol, a very small value consistent with the experimental data that cycloaddition will occur. Progress has also been made for the methyl and ethyl group substitutions, but increased difficulty with these more substituted molecules has slowed creation of potential energy hypersurfaces. Once the data for these molecules is finalized, the results can then be applied to other 3(2H)-furanone systems to help predict their photochemical behavior and potentially to design compounds that have certain photochemical properties. Specifically, this data will be useful in understanding the unfortunate photosensitivity side effect caused by some furanone-containing pharmaceuticals.

**An Attempt to Investigate Bias through Shifting Group Boundaries**

*Arthur Davis*

*Mentor: Dr. Jeremy Shelton*

For two decades, researchers have been studying implicit bias and its behavioral impact on individuals. To date, published research suggests that unconscious (i.e., implicit) prejudice internalized by Caucasians negatively influences how these individuals interact with African-Americans. Previous research also suggests interventions that may help reduce this implicit prejudice. In the ongoing research project, the investigators continue to investigate one such intervention (shifting group boundaries through competition) to better understand the process by which it helped to reduce implicit prejudice levels. Thus far, the investigators have yet to successfully replicate previous research findings via the scientific method. Therefore, determining the exact nature of how the previous successful intervention produced statistically significant differences has yet to be determined. Although, alternative explanations as to why previous research is not easily replicable has also been examined. The most prominent conclusion from this study is not the prospective statistical insignificance of the study’s
findings, but the Implicit Association Test’s (IAT) inability to adequately measure an individual’s level of implicit bias and its low level of test-retest reliability.

**Voice Characteristics during face-to-face vs Telephone Conversation**  
*Caitlin Eakin*  
*Mentor: Dr. Nandhu Radhakrishnan*

Speech communication includes body language and gestures. However, communication via telephone may not involve gestures or body language. Speakers may increase vocal effort to compensate, which may be the reason for voice problems in telephone operators and call center agents. The goal of this research is to analyze voice characteristics in audio and video samples of research participants during telephone and face-to-face conversation. Voice analysis and gestural communication will be analyzed. 19 subjects, 7 males and 12 females, within the age range of 20-50 years were recruited for this study. Subjects who had an existing voice problem or disorder were be excluded. Each subject was simultaneously audio and video taped in two scenarios, (1) a face-to-face description of the recipe to make a Peanut Butter and Jelly sandwich and (2) sharing the same recipe over the telephone. In addition, participants read a passage, various sentences, and participated in a spontaneous speech sample regarding their educational goals and spring break plans. Descriptive analysis of body language and gestural communication that was videotaped and presence of any vocal tension will be performed for both the scenarios. Similarly, acoustic analysis of voice recorded during these scenarios will be compared. Measures such as fundamental voice quality, intensity, and intonation will be compared. The results of this study will indicate differences between the two types of communication and will be presented further at the Expo. This will assist speech language pathologists in instructing patient population whose occupation involves communication via telephone.

**Mutational and Binding Analyses of the Bacterial Protein Hfq**  
*Amanda Essoh*  
*Mentor: Dr. Maxim Soukhodolets*

The bacterial protein Hfq is known to function in nucleic metabolism and signaling but its specific function is not yet known. It is thought that Hfq contributes to the virulence of pathogenic bacteria by altering mRNA and small regulatory RNA interactions. Research has also indicated that Hfq-DNA interactions may play a role in its function, however, this has not been proven. Our preliminary task was to perform the mutagenesis of Hfq by substituting amino acids along the predicted DNA binding sites which was successfully completed. The more recent stages of our research have been focused on utilizing band shift assays to understand how the wild type protein binds to DNA. Currently, our research remains in progress. We have conducted pilot experiments which have led us to conclude that the fluorescent probes we chose do indeed bind to the wild type Hfq protein. To further our research, we plan to continue these band shift assays with the addition of mutated Hfq as well as the variation of conditions to better characterize the role of Hfq in DNA binding.

**Fantasy, Morality, and Philosophy: The Value of Mythical Storytelling in Tolkien**  
*Kaily Garcia*  
*Mentor: Dr. Nicki Michalski*

Stories serve many roles in society. They help us understand our world, our past, and ourselves. Stories that do not take place in the real world still have value in helping readers grow and develop morally and intellectually. One of the purposes of mythologies is to provide the audience with examples of heroic behavior and to show how a person can grow morally. Different mythologies and stories also represent different philosophical ideas. The modern equivalent to this type of storytelling can be found in the fantasy and sci-fi genre. Both ancient mythologies and modern fantasies contain supernatural elements, yet both of them are meant to teach people
philosophical and moral ideas on the real world. The works of J.R.R. Tolkien are an example of this, as they contain examples of heroism and questions about the nature of evil. Tolkien’s books, like many other fantastical novels, use the realm of fantasy and the supernatural to give readers ideas on heroism, morality, and philosophy.

Analyzing the Phases of the Moon
Jessica Getz, Michaela Garlaska, and Brittany Bricker
Mentor: Dr. Mamta Singh

The purpose of this study was to use guided discovery teaching method to teach phases of the moon to 4th grade students. Science 4th grade TEKS was used: §112.15. Science, Grade 4, Adopted 2017. (b) Knowledge and skills. (8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to: (C) collect and analyze data to identify sequences and predict patterns of change in shadows, seasons, and the observable appearance of the Moon over time. Materials used were writing utensils, glue sticks, white construction paper, markers, moon phase cards, torn color construction paper and moon phase worksheet. The post activity results suggested that students were be able to distinguish between all phases of the moon and create at least one visual representation with 98% accuracy.

Addressing Special Needs within the ARTS Classrooms
Katie Gibson, Chaston Miller, and Rebekah Moreau
Mentor: Dr. Mamta Singh

The purpose of this study is to investigate different strategies to accommodate special needs students within the ARTS classroom. This study assessed how the teachers include special needs students, and if they would benefit from other professionals or specialized training. The survey research method was used to collect the data from selected educators from five different school districts in the Southeast Texas area. Overall, the results suggested that most teachers were qualified to teach special education, but not in every situation. Our goal is to create a new method for the assimilation of special needs students and push the boundaries further to provide proper training and accommodation for teachers. This will add value to the students’ lives as well as including those students in a harmonious classroom environment.

Effect of Statutory and Regulatory Protection in Investment Decision in Argentina, Chile, Mexico and Venezuela.
Alexis Granados
Mentor: Dr. Gevorg Sargsyan

When making an Investment Decision, the individual’s or investment company’s main concerns are: return on investment, liquidity, and statutory and regulatory protection. The research question of this study is “How does statutory and regulatory protection affect investment decisions in Argentina, Chile, Mexico, and Venezuela?” The goals of current research are: implement the survey, and analyze and compare survey results. This research project will help us to discover the effect of statutory and regulatory protection in investment decisions in Argentina, Mexico, Chile, and Venezuela. Also, the study will determine where Statutory and regulatory protection stands among the above mentioned main investment concerns in our research countries. Research confirms that statutory and regulatory protection is important factor and it affects investment decisions in Spain, US and Russia. However, we want to measure the level of the importance of statutory and regulatory protection in investment decisions in Argentina, Chile, Mexico and Venezuela. We also will contrast the statutory and regulatory protection with return and liquidity factors in each research country. The study results will give us an opportunity to compare our research countries and link it with Spain, US and Russia in existing research of Fernández, French, Martí and Sargsyan. A database of investment companies and financial advisory firms of
Mexican, Chilean, and Argentinian capital markets has already been created. The database will be used as a focus group of survey planned to implement during this study.

**Feminisms: The endless fight against sexism.**

*Sur Span Peninsular Lit I*

*Guadalupe Gomez-Angeles*

*Mentor: Dr. Jaime Retamales*

Feminism has been considered one of the most controversial topics around the world during the last decades. The object of this study is to identify the difficulties impacting women's lives and identify the changes necessary to move toward equal footing in society. Its scope is to examine several of the obstacles, laws, and individual contributions that have moved society progressively toward equality. More than a word, feminism carries a sentimental meaning to its supporters giving them a sense of freedom and justice. Being a “feminist” carries a feeling of social responsibility and inherent pride, but it had often historically been met with discrimination, violence, and stereotypes.

**The Role of Statistics in the Fight against Alzheimer’s Disease**

*Grace Granger*

*Mentor: Dr. Jasdeep Pannu*

At some point, on some level, we all have to ask ourselves, “What makes life meaningful?” Our motivations stem from the answer, which for most people usually boils down to this: the people we meet and the experiences we share, held in the library of our memories. If nothing else, we’ll always have that—at least we hope so. Alzheimer’s Disease is the leading cause of dementia, and is projected to become more common in the coming decades. Although researchers aren’t yet able to determine with certainty whether or not an individual will develop Alzheimer’s, we have access to statistical data that has helped determine some factors that affect one’s probability of doing so. Even though certain protection is not yet available, what can we do to reduce the risk in ourselves and loved ones? The answer to this problem is largely already available from sources like the Alzheimer’s Association’s Facts and Figures annual reports. Modifiable risk factors include a healthy diet, physical activity, managing cardiovascular health, and sustained cognitive activity. Other powerful tools include awareness for the disease, and increased research funding to uncover further answers. Alzheimer’s Disease is about more than memory loss; it slowly kills the brain and is ultimately fatal. Because Alzheimer’s is the sixth leading cause of death in the USA, it is important for individuals to be aware of their risk for developing it, something we are able to gauge using the statistical data available.

**History and Legacy of Herbicide Use During the US-Vietnam Conflict**

*Julianne Haidusek*

*Mentor: Dr. Rebecca Boone*

The United States-Vietnam conflict, occupying the decades between 1955 and 1975, saw the extensive use of herbicides as a means to clear vegetation and destroy food supplies in southeast Asia. These herbicides greatly threatened environments and populations exposed to it, and the toxins appear to have had a continuing effect in the areas of use. It is the purpose of this research to explore the usage of such herbicides and trace their ongoing effects in the decades after the conflict. Varying viewpoints from the world of academia—including military and medical records and professional commentaries from the fields of chemistry, history, and humanitarian law—have been explored at length to analyze herbicide usage during the conflict, its immediate effects, and its diplomatic, socioeconomic, and ecological implications in post-conflict history. In doing so, attention is brought to the ongoing situation caused by such herbicides, thereby allowing post-conflict historical research to act as a catalyst for change.
The Effect of Formal Resolutions or Statements given by Nations and Concerning the Israeli-Palestinian Conflict: Who Helps Most?

Ali Hamza
Mentor: Dr. Terri B. Davis

My research examines the ways in which formal resolutions or statements by foreign countries impact the Israeli-Palestinian conflict. Specifically, I analyze whether and how formal resolutions or statements by four influential countries affect the intensity of protests in both Israel and Palestine; the responses given by the international community because of resolutions and statements made by the case study countries; and diplomatic actions taken by the United Nations after such resolutions and statements are issued. I hypothesize that countries that are geographically closer to the Israeli-Palestinian conflict will promote policies that are more neutral and objective than those advanced by countries geographically located further away from the conflict. I conclude with a discussion about the current state of the conflict and offer a proposal based on my findings for addressing the conflict.

Development of Novel Techniques for Tissue Engineering Applications

Omar Hamza and Alexus Locke
Mentors: Dr. Ian Lian and Dr. Ping He

The artificial construction of tissue is currently incredibly expensive and inefficient. These tissues are vital to the biochemical and biomedical fields however. Our project focuses on different novel techniques to develop cheaper alternatives to tissue engineering including 2D and 3D scaffold printing, soft lithography, surface modification, and material science engineering. By utilizing these novel tissue engineering techniques, we will be able to create tissue at a fraction of the present-day cost and further contribute to the ever-growing field of biochemical and medical studies. Our project is still currently in progress as we continue testing and progressing in each of these techniques.

Potential of Virtual Reality for Industrial Construction: Design and Field Operation

Mason Harris and Shawn Miller
Mentor: Dr. Seokyon Hwang

It is challenging to ensure design and construction performance in industrial construction projects due to the highly complex nature of industrial facilities. The objective of this research is to investigate the impact of virtual reality (VR) technology on the design constructability and field operation. To determine the magnitude of impact, a metric was developed to find how much rework could be reduced by using VR technology throughout the construction process. The primary findings of this research are as follows. The virtual reality provides a unique environment that allows both designers and constructors to fully immerse themselves in 3D models and 4D schedules. The environment enables them to perform constructability analysis and pre-construction visual simulation collaboratively among various project participants at the early stage of a project. These efforts ultimately bring significant improvement in reducing change orders and ensuring the quality of construction activities. Additionally, it was found that VR technology can be effectively utilized to train construction workers, especially heavy equipment operators, and thereby to reduce accidents on the construction site. While the cost of VR technology is not negligible, the potential cost savings throughout the design and construction phases from implementing the technology are significant enough to justify the adoption of the technology into industrial construction. The findings of this research are expected to increase the awareness of the potential of VR technology among design and construction personnel working in the industrial construction industry.

Vocal Fry: Extent of Pathology and Tolerance among Listeners

Hope Hardin
Mentor: Dr. Nandhu Radhakrishnan
Voice production is an intricate balance of respiration, phonation, and resonance. Speaking voice parameters are different between men, women, and children. Over the years, these parameters have changed along with culture. Vocal fry, an erratic form of vocal fold vibration, has become popular among the younger generation. Vocal fry is considered unhealthy among voice scientists and clinical professionals. The aim of this project is to analyze listeners’ perception towards different levels of vocal fry. This research included two sets of subjects, (a) speakers and (b) listeners. 19 speakers between 18 and 50 years of age were recruited for this project. These participants were recorded using microphone and electroglottograph, a device that detects vocal fold vibrations, during spontaneous description of their spring break, major, and reading a standardized passage (the rainbow passage). Perceptual and electroglottographic analysis of vocal fry was performed by the research team. The research team recorded ten sentences with voluntarily induced vocal fry. Each sample had 0% to 100% levels of vocal fry. These 10 files were randomly played to listeners. The listeners were instructed to rate each sample as normal or abnormal across a scale of 0-10 (0 = normal, 10 = extremely abnormal). The study concluded that vocal fry was present in this population during spontaneous speech. Further results will be revealed at the Expo. The implication of this study is to educate the general public about vocal hazards due to abnormal use of voice.

Systematic Approach for Quality Level Assessment of Steel Products

Jason Higgins, Ana Moreno, Jesus Perez, and Manuel Martinez
Mentors: Dr. Berna Tokgoz and Dr. James Curry

The main objective of the study is to create a measurement tool by using a systematic approach for capturing quality levels of different products of a steel company. The company has numerous steel mills across the United States, Canada, and South America. The company is currently using semi-log papers to measure the quality levels of their steel products. However, this quality measurement process is outdated, time consuming, and lacks accuracy. To automate this process, a user-friendly software program and a website have been developed in this study along with the employee-training manual. In the first part of the study, a Microsoft Excel® model was developed, relying on an Access® database and later applied in a software. An employee-training manual for the new quality level measurement process has been written in the second part of the study. The employees can understand, learn, implement the new quality level detection method practically in their daily work life but most importantly, set a standardized procedure across the multiple mills in order to achieve better outcomes. As a result, the company will deliver more accurate results to further on make important decisions and greatly decrease the processing times. This approach will have a major impact on the company by saving money and time in the long run. This method will instantly give the company an edge in the manufacturing industry.

Company Sponsors: Dr. Bhaskar Yalamanchili, Peter Power

Necessary Improvements in Records and Possible Bias toward Different Races in Jefferson County

Lillian Hill
Mentor: Dr. Jerry Bradley

Due to the lack of a modern criminal records system in the Jefferson County Clerk's Office, formatting a database on an Excel sheet and producing charts and graphs which present the criminal activity statistics from 2018 is necessary for the ease of access for current and future researchers. Gathering statistics for this report aided in the process of presenting statistics with the following details: race, crime committed, fine, plea bargain and whether they accepted it, and if they are a repeat offender. Based on these details, charts and graphs were produced from the accessible data taken from the courthouse. This report includes an infographic to present the most important information at the end of the study. From the database, graphs, and charts, sharing the criminal activity statistics with the Beaumont Police Department will aid in the process of proper and accurate record keeping for 2018. The final product will help future researchers access the criminal activity statistics from the crimes committed in Jefferson County in 2018 more easily.
The purpose of the present study is to assess the different types of study-system and which systems work best for different students and subjects in a middle school setting. The survey research design method was used for this study. The participants were in-service teachers of the middle school in South East Texas. The results suggested that most teachers feel that out of the main seven study systems flashcards, chapter outlines, and reviewing games tend to be the most effective study systems. However, the numbers did fluctuate depending on certain grades, subjects, and class levels.

The Fall of the Berlin Wall and What it Meant for Communism and the Cold War
Angela Hutson
Mentor: Dr. Gwinyai P. Muzorewa

This paper will attempt to explore the world-wide repercussions of the Berlin Wall, both its being built and eventually being taken down. Using articles written about the feelings of the people of Berlin about the Wall being built and how it affected them personally as well as the economy. As well as articles that discuss the city of Berlin once it is reoccupied after the Wall is taken down. These sources will help to show the reader the feelings of the people in the time when this was happening, how communism really was to the people. Additional sources include: textbooks, which give the reader the facts about what was going on throughout the world and the history of how communism came to become such a factor in the political world, and interviews with people from South East Texas who have seen the wall recently and others who were in the military or Germany during the years that the wall stood and fell. This paper is intended to be an overview of the way the world viewed communism after World War II and throughout the space of the Cold War, including putting into perspective what the world economies look like today in respect to communism versus capitalism. Therefore, this paper will describe the events that led up to and followed the building and falling of the Berlin Wall as well as attempt to answer the question, is the world in or headed to a second Cold War.

The Search for Baryon Resonances – the Excited States of Protons
Alek Hutson
Mentor: Dr. Phillip Cole

Protons belong to a family of particles known as baryons. Baryons are formed of three quarks, all bound together by the strong or nuclear force. We seek to understand the inner structure of excited states of protons in terms of the quark degrees of freedom. Similar to how the atomic spectroscopy of excited atoms was the incisive tool revealing the shell structure of electrons, we seek to study the underlying pattern of the three-quark system of baryons. Experimental physicists at Thomas Jefferson Laboratory in Newport News, VA use a process akin to atomic spectroscopy in which a high-energy beam of electrons is incident upon a proton target. This interaction will excite the quarks inside the proton and will thereby create a baryon resonance, which is an energetic proton. These resonances will then immediately decay into final-state particles, such as a proton and a pi meson, which are measured with CEBAF Large Acceptance Spectrometer (CLAS12). CLAS12 just started taking data in the Fall of 2018. While these proton resonances may decay in many ways, my analysis focuses on resonances for the single-meson decay mode, i.e. a $p\pi^0$ or $n\pi^+$. For this analysis, I used the C++-based analysis tool called ROOT, developed at CERN, to analyze these CLAS12 final-state topologies with various relativistic kinematic variables. By comparing my results with the results of similar data sets and with known resonance values, I could gain a better understanding of how the detector or the data set itself needed to be calibrated.
Studying the Effects of Catalysts on Ammonia Borane-Polyethylene Oxide Composites for Hydrogen Fuel Cells  
Emily Ingram, Caitlyn Clark, and Krishna Karel  
Mentor: Dr. Ozge Gunaydin-Sen

Recently, alternative fuel sources have been a popular foundation of study in the research community. Carbon-based fuels currently dominate as a source of energy due to their wide-spread uses. However, as resources decrease and environmental challenges increase, the need for alternative fuel systems also increases. Hydrogen has been considered to be one of the best alternatives because of its abundance and clean byproducts. A safe and effective way to use hydrogen is through chemical hydrogen storage. It has been proposed that a promising candidate for hydrogen storage is modified ammonia borane (NH\(_3\)BH\(_3\), AB) composites. AB has a high hydrogen content of 19.6 wt% and willingly decomposes around 117 °C giving one mole of hydrogen. Moreover, the usage of AB is limited due to its high dehydrogenation temperature and production of unwanted impurities that could poison the fuel cell. Implementation of polymers (i.e. polyvinylpyrrolidone) and catalysts (magnesium chloride, MgCl\(_2\) and calcium chloride, CaCl\(_2\)) to AB have proven to sequester unwanted byproducts and lower the first hydrogen release temperature. The current study investigates composites of AB with polyethylene oxide (PEO, M\(_w\): 400,000) with MgCl\(_2\) and CaCl\(_2\) using different ratios of AB. Data analysis revealed decreased dehydrogenation temperature of AB from ~ 117 °C to ~ 86 °C for the composites. Quantification of activation energies showed improvements in kinetics of the polymer composites. These results demonstrated the concertedness of polymers and catalysts to lower the temperature of hydrogen release and improve kinetics of AB, making it more suitable for hydrogen storage.

Analyzing the Incidence Rates of Gonorrhea, Syphilis, Chlamydia, and HIV, in Port Arthur, Texas  
Afsana Islam  
Mentor: Dr. Ashwini Kucknoor

Recent reports from the Center for Disease Control (CDC) have shown a drastic increase in the incidence of sexually transmitted diseases (STDs) across the United States. The goal of this project is to determine the incidence of these STDs in the Beaumont-Port Arthur area. De-identified data obtained from the Port Arthur City Health Department were analyzed to determine if the findings from our local area were similar to those from the CDC reports. The data included reports of Gonorrhea, Chlamydia, HIV, and Syphilis among different age groups (13-25 years, 26-38 years, 39-65 years) from 2013 to 2017. Approximately 80% of reported Chlamydia cases came from the 13-25 year age group, with the group's incidence rates gradually increasing each year. Similar trends were found in the reported Gonorrhea cases, with approximately 67% of reports coming from the 13-25 age group. However, each age group maintained a relatively constant number of reports of Gonorrhea each year. The reported Syphilis cases from the 13-25 and 26-38 age groups displayed much variability over the years. However, the data shows a decline in reported Syphilis cases among the 39-65 age group. While the results of the study did show some of the trends found in the national study as per the CDC reports, it did show some variations, which can be attributed to the sample size and also especially since there are more possible cases that are not reported. Thus, there is an immediate need for creating awareness of STD's, especially among the target population.

Effects of Varying Cell Culture Conditions in SKNO-1 Acute Myeloid Leukemia (AML) Cells  
Cade Johnson and Carlo Vanz  
Mentors: Dr. Ian Lian and Dr. Chun-Wei Yao

SKNO-1 is a cell line of t(8;21) Acute Myeloid Leukemia (AML) that was established from a male, twenty-two years of age, who was in his second relapse. Other AML cell lines with t(8;21) have shown variance in cell division rates when placed under normal and hypoxic conditions with hypoxic conditions producing greater division speeds. This effect is likely due to one of the hallmarks of cancer, derailing cellular energetics. SKNO-1 cells will
be placed under varying hypoxic conditions to determine if the cells are capable of upregulating an additional pathway (such as the upregulation of GSH in NB4 cells) in order to meet the energetic demands made by the cancer cell for its characteristically rapid cellular division. Additionally, certain conditions may provide some cancer cell lines with an advantage over clinicians, namely an increased ability to resist cellular death when exposed to some chemotherapeutic drugs. Our assays will quantify the effects of Cisplatin, Taxol, and Doxorubicin Hydrochloride on the SKNO-1 cell line in order to provide useful data to clinicians and other researchers on how the t(8;21) mutation could possibly impact the prognosis of AML patients.

J.R.R. Tolkien, The Political Scientist: How Tolkien’s Political Ideology and Views Represent Themselves in His Works
Govin Kaggal
Mentor: Dr. Nicki Michalski

In Letter 181 of *The Letters of J.R.R. Tolkien*, J.R.R. Tolkien once wrote to Michael Straight, the editor of *New Republic*, that *The Lord of the Rings* was “written to amuse (in the highest sense): to be readable. There is no . . . moral, political, or contemporary in the work at all.” In simplest terms though, his statement makes little sense. While Tolkien may have intended for his stories to simply be readable, nevertheless, he still wanted to provoke thought and intellectual conversation among his readers, encouraging them to imagine a better world. This leads into the discussion of Tolkien’s ideology and political views which play a large role in the development of *The Silmarillion*, *The Hobbit*, and *The Lord of the Rings*. These ideas are through different characters, symbols, and events. By meshing these views with the different aspects of his famed books, Tolkien presents to his readers his ideas for what he believes would amount to utopia.

Student Career Preparation: Interactions with the Deaf Community
Baron Douglas Kane
Mentor: Dr. Laura Maddux

Individuals in the Deaf community have unique needs when it comes to professionals providing services to them in the public sector. Often, those professionals lack the appropriate training to provide appropriate care. This presentation will provide a description of a research study designed to test a remedy for this disconnect and include preliminary results for that study. In this study we conducted a pretest, presented a workshop lecture about Deaf community issues, conducted a posttest, and have plans for a delayed posttest. We completed a total of 6 workshops (5 with nursing students & 1 with social work students) and will present the data we have been able to analyze thus far. Presently, through our analysis, we see a trend that leads us to believe that our workshops were beneficial to both groups.

The Effects of Society on the Female Body Image
Fizzah Noor Khan
Mentor: Dr. Raymond Doe

This research paper discusses the effects of society on the female body image and how these societal pressures cause mental and physical health issues in women. Society and social media play a huge role in portraying the standards women need to meet in order to obtain a socially acceptable body image. Not meeting the idealized perception of beauty and body impacts a woman’s life by leading them to become mentally or physically unstable. Insecurity, low self-esteem, and psychological issues can all develop from the pressures women experience regarding the way they look. Finally, this research paper explores how negativity relating to a female’s body image can take a toll on her life, decisions, and values. As this worldwide problem has increased throughout the years, women have come together to work against it. Society continues to negatively affect women regarding their body image; however, social and psychological awareness will decrease this global issue.

The Risk-Need-Responsivity Model and Its Effectiveness with At-Risk Youth
Identifying the unique characteristics of high-risk youth is critical in determining risk factors for juvenile offenders. The application of the Risk-Need-Responsivity (RNR) model has shown to be an effective intervention with adult populations, including decreasing recidivism rates. The RNR model focuses on three principles: risk, need, and responsivity. “Risk” addresses the ability to predict criminal behavior. “Need” focuses on the specific criminogenic needs, and “responsivity” lays out the framework of treatment. This research project considers characteristics of at-risk juveniles and determines the effectiveness of applying this model to juveniles considered to be high-risk youth. The study was conducted by collecting secondary data from Jefferson County Juvenile Probation and analyzing the rate of recidivism for high-risk juveniles. Data indicates the RNR model, implemented six months ago in this facility, is effective with reducing recidivism rates.

**Overcoming the Journey to Mordor: A Look of How J.R.R. Tolkien Wrote to Process War Trauma**

Aurora Maldonado

*Mentors: Dr. Nicki Michalski and Dr. Kevin Dodson*

Against J. R. R. Tolkien’s assertions that his novels were not intentionally influenced by his life experiences, scholars have developed theories that indicate otherwise. One such theory argues that Mordor represents the place the Battle of the Somme occurred in during World War I. Likewise, the event that is most central to the *Lord of the Rings*, and that incorporates other major themes, is Tolkien’s war experience in World War I. By looking at Tolkien’s war experience, his devout Catholic faith, and the significant value he placed on friendship, I will explore how Tolkien’s works were a way to process and overcome his war trauma. Tolkien’s Catholic faith will prove to be a major underlying theme propelling the popular fantasy series. This will be used to argue that not only was Tolkien processing the war trauma that he endured, but that he also had to re-affirm his faith after the horror and grief he experienced as consequence of the war. After spending many years writing and editing his novels, Tolkien had a firm stance on his faith and in how the events he witnessed could have meaning.

**Negative Effects of Over-Compacting Asphalt Concrete Pavement on Roadway Surfaces**

Ryan Malone and Charlie Kappelman

*Mentor: Dr. Seokyon Hwang*

Over-compacting asphalt concrete pavement (ACP) can develop stress in the coarse aggregate of the mixture beyond its yielding stress, which results in a rupture or break of the aggregate and consequently permanent damages to the surface of the pavement. The objectives of this research are: (1) to examine how over-compaction damages the surface of ACP; and (2) synthesize the best rolling compaction practices to prevent over-compaction of ACP. Concerning the first objective, the research team conducted Hamburg Wheel Tracker test using four 6” ACP molds made of the same aggregates, but different asphalt binders. The team identified and evaluated the best rolling compaction practices through a comprehensive literature review. Hamburg test results were analyzed to determine how many passes of rolling each mixture can withstand before failure and examine the resulting damages. The test was found to be an effective method to determine an appropriate amount of compaction. The best practices of rolling compaction include: overlap 3-4 inches of the joint between cold and hot panels, roll in a slight arc toward the center of panel, roll the end of each subsequent pass beyond the end of adjacent and previous pass, and limit the length of rolling zone to maintain a constant distance between a compactor and a paver. The research findings are expected to be used effectively to alleviate the over-compaction problem. It should be noted that the Hamburg test results are limited where there can be a variety of ACP mixture types.

**A Comparison between Mental Insanity and Maniacal Madness: Comparing Edgar Alan Poe’s “The Tell-Tale Heart” and Charlotte Perkins' “The Yellow Wallpaper.”**

Morgan Martin
Unreliable narrators have long been a fascinating subject in the field of literature. Two stories that very much symbolize what an unreliable narrator is are “The Tell-Tale Heart” by Edgar Allan Poe and “The Yellow Wallpaper” by Charlotte Perkins. A comparison was made between these two stories by categorizing the narrators of each and examining their motivations in the story all to show how similar, yet utterly distinct each narrator is from the other. It was found from critically analyzing the individual texts, and reading a study done by Theresa Heyde in unreliable narrators, that while both narrators are categorized in a similar way they differ greatly in their motivations. In a general view, both narrators seem exactly the same because they are both insane. However, on closer inspection it becomes clear that these two narrators are very distinguishable underneath their respective layers of insanity, something that readers should understand when reading these two works of literature.

**Triboelectric Nanogenerators as an Alternative Power Source**  
*Tyler Martin*  
*Dr. Cristian Bahrim*

Triboelectric Nanogenerators are a class of emerging nanoscale power generation systems receiving special attention due to their novel approach, high power density, and simple design, which can find widespread use in various areas such as industrial applications or public transit. In contrast to ordinary nanogenerators, such as the Piezoelectric class, this system utilizes the contact electrification created by the Triboelectric Effect in order to produce charges. This is achieved through the utilization of materials with opposite triboelectricity producing adhesion, thus capturing electrons from the other material. The magnitude of this contact electrification is affected by electric properties such as electron affinity, coefficient of static friction, and electrochemical potential, meaning there are numerous variations possible for generation of electric power. The goal of this paper is to analyze the feasibility and effectiveness of Triboelectric Nanogenerators in comparison to other well-established methods, such as Piezoelectric or Pyroelectric variants.

**Structural and Mechanical Characterization of High Entropy Alloy Coatings Fabricated by Reactive RF Magnetron Sputtering**  
*Tyler Martin*  
*Mentor: Dr. Keivan Davami*

High entropy alloys (HEA) are a unique class of metal alloys comprising five or more elements in equiatomic proportions and are becoming the focus of significant attention due to their highly desirable properties. These novel materials can exhibit significantly higher strength-to-weight ratios, fracture resistance, tensile strength, as well as oxidation and corrosion resistance when compared to traditional binary alloy systems such as iron-based materials. It is the goal of this research to synthesize a thin-film (AlCrMoTaTiZr)Nx alloy using gas-phase processing wherein a reactive magnetron sputtering system will be used to carefully control the material’s elemental composition. With the synthesized HEA film, a series of characterization techniques will be performed with the aim of discovering the material’s intrinsic structural and mechanical properties.

**Heroism in the Works of J.R.R. Tolkien**  
*Emily McCall*  
*Mentors: Dr. Nicki L. Michalski & Dr. Kevin E. Dodson*

Heroism throughout Tolkien’s works is varied in its type and presentation, but the forms of heroism present also play an integral role in the overall intended meaning of the work itself. Tolkien’s heroes differ in background, motivation, and deed, with the author shifting the typical cast of heroes found in the chronological beginning of his works, *The Silmarillion*, to the more modern heroic ideals found in his world’s last work, *The Lord of the*
Rings. This paper will explore the kinds of heroism found in Tolkien’s works, along with identifying the types of heroes the characters from the various stories represent. Topics addressed within the presentation include the Great Man Theory and its relation to Classical and Everyday Heroes, Jungian archetypes in relation to Assertive Heroes and the Hero in Society, as well as a comparison of the contrasting heroic themes of *The Silmarillion* and *The Lord of the Rings*.

**Rhomboid Gene silencing using siRNA transfection in Trichomonas vaginalis, a human STI causing pathogen**

*Emily McCall, Guadalupe Cisneros, Haya Alani, and Katelyn Meaux*

*Mentor: Dr. Ashwini Kucknoor*

*Trichomonas vaginalis* (Tv) is a protozoan parasite that causes Trichomoniasis, a sexually transmitted disease in humans. This organism is capable of penetrating the mucosal lining of the genital epithelium. But, many people, both men and women, show no symptoms of having this STD, and therefore can transmit the pathogen to their partners. Studies have shown that long-term hoarding of the pathogen has been linked to cervical cancer in women and prostate cancer in men. The goal of this study is to employ genetic manipulation using RNA silencing of a family of genes called rhomboid protease to determine the gene function. There are three rhomboid proteins reported from *T. vaginalis*. One of them is a cell surface membrane rhomboid protease named TvROM1. TvROM1 is believed to aid in the adherence and cytolysis of host ectocervical cells. The other two rhomboids function is yet to be determined. Small interfering RNA molecules (siRNA) primers corresponding to the three Rhomboid genes of *T. vaginalis* were designed using online siRNA design tool provided by Invitrogen, and the primers were synthesized also using the Invitrogen. These siRNA primers were transfected into logarithmic phase Trichomonas cells using electroporation method. The transfectants were allowed to grow for 24 or 48 hours. Total RNA was isolated from these cells and the expression of rhomboid genes were determined using RT-PCR techniques. Our initial results show that the transfectants with siRNA for TV RH8 gene was not affected by the siRNA, and therefore showed no reduction in gene expression. Transfections with different siRNA molecules are now underway.

**Racism in the Works of J R R Tolkien**

*Katey McCall*

*Mentors: Dr. Kevin Dodson and Dr. Nicki L. Michalski*

People often view racism through the portrayal of good being white and evil being black in literature. This interpretation of Tolkien’s works ignores the painstaking depth that he weaves into his secondary world though. Racism is undeniably present within the novels, but not in such a simplistic manner. The inequality of bloodlines, prejudgment within the races and normalized prejudice between species of the secondary world display a picture of racism which reflects that of Earth. Throughout his writings, Tolkien uses this base of racism to craft an argument against such barbaric behavior. Many people quickly condemn Tolkien as being racist because of the normalization of it in his works, but under closer inspection, there is an underlying theme within the novels that teaches a lesson. The rise in station and heroic deeds of characters who originally were of lesser bloodlines and races provide the reader with the argument that all people have equal potential. The close friendships formed between species that hold a deep-seated hatred for one another argue for reconciliation and peace between them. The destruction of land and lives warns of the dangers of blind hatred. Finally, the presence of an undeniably equal people, the ents, where there is no inequality between age, race, or station provides the mindset that all should strive to have. Tolkien weaved racism into his works, not as an endorsement of it but a warning.

**The American Woman’s Fight for Voice**

*Hallie Merrell*

*Mentor: Dr. Gwinyai Muzorewa*
This paper will review how women have fought for their voices to be heard over the last couple of centuries. It will cover some pioneers who made major positive contributions, such as Elizabeth Cady Stanton and Susan B. Anthony; women who took a stand for social justice, such as Harriet Tubman, Rosa Parks, and Jane Elliot; and other influential women, such as Eleanor Roosevelt, Shirley Chisholm, Hillary Clinton, and Michelle Obama, who used their position to influence our nation. Basic American liberties, such as voting, running for office, or having any credible place in politics, that had been granted to most men throughout the centuries, were withheld from women of all social classes, backgrounds, and ethnic group for most of America’s and for that matter, the world’s history. Recent decades, however, have shown women achieving some major victories in securing these rights. While men – primarily white, rich, and college educated – still hold the vast majority of elected positions, women have been able to secure some notable positions and make a positive impact. The author will be referencing scholarly articles to research these claims. Therefore, this paper will explore these issues and others that women throughout the centuries have faced, how women have fought to overcome them, and how these things have shaped the modern American woman.

**Optimization in Hardware Design and Algorithm for Improving Computer Motherboard Architecture**

*Trinity Morris*

*Mentor: Dr. Cristian Bahrim*

Literature overview of the components that make up a computer circuit shows the functions of electronic constituents (i.e. transistors, diodes) and logic gates, which allows to partition the motherboard on specific functions. These regionalized electronic structures are thoughtfully designed to be as efficient as possible and also to accommodate certain limitations. Exploring some of the biggest issues encountered in the process of improving the motherboard, such overheating and cross talking leads to significant findings in the development of efficient and fast motherboards. The logic behind the concept of binary coding is essential to defining various quantities. The logic gates perform Boolean functions and are the analogous to mathematical operations such as junctions or intersections of various sets. Thus, the complex tasks computers need to perform are essentially simple functions. All computers are heavily rooted in mathematics and logic. Our main goal is to exemplify the math and logic that shared by electronic components in motherboard. Also, I hope that my research will offer a wealth of information for better understanding and greater appreciation of computer hardware design.

**Does Diversity on College Campus Influence Student Success and Retention among College Students?**

*Vishal Mundodi*

*Mentor: Dr. Jasdeep Pannu*

Student success and retention of freshman has become an important topic of discussion at four-year undergraduate institutions. The goal of this proposal was to understand the role of diversity in college campus on student success and retention. In order to do this, a standard College Student Experiences Questionnaire (CSEQ) was utilized to collect student responses. The CSEQ an instrument that asks about the time students have spent at the college, with faculty and friends and in classes, social and cultural activities, extracurricular activities, employment, and use of campus facilitates such as the library and student center and their overall performance in classes. To better suit our needs, only selected questions to this study was used. Factors such as gender, race and generation status were examined for their correlation with academic success as measured by GPA. The target student population was mainly of freshman and sophomore standing. The data collected is currently being analyzed. The outcome of this study will provide an insight into student retention in Lamar.

**Fabrication and Characterization of Metal-Coated Mechanical Metamaterials**

*Nguyen Nguyen*

*Mentor: Dr. Keivan Davami*

This project aims at exploring the mechanical properties of metal-coated mechanical metamaterials. Metamaterials are featured for their complex structures with exceptional mechanical properties obtained by
unique architectures. Here, polymeric metamaterials with octet- and isotropic-truss unit cells will be fabricated, using an SLA-based 3D printing technique. The samples are then coated with thin films of copper and nickel, using an electroless deposition method. The mechanical properties of the fabricated structures could be manipulated by the metallic coating thickness. Mechanical metamaterials which represent some of the lightweight, but strongest materials are expected to be a promising candidate for all the applications that desire high stiffness and ultralow density.

**How Children Perceive Violence**

*Shadye Nolan-Vaughns*

*Dr. Ginger Gummelt*

The Do the Right Thing (DtWT) Challenge was created to allow middle school students a platform to write about the violence surrounding them and inspire them to explore solutions. The secondary data was provided by pulling about 800 student essays from Region V of DtWT. The researcher began evaluation of the data both quantitatively and qualitatively. This research is still in its early stages and the collected data has only recently been sorted for quantitative analysis. Coding and qualitative analysis will continue as the research progresses. Eventually, the data will be compared to the 2014 to 2015 submissions that were previously gathered and analyzed. This research focuses on these questions: How do the themes within the children’s essays compare to 2014 to 2015 data? How is violence perceived within these children’s lives now? How do children conceptualize solutions and how have solutions changed since 2014 to 2015 research? Preliminary results indicated that students consider bullying to be the most prevalent type of violence in their lives. This research will help those who serve children better understand the experience of violence within their everyday lives. Looking into the perspectives of these children can open up the doors for future victims. By using data pulled from the essays written by children, this research brings an authentic display of how children perceive violence; it gives a voice to the children and shed light on their experiences.

**Synthesis of C$_2$-Symmetric Diazadienes and Imidazolium Salts: N-Heterocyclic Carbene Metal Complexes for Catalysis of Organic Catalytic Reactions**

*Emily Ochoa*

*Mentor: Dr. Gino Canlas*

Diazadienes and $N$-heterocyclic carbenes are useful ligands for transition metals and their complexes have been since they provide a unique environment around the metal coordination sphere and the syntheses of these ligands are modular, thus structural tuning of these complexes allow the discovery of new reactions or improvement of existing ones. In this work, diazadienes were synthesized by condensation of 1,2-dicarbonyl compounds and primary amines using a number of methods to ensure the ease of recovery and moderate to high yields of desired products. These diazadienes were then used to synthesize their corresponding imidazolium salts with paraformaldehyde and an acid catalyst, providing variable yields of the desired salts. A number of these imidazolium salts were converted to their corresponding copper(I) and silver(I) complexes by deprotonation with excess copper(I) or silver(I) oxide. These complexes will be used for reaction scouting such as cycloaddition and oxidation reactions.

**Preparation & Characterization of Electrospun Algal EPS/PVA Nanofibers**

*Zhen Wei Ooi, Adarsh Bafana, and Shishir Kumar*

*Mentor: Dr. Clayton Jeffreys*

Electrospun nanofibers can be used to form membranes that find applications in various fields such as textile industries, wastewater remediation, biomedical industries and polymeric batteries. Electrospinning is a cost effective, rapid, and simple process that can be environmentally friendly with properly chosen precursors. The addition of biopolymers to the electrospinning mix to create biopolymeric nanofibers could lead to new applications in water treatment systems. However, electrospinning biopolymers is not yet an established
science. Therefore, this project investigates nanofibers formation through electrospinning extracellular polymeric substances (EPS) derived from the microalgae *Chlamydomonas reinhardtii*. EPS was blended with non-toxic, biocompatible polyvinyl alcohol (PVA), enabling uniform fiber formation. The EPS was quantified by chemical oxygen demand, its functional groups identified by Fourier-transform infrared spectroscopy (FTIR). The thermal stability of the nanofibers was studied using thermogravimetric analysis (TGA) and its morphology was investigated through scanning electron microscopy (SEM). The ability of the nanofibers to remove heavy metals from synthetic wastewater was quantified through inductively coupled plasma-atomic emission spectroscopy (ICP-AES). Data collected from this study will be presented at the 2019 Undergraduate Research Exposition.

**Development of an Algal-based Landfill Leachate Treatment System**

*Burgandy Petri and Kyleigh L Dixon*  
*Mentor: Dr. Thinesh Selvaratnam*

Landfill leachate is high strength wastewater containing a variety of inorganic species and organic wastes that can possess chronic and acute toxicity. There are 3,000 active landfills and 10,000 or more inactive or closed landfills across the United States. Depending on the landfill size and age, costs associated with the treatment of leachate range between hundreds of thousands to millions of dollars per year. The most common method for handling and treating leachate is to co-treat with municipal wastewater. However, the current practices are energy extensive and deemed unsustainable. The proposed research will develop an algal-based on-site bioremediation pathway to treat leachate. In addition to the nutrient removal, algal biomass produced from this system can be used for biofuel production, value-added bioproducts, and livestock feed supplements. Successful implementation of the proposed system will reduce the current leachate treatment costs and will provide an avenue for supplemental revenue from the produced algal biomass. In this research activity, we have evaluated the potential of using thermophilic mixotrophic algae, Galdieria sulphuraria (GS) 5587.1 (Isolated from Yellowstone National Park, WY) to efficiently perform on-site treatment of leachate. The initial experiments were conducted in 50 mL algal bioreactors under mixotrophic conditions. We experimentally determined the growth rates GS in various dilutions of actual municipal landfill samples and evaluated the nutrient and removal rates. The mixotrophic algal growth rate with a 2.5X dilution of leachate was determined to be 0.209 g L^-1 d^-1 and yielded a nitrogen removal rate of 22.6 mg L^-1 d^-1, which were higher than values recorded with control sets.

**Implementing Solar Energy into Southeast Texas with Efficient Solar Cells**

*Daniel Quispe*  
*Mentor: Dr. Cristian Bahrim*

Solar energy is uncommon in U.S. coastal areas. A lab-controlled environmental setting allows us to study the efficiency of solar cells. Having the ambient temperature varying from 30°C to 40°C (86°F to 104°F) leads to a 4.5% drop in generated voltage when using a PASCO commercial solar cell of 1-W. Lightly dense clouds do not significantly impact the solar cell’s efficiency in generating photo-voltage, but when denser clouds blocks the sun, our solar cell experiences a significant drop of 82%. Within a 25° rotation about the solar cell’s vertical axis, the voltage saturates at a maximum value of 1.9 V when outside. Coupling this observation with the sun’s 8.43° change in the angular position every 34 minutes, we only need to reorient the solar cell every 3 hours and 20 minutes. This reduces the mechanical energy consumption for solar cell reorientation. Our results will provide the solar energy research community an idea on how solar cells are affected by coastal weather conditions and how to mitigate these negative effects. Further research in solar cell's orientation and the effects of weather conditions on its efficiency could potentially allow solar energy to become a viable option for generating electricity in South East Texas.

**Cost-Benefit Analysis of Harvesting Solar Energy at Home-Scale in Southeast Texas**

*Erik Rodriguez and Pedro Escamilla*
Harvesting solar energy is an important component of today’s transition of energy usage toward a more sustainable source of energy. The goal of this study is to investigate whether installing solar panels to single-family homes would be financially beneficial to homeowners in the Southeast Texas region. In pursuit of the goal, the research objectives are: (1) to find out the average cost of installation and maintenance of solar panels; and (2) to calculate the pay-back time of the solar panels. To this end, the research team collected data of the average monthly usage and cost of electricity for a residential home in the region ($114.53 per month), and determined the right size and quantity of solar panels to power a residential home to calculate installation and maintenance costs. Using the resulting data, the team performed a cost-benefit analysis to calculate the pay-back time of the investment. The cost-benefit analysis was carried out by comparing the costs for purchasing, installing, and maintaining solar panels with the amount of saved electricity bill by powering a home with solar energy harvested with solar panels. The analysis revealed that it would take an average of 16 years to reach the break-even point. The calculated net present value also indicated that the financial benefit outweighed the investment costs in the long run. The findings of this research are expected to support homeowners as they explore alternative options of solar panels to power their homes. The research findings are applicable to the Southeast Texas region.

Use of Dredge Material for Construction Purpose: Pollution Treatment and Financial/Environmental Impact

John Reichard and Chris Albright
Mentor: Dr. Seokyon Hwang

Gulf Coast ports are currently going through a major channel expansion to allow the passing of post-Panamax ships. Many of the channels are going to be expanded five to ten feet in depth and widened up to an additional 100 feet. Executing such large dredging projects requires a strategic plan for the sustainable handling of the dredged material. The objective of this research is three-fold: (1) conduct a comprehensive literature review on the handling of dredged material, (2) determine the sources of the pollution settling in, and (3) investigate the financial and environmental implications of using dredged material for construction. To this end, the research team analyzed the archival reports from the United States Army Corps of Engineers, United States Coast Guard, and the Environmental Protection Agency. Each of these federal agencies has jurisdiction over the waterway under the Clean Water Act. These agencies also work together to monitor maritime safety and potential pollution. The primary findings of this research are as follows. While pollution is not always prevalent in all dredged material, the concentration of pollution in sediment is highly dependent on upstream industry and farming. Removing and handling pollution from dredged material is extremely expensive. Reducing pollution of dredged material is crucial to reusing it for construction purposes, which can be done more effectively and economically by increasing soil cleaning locations during dredging operations. The merit of this research is to integrate and synthesize the findings from individual agencies responsible for safe dredging practices on the waterway.

Cassie-Baxter Transition: Gibbs Energy Analysis and CFD Simulations Using Newly Developed, Validated Algorithms

Chae Rohrs and Arash Azimi
Mentor: Dr. Ping He

A liquid droplet on a textured substrate equalizes into either the Cassie-Baxter, or Wenzel state. In addition, metastable states between these conditions are reported in the literature. The Cassie-to-Wenzel transition has been understood as the intersection of the Cassie-Baxter and Wenzel equations, which are functions of the
Young’s angle; however, a major issue exists: the texture shape and dimensions are not considered. What’s more, the transition point of the Young’s model has not been experimentally verified. Because changing texture dimensions will also cause the droplet to transit from one state to another, we plan to build a new transition model through a Gibbs energy analysis of a liquid-gas-solid system. The Young’s angle is held constant and the wetting phenomena are computed as a function of texture dimensions. Each dimension set will have an equilibrium state identified by its penetration depth and apparent contact angle. Lastly, the energy barrier describing the obstacle to a droplet moving from a meta-stable state toward the stable state can simultaneously be computed. Our newly developed, experimentally validated CFD method is being used to confirm our Gibbs energy analysis, and to explore the dynamic behaviors of a droplet during the Cassie-to-Wenzel transition.

Poetry: Culture of Louisiana
Kimberly Schexnider
Mentor: Dr. Katherine Hoerth

My poetry tackles the culture of Louisiana. There are various aspects that represent the culture and my poems give insight to each one. My poetic style is bank verse and free form with the use of imagery. I like to try and look at the world in a different perspective than my own. Most of my poetry is influenced by authors such as: Robert Browning, Margaret Atwood, and Edgar Allan Poe. I do not write in the same style, but I do tend to follow the subject matter. I see myself continuing my poetry, but I want to expand and experiment with different styles.

Literature Review of Malignant Hyperthermia: Pathophysiology, Treatment and Preparedness
DaShonda Shepard
Mentor: Dr. Gina Hale

It is important to understand not all procedures in the operating room go as planned. Individuals may experience a crisis in which there are signs of hyperventilation, hyperthermia, tachycardia, muscle rigidity and spasms. These signs are key in diagnosing a rare disorder called Malignant Hyperthermia (MH). MH is a pharmacogenetic disorder of skeletal muscle that responds to potent volatile anesthetic gases such as halothane, sevoflurane, desflurane, isoflurane and the depolarizing muscle relaxant, succinylcholine (Rosenburg, Pollock, Schiemann, Bulger, & Stowell, 2015). Researchers have discovered various differences in manifestations among individual age groups. With such lethal effects on the body and rapid progression, it is essential that healthcare practitioners pinpoint key manifestations of the disorder across all ages to increase survival rates. The literature coherently agrees on treatment methods for an MH crisis, including symptomatic treatment and drug therapy. The only exception made is a small variation (0.5mg) in the dosage of dantrolene, a muscle relaxant, to treat spasms and rigidity. It is important to consider whether a small difference in dosage would create a drastic effect on the overall efficacy of the treatment. The literature also emphasizes the notion that many facilities lack the necessary materials, education and training to deal with an MH crisis within the operating room. With an inability to treat the disease promptly, healthcare practitioners place the patient at a higher risk of mortality, therefore preparedness is vital.

Risk Evaluation of Frequently Transported Chemicals in Ports of Gulf Region
Dikshant Singh
Mentors: Dr. Berna Eren Tokgoz and Dr. Cagatay Tokgoz

With a worldwide rise in transported chemicals comes an evident increase in risk of accidents and spills en route to ports or even at the ports themselves. While non-threatening chemicals and petrochemicals are commonly shipped in cargo vessels, they are often accompanied by numerous poisonous, corrosive, and flammable chemical substances as well. A myriad of toxic chemicals within one cargo shipment presents a formidable risk to all forms of life within and even outside the radius of incident. When combined with other chemicals or
exposed to the right conditions, even seemingly innocuous chemicals can pose a formidable risk to the environment. The primary objective of this research was to identify the harmful chemicals, both organic and inorganic, that are frequently transported in the Gulf of Mexico and subsequently perform a risk assessment of each chemical based upon their physio-chemical characteristics. Developing a risk assessment methodology to enable accurate classification and prioritization of these chemicals based on their public health effects and environmental health effects in case of exposure was also a central focus of this study. Based on transport volume, the top chemicals of each of 16 different ports within the Gulf of Mexico were investigated, analyzed, assigned a risk score in terms of public health and environmental health, compared, and subsequently organized.

Point Cloud Mapping Using LiDAR with Application to Robotics

Juliana Silva, Juan Vaca, Lauren Watts and Melanie Olvera
Mentors: Dr. Cagatay Tokgoz and Dr. Hassan Zargarzadeh

Advanced technologies in navigation and control have reached new heights, and their application to improve the quality and safety of life is inevitable. While outdoor mapping and navigation are fully addressed, indoor localization, navigation and inspection in GPS deprived areas has remained to be a challenge. In this project, a light detection and ranging (LiDAR) device was used to develop an accurate and cost-effective mapping and navigation system, because available solutions such as image-based and ultrasonic sensors have limitations. The first step was to design an electromechanical system in SolidWorks Software and fabricate it using 3D printing. Stepper and servo motors were controlled using an Arduino board to generate the desired motion of the electromechanical system. An inertial measurement unit (IMU) was added to the system for precise determination of the LiDAR orientation to yield accurate data points. The data from the LiDAR was used for real-time generation of a 3-D point cloud that graphically represents a replica of its surrounding. Real-time communication with the LiDAR has been successfully accomplished, even though it was one of the most challenging parts of the project. The developed system has promising applications in navigation and control in robotics such as unmanned aerial vehicles. Civil and environmental engineers in the Southeast Texas region can utilize the LiDAR system for applications in structural damage assessment, which will be beneficial to the local community, because the region is susceptible to natural disasters.

Sediment Porewater Salinity versus Sulfide: Which Affects Deterioration of Salt Marsh Health?

Jordan D. Snowden, Emily J. Smith, and Carrie A. Martin
Mentor: Dr. Matthew P. Hoch

Over recent decades marshland across the Chenier Plain of Southeast Texas has subsided and sea level has risen. Increased frequency of inundation of saltwater and high salinity has been implicated in the die back of marsh vegetation. An alternate hypothesis is that the marsh die back is due to inundation creating favorable conditions for sulfate reducing bacteria. These bacteria reduce sulfate in seawater to sulfide, which at >1 mM level is phytotoxic to many species of high-marsh grass species. Sediment cores and porewater samples were collected at marsh sites of varying degrees of degradation and sites restored by application of dredge material to increase elevation. Water and organic content were determined gravimetrically pre- and post-drying and combustion. Ion chromatography was used to measure chloride and sulfate levels and Cline’s colorimetric assay was used to measure sulfide in porewater samples. Unhealthy marsh vegetation sites have a higher water content, more organic matter, more sulfate and phytotoxic levels of sulfide. In contrast, the healthier and restored marsh sites had higher levels of salinity, less water and organic matter content, and lower levels of sulfide, which overall are less stressful conditions for marsh grasses to grow. Salinity does not have as large an impact on the health of the marsh as is currently believed. When observing the declining health of marsh vegetation in subsiding coastal marshlands, salinity is less of a factor compared to the conditions allowing sulfate reducing bacteria to thrive to increase sulfide concentration to phytotoxic levels.

Intellectual Benefits: Perspective Lens of a Learner
The purpose of this study is to assess different student learning styles: Do students learn better with illustrations of graphs, doing hands-on activities, or traditional lecture style instruction? Or do they learn with the help of all three? This study was conducted in a special topics course and involved five pre-service teachers. Pre-post tests were administered with a follow up station-based approach. The results suggested that most students learn better visually and by doing hands-on activities. Ten percent of the students preferred auditory and the standard learning instruction. While, approximately 20 percent of the students favored being able to rewrite the information; therefore, they favored using hands-on and tactile-based activities. Even though there was no difference between pre-posttests’ results it was concluded that the implementation of these learning styles helped students understand the concept better.

Mechanically Durable Nanocomposite Superhydrophobic Coating on Aluminum Substrate
Stacy Towers
Mentor: Dr. Chun-Wei Yao

Corrosion is a common issue that occurs with metals, typically through physical contact or chemical reactions. While inevitable, preventing chances of corrosion buildup can increase quality, performance, and service life of any metal. One method to control corrosion is the application of superhydrophobic surface coatings. This recent discovery supports corrosion prevention for many metals, along with self-cleaning and other significant applications. These coatings have potential to be used on pipelines and tools. Our research study consists of the fabrication of such coating using nanocomposite solution composed of silica nanoparticles. As the mechanical durability of superhydrophobic coatings is an essential requirement for practical applications, abrasion tests were conducted using a manual abrasion method and an automated linear abrasion method. In addition, other surface mechanical properties, such as adhesion force, adhesion energy, and the average roughness, can be characterized using an atomic force microscope. These adhesion properties are important in the quality of these coatings, because they have a direct relationship to the durability and wear resistance. By characterizing the surface properties of multiple samples, we strive to create the best formula in yielding high contact angles and adhesion properties for super hydrophobicity.

Alienation of Migrants and Gregor from the Metamorphosis
Himani Vithanage
Mentor: Dr. Shannon Joffe

The Metamorphosis is an ode to Franz Kafka’s experiences as a Bohemian Jew during the first half of the 20th century. This novella serves as a form of therapy for Kafka to express the tribulations which he was victim to during his life, and therefore could function as a form of therapy for migrants. The adversity experienced by Gregor greatly coincides with the state of modern-day migrants and their experiences in America. As Gregor and his family learn to accept his new physical state, he undergoes ennui or a complete loss of self. Despite being mentally conscious, Gregor’s family reacts as if Gregor is completely lost. Similarly, migrants are subject to parallel experiences from their families while working in present-day America. Not only are migrants deprived from relations to their families, but also tolerate hatred throughout their stay in America. Returning to Gregor’s emotional state, it is now possible to state that both Gregor and migrants suffer from similar struggles. This paper identifies and explains that the following traits of alienation or ostracization, physical and mental detriment, and necessity can be drawn between Gregor from The Metamorphosis and modern-day migrants.

The Democratic Response to “Tough on Crime”: William Clinton’s Crime Bill
Himani Vithanage
Mentor: Dr. Gwinyai P. Muzorewa
The Violent Crime Control and Law Enforcement Act of 1994 was written by Senator Joe Biden of Delaware, sponsored by Jack Brooks of Texas, was passed by Congress, and signed by President William Clinton on September 13, 1994. This crime bill was the largest in US history at that time and was intended to be the solution to combat the idiotic homicide, robbery, assault, and drug rates in urban hubs across America. Under the Violent Crime Control and Law Enforcement Act of 1994, the new “three strikes” of being arrested ensued a mandatory life sentence, money was allocated toward growing the police force nationwide, granting $9.7 billion in funding to prisons, and diversifying death penalty-eligible crimes. The cynosure of these initiatives was largely punitive harming more people than helping. This research paper will discuss and investigate the change in incarceration rates, percentage or number of cases/reports of police brutality that were an effect of the crime bill, increase in percentage of prisoners on death row accredited to “three strike” principle, and overcharged sentences by using statistics, journals, and government documentation. Thus, this paper will examine the effects of William Clinton’s crime bill, The Violent Crime Control and Law Enforcement Act of 1994 on law and order as well as disaffected segments of United States’ society ever since.

Beta-Amyloid’s Antibacterial Effects on Alzheimer’s Disease
Paityn Warwick and Kelsey Tran
Mentor: Dr. Maryam Vasefi

Alzheimer’s disease (AD) has become a significant health concern as the number of diagnoses continues to increase worldwide. Alzheimer’s disease is a multifactorial disease-causing inflammation that causes the propagation of neurofibrillary tangles and beta-amyloid plaques. The propagation leads to the destruction of brain cells. Research shows that the pathogenesis of periodontitis is associated with Alzheimer’s disease. Chronic infection of periodontitis can propagate the onset of AD through an increase in production of beta-amyloid plaques. In particular, certain bacteria display the ability to elicit the human immune response, triggering the release and accumulation of the beta-amyloid peptide leading to the release of inflammatory mediators. The goal of this study is to broaden the research of Alzheimer’s disease through acquiring experimental evidence and analyzing data through creative synthesis. Antibacterial effect of Aβ peptide was measured by using the minimal inhibitory concentration (MIC). Gram stain was used to measure agglutination of bacteria in presence of beta-amyloid. In addition, bacteria/beta-amyloid aggregation and neurotoxicity is measured in presence of antibiotic. Results shown from the experiment suggest that the secretion of beta-amyloid plays a role in the immune defense against bacteria. This research will allow a better understanding of the pathology of Alzheimer’s disease and the contribution of chronic infection in the progression of the disease. Ultimately, this research may lead to the development of new treatments for Alzheimer’s disease.

Gulf water family roots
Holly Westbrook
Mentor: Katherine Hoerth

Travelling the local cultures of the Gulf Coast shores through poetry, the connection between food and family is expressed, nature and history is viewed by a child, and area legends and truths are explored within four poems. Each take on a different poetic meter and style. Poem one showcases the Big Thicket while poem two turns to legends and truths. Poem three addresses our ties of food to family and friends, and poem four gives voice to little white squirrels in Orange.

Mechanical Characterization of Graphene-Hexagonal Boron Nitride Nanocomposites
Quintin Williams and Michael Munther
Mentor: Dr. Keivan Davami

Atomically thin forms of layered materials such as graphene and hexagonal boron nitride have generated great interests recently due to the prospect of combining diverse atomic layers by mechanical stacking with the aim of creating novel materials and devices. However, it is unclear how graphene-based heterostructures comprising
two or more materials behave, and how each constituent influences the overall mechanical response. Understanding this is important as graphene-based heterostructures are highly desirable for flexible electronics and battery technologies as they possess highly desirable electronic properties and high Young’s moduli. Additionally, the mechanical robustness of graphene-based heterostructures aid in mitigating mechanically-induced electrochemical degradation commonly observed in traditional battery components. Therefore, uncovering the mechanical performance of graphene-based heterostructure will allow for proper implementation of these novel materials in quickly advancing technologies. It is the goal of this work to synthesize a variety of few-nanometer thick vertically stacked graphene/hexagonal boron nitride heterostructures wherein extensive mechanical characterization will be performed via advanced atomic force indentation spectroscopy techniques with the aim of developing a thorough understanding of the mechanical properties of these novel materials.

**Parts of the Whole: The Divine Proportion and Red Carnations in the Novel Mrs. Dalloway**

Jenny Wilson  
Mentor: Dr. Amy Smith

When Virginia Woolf set out to write *Mrs. Dalloway*, she wrote in her diary that she wanted to “…give life and death, sanity and insanity. I want to criticize the social system, and show it at work, at its most intense” Virginia Woolf was intimately familiar with the razor-thin line separating sanity and insanity, and how the social system dealt with those who strayed too far over it. In 1509, Italian scholar Luca Pacioli published a detailed study of the Golden Ratio and polyhedral solids entitled “De Divina Proportione”, or the Divine Proportion. For the field of geometry, Divine Proportion is understood to mean that *from the parts we can understand the whole*. In the novel, *Mrs. Dalloway*, Divine Proportion is a goddess worshipped alongside her sister, Conversion, by Dr. Bradshaw in order to protect the social order from the irrational and insane. Experimenting with stream of conscious allows Woolf to create an intense narrative that is pieced together from scattered parts of the main characters thoughts, emotions, memories, and experiences. This paper will explore how the subtle theme of Divine Proportion, when applied to a close reading of a woman wearing a red carnation, could create new ways to understand the novel, *Mrs. Dalloway*, as a whole. With new understanding comes a deeper appreciation for the paths Modern writers like Virginia Woolf carved through the post-World War I patriarchal social system.

**Creative Activity Showcase: Excerpts from 12th Night by William Shakespeare**

Matt Hurt, Chris Shroff, Josh Pendino, Caitlin Grammer, Katelynn Haynes, Brianna Butler, Austin Jones and Jennifer Salazar  
Mentor: Joel Grothe, M.F.A.
2019 Summer Undergraduate Research Fellowship Recipients

**Steve Boudreaux** | Electrical Engineering | Mentors: Cagatay Tokgoz, Ph.D.
Vision Guided Autonomous Robot

**Jennifer Caltzontzin** | Speech and Hearing Sciences | Mentor: LeKeitha R. Morris, Ph.D., CCC-SLP
Pre-School Teachers’ Perceptions and Knowledge of Speech-Language Pathology

**Caitlyn Clark** | Chemistry and Biochemistry | Mentor: Ozge Gunaydin-Sen, Ph.D.
Thermo-Optical Properties of Organic Verdzyl Biradicals

**Kyleigh L Dixon** | Civil Engineering | Mentor: Thinesh Selvaratnam, Ph.D.
Development of an Algal-based Landfill Leachate Treatment System

**Donna Fleming** | Chemistry and Biochemistry | Mentor: Christopher B. Martin, Ph.D.
Computational Study of the Effects of Epoxyketene Formation and Rearrangement in 2, 5-Diphenyl-3(2H)-Furanones to Reaction Rates

**Hope Fowler** | Speech and Hearing Sciences | Mentor: LeKeitha R. Morris, Ph.D., CCC-SLP
Parent Beliefs and Behaviors about Shared Book Reading

**Madison Hamby, Alyssa Kelley** | Psychology | Mentor: Robert Worley, Ph.D., Vidisha Worley, Ph.D.
A Qualitative Study of Juvenile Probation Officers and Their Opinions Regarding Counseling and Mental Health Therapy in Juvenile Detention Centers

**Ali Hamza** | Political Science | Mentor: Terri B. Davis, Ph.D.
The Effect of Formal Resolutions or Statements given by Nations and Concerning the Israeli-Palestinian Conflict: Who Helps Most?

**Hannah Meyer** | Department of Music | Mentor: Debra Greschner, MM
Tools to Identify Poor Vocal Use and Suggested Methods of Remediation for Intermediate Students and their Teachers
2019 Summer Undergraduate Research Fellowship Recipients

**Julio Benjamin Morales** | Health and Kinesiology | Mentor: Shannon Jordan, Ph.D.
Relationship between Exercise Intensity and Blood Lactate Levels

**William Perry, BSSN** | Nursing | Mentor: Cynthia Pipkins, PhD, RN
Relationships of Work-related Musculoskeletal Disorders and Psychological Factors in Licensed Nurses

**Melissa Torres** | Speech and Hearing Sciences | Mentor: Ashley Dockens, Ph.D., Au.D., CCC-A
Identifying Knowledge and Perceptions of School Administrators and Staff on Rehabilitative Resources and Support Provided to Deaf/Hard-of-Hearing Elementary Students and Families

**Russell Rowe** | Mechanical Engineering | Mentor: Keivan Davami, Ph.D.
Nanoindentation-Based Investigation of Additively Manufactured Inconel 625 at High Temperature

**Himani Vithanage** | Political Science | Mentor: Terri Davis, Ph.D.
Mental Health Services for First Responders in Jefferson and Orange Counties

Congratulations
Dr. Ashley Dockens is an educator, researcher, and administrator with demonstrated success in higher education. She holds her Doctor of Philosophy degree in Communication Sciences and Disorders, as well as the Doctor of Audiology degree, from the University of South Alabama in Mobile, Alabama. Dr. Dockens joined the Department of Speech and Hearing Sciences at Lamar University in 2014, and has held the role of Program Director of Audiology since 2017. She serves the University in multiple roles, including, but not limited to: Faculty Senator, Speech and Hearing Sciences Cardinal Community Pro-Mentor, Co-Advisor of the National Student Speech-Language Hearing Association (LU student organization of the year), and multiple Departmental roles. She is a 2018 Lamar University Merit Award recipient, and has been recognized for her innovation in teaching and her service to students. Since 2016, Dr. Dockens has authored or co-authored 24 peer-reviewed publications, presentations, and posters, many with undergraduate and graduate student co-authors. She has been fortunate to mentor many undergraduate McNair Scholars, Beck Fellows, Summer Undergraduate Research (SURF) Fellows, and Office of Undergraduate Research (OUR) scholarship recipients. She is currently co-mentoring two McNair Scholars alongside Dr. Heather Reading and Dr. Lilian Felipe, and recently learned that one of her student mentees, Ms. Torres is also a recipient of the 2019 SURF fellowship and will begin mentoring her through this process this Summer. The Office of Undergraduate Research has funded many of her student projects, which have then been presented at regional, state, and national conferences. Mentorship is of high importance to Dr. Dockens, and for this reason, she attempts to instill mentoring skills in her students. A high number of her research mentees have gone on to mentor other students through Cardinal Community, Lamar Ambassadors, Student Government, the National Student Speech-Language Hearing Association, Student Academy of Audiology, and through the Future Leaders of Audiology Student association. She encourages all students to engage in research and all faculty to engage in mentorship.

Congratulations
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OUR Grant 2019-20
Application Deadline: September 23, 2019

7th Annual Texas STEM Conference
October, 2019

6th Annual Humanities, Arts, Social & Behavioral Sciences, Education & Business
November, 2019

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