

5th Annual Undergraduate Research & Creative Activities Expo

“Research: The Pathway to our Future”

Friday, April 20, 2018

Setzer Student Center

Lamar University, Beaumont



OFFICE OF UNDERGRADUATE RESEARCH
LAMAR UNIVERSITY

Sponsored by the Office of Undergraduate Research

The event includes _____ presentations _____ Lamar University students, and _____ faculty mentors; representing _____ academic departments. All abstracts were reviewed and selected by the Office of Undergraduate Research Advisory Committee.

All accepted abstracts are published and listed alphabetically by the primary author's last name



OFFICE OF UNDERGRADUATE RESEARCH
LAMAR UNIVERSITY

FIFTH ANNUAL
UNDERGRADUATE RESEARCH
EXPO 2018

Dr. Kumer P. Das
Director, Undergraduate Research

Dr. Catalina Castellón
Assistant Director

Dr. Cristian Bahrim
Assistant Director

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2017-2018

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College of Arts and Sciences

Mr. Juan Zabala
University Advancement

Dr. Weihang Zhu
College of Engineering

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KEYNOTE SPEAKER

CHRISTINE LAMBERT, PH.D.

*Technical Leader
Ford Motor Company*



Dr. Christine Lambert is a Technical Leader for emission control within Powertrain Research and Advanced Engineering at the Ford Research and Innovation Center in Dearborn, MI. She started at Ford in 1999 after receiving a Ph.D. in Catalysis from Tulane University in New Orleans, Louisiana. Prior to that she earned a B.S. in Chemical Engineering from Lamar University in Beaumont, TX. Dr. Lambert holds thirty-five U.S. patents and is co-author of over seventy technical publications in the areas of supported metal catalysts and emission control systems for diesel vehicles. She is a Fellow of the Society of Automotive Engineers.

UNDERGRADUATE RESEARCH EXPO

SCHEDULE

Friday, April 20, 2018

All activities will be in the Setzer Student Center

10:00 AM – 10:30 AM

WELCOME

Dr. Kumer Das,
Director, Office of Undergraduate Research

Dr. Kenneth Evans
President, Lamar University

Dr. James Marquart
Provost and VPAA

10:30 AM - 11:30 AM

POSTER EXPOSITION

11:30 AM – 12:00 PM

Lunch (*Box lunch*)

12:00 PM – 1:00 PM

POSTER EXPOSITION

1:00 PM – 1:15 PM

PICTURE

1:15 PM – 2:15 PM

ORAL PRESENTATION – SESSION I

2:30 PM – 3:30 PM

ORAL PRESENTATION – SESSION II

3:45 PM – 5:15 PM

BREAK (*Students may go back to the dorms to prepare for the Closing Ceremony*)

5:30 PM – 7:30 PM

Banquet and Closing Ceremony
Setzer Center Ballroom

- ❖ Creative Activity Showcase
- ❖ Dinner
- ❖ Keynote Speaker
Dr. Christine Lambert
Technical Leader
Ford Motor Company
- ❖ Award Ceremony

Awardees Picture

CHAIR:

1:15 PM – 2:15 PM

SESSION 1A

Fabrication of Novel Graphene Oxide-Based Nanofiltration Membranes for Water Desalination

Isaac Angeron and Tyler Palma | Mentor: Dr. Keivan Davami

Mechanical Engineering

Presentation will begin at 1:15 pm

Alternate Clothing Washing or Sanitizing System for Long Duration Space Missions

Carlos Caballero, Erick Lopez-Garcia, Karli Ovverstreet, and Wyatt Wales |

Mentors: Dr. Kendrick Aung, Dr. Ashwini Kucknoor, and Dr. Jenny Zhou

Mechanical Engineering & Physics

Presentation will begin at 1:30 pm

Preparation & Characterization of Water Desalination Membranes using Graphene-Oxide based Nanosheets

Progga Chirontoni, Isaac Angeron, and Michael Munther | Mentor: Dr. Keivan Davami

Chemical Engineering

Presentation will begin at 1:45 pm

Quasi-Static and Dynamic Force Analysis of 3D Printed Metamaterials

William Villa, Mehrdad Mohsenizadeh, and Federico Gasbarri | Mentor: Dr. Keivan Davami

Mechanical Engineering

Presentation will begin at 2:00 pm

CHAIR

1:15 PM – 2:15 PM

SESSION 1B

Nurse Educators, Nursing Students, and Licensed Nurses Knowledge and Attitudes of Complementary and Alternative Medicine: A Comparative Study

Victoria Cornell | Mentor: Dr. Cynthia Pipkins

Nursing

Presentation will begin at 1:15 pm

Gauging Pre-Service Teachers' Awareness of Dialectical Code Switching in an Undergraduate Teacher Education Program

Drake Curette | Mentor: Dr. Tilisa Thibodeaux

English

Presentation will begin at 1:30 pm

Cultural Appropriation among White Celebrities

Jamie Dixon | Mentor: Dr. Adrienne H. Blackwell-Starnes

English

Presentation will begin at 1:45 pm

The Work of F. Isabel Campoy: Using Children's Literature in the Spanish Language Learning Process

Emily Jacobs-Ramos | Mentor: Dr. Catalina Castellón

Spanish

Presentation will begin at 2:00 pm

CHAIR

1:15 PM – 2:15 PM

SESSION 1C

The Evolution through Emotional Distress

Mariah Harris | Mentor: Dr. Katherine Hoerth

Creative Writing

Presentation will begin in 1:15 pm

Tapping into Memory

Sydne Clark | Mentor: Dr. Katherine Hoerth

General Studies

Presentation will begin at 1:27 pm

Personal Reflections through Poetry

Shachi Kulkarni | Mentor: Dr. Katherine Hoerth

Liberal Arts

Presentation will begin at 1:39 pm

Poetry of Neorealism

Cedric Lyons II | Mentor: Dr. Katherine Hoerth

Communication Film Studies

Presentation will begin at 1:51 pm

Dramatic Poetry Readings

Cortney Prescott | Mentor: Dr. Katherine Hoerth

Music

Presentation will begin at 2:03 pm

CHAIR

1:15 PM – 2:15 PM

SESSION 1D

Carbon Black: Properties and Applications

Nathan House | Mentor: Dr. Cristian Bahrin

Chemical Engineering

Presentation will begin in 1:15 pm

An Investigation Of Successful Information Technology Practices For Nonprofit Organizations And Small Businesses (Based On Findings From Yea! And The Cadets Drum & Bugle Corps)

John Ellis | Mentor: Dr. Kami Makki
Computer Information Systems
Presentation will begin at 1:30 pm

Reusable Metal Ion-Imprinted Polymer Sponges for Selective Removal of Heavy Metals

Austin Seaux | Mentor: Dr. Gino Martin Canlas
Chemical Engineering & Chemistry
Presentation will begin at 1:45 pm

Presence of flesh eating bacteria *Vibrio vulnificus* in water bodies of South East Texas aftermath of Hurricane Harvey

Yves Jordan Kenfack and Jami Brown | Mentor: Dr. Ashwini Kucknoor
Biology
Presentation will begin at 2:00 pm

CHAIR

2:30 PM – 3:30 PM

SESSION 2A

Almodovar's representation of women's progress in post-Franco Spain

Laura Fiedler | Mentor: Dr. Catalina Castellón
Spanish
Presentation will begin in 2:30 pm

Comparative Analysis of Children's Diets in Texas and Andalusia

Amorette Fernandez | Mentor: Dr. Catalina Castellón
Nursing
Presentation will begin in 2:45 pm

Freedom of Expression and Rap Music: A Comparative Analysis of Spain and The United States

Briseida Gutierrez
Spanish
Presentation will begin in 3:00 pm

Powerpoint

Alexander Neiford | Mentor: Dr. Catalina Castellón
Spanish
Presentation will begin at 3:15 pm

CHAIR

2:30 PM – 3:30 PM

SESSION 2B

Fabrication of Novel Graphene Oxide-Based Nanofiltration Membranes for Water Desalination

Isaac Angeron | Mentor: Dr. Keivan Davami
Mechanical Engineering
Presentation will begin at 2:30 pm

Microfabricated Sharklet Patterns for Marine Antifouling Applications

Craig Martin and Tyler Palma | Mentor: Dr. Keivan Davami
Mechanical Engineering
Presentation will begin at 2:45 pm

CHAIR

2:30 PM – 3:30 PM

SESSION 2C

Assessing Elementary Pre-Service Teachers' Science Content Knowledge and Teaching Readiness

Zara Killman | Mentor: Dr. Mamta Singh
Interdisciplinary Studies
Presentation will begin at 2:30 pm

American Sign Language Comprehension and Spatial Skills in Regards to College Students

Brooke White | Mentor: Dr. ChongMin Lee
American Sign Language
Presentation will begin at 2:45 pm

The Demographic Collapse of the Indigenous Peoples of America

Taylor Handy | Mentor: Dr. Gwiniyai Muzorewa
Corporate Communication
Presentation will begin at 3:00 pm

CHAIR

2:30 PM – 3:30 PM

SESSION 2D

A Gift to Henry Morgan and the Pirates of the Caribbean: Legitimacy

Suzanne Williamson | Mentor: Rebecca Boone
History
Presentation will begin at 2:30 pm

The Impact of Mexico's National Housing Institution on the Country's Working Class

Samuel Rueda | Mentor: Dr. Terri Davis
Political Science
Presentation will begin at 2:45 pm

Where the World Found Peace: The 1948 Olympic Games

Emily Smith | Dr. Rebecca Boone
History
Presentation will begin at 3:00 pm

Development of the Hudson River Valley during Dutch rule

Alexander Nispel | Mentor: Dr. Brendan Gillis

History

Presentation will begin at 3:15 pm

Poster Session Chairs:

Poster Session 1

Poster No.

- 1. Human Tended Inflatable Lunar Outpost**
Nasim Abdelwahab | Mentor: Dr. Jenny Zhou
Co-Authors: Stephen Mays, Quaid Campbell, and Will Newell
Mechanical Engineering
- 2. Computational Study of the Effect of Substituents on the Rearrangement of Acylcyclopropanones**
Nathan Abshier | Mentor: Dr. Christopher Martin
Chemical Engineering
- 3. Human Effect on Supply Chains**
Nathan Adams | Mentor: Dr. Mahdi Safa
Co-Authors: Cameron Walston, Jordin Pastorella, Pedro Escamilla, and Luke Potter
Construction Management
- 4. Insight on the Gender Bias in the Higher Professions of the Medical Field**
Samira Ahmed | Mentor: Dr. Sara Hillin
Biology
- 5. Associations Between Periodontal Pathogens and Alzheimer's Disease**
Roshney Ali | Mentor: Dr. Maryam Vasefi
Biology & Pre-Dental
- 6. Coxeter Groups**
Destiny Allain | Mentor: Dr. Jacqueline Jensen-Vallin
Mathematics
- 7. Effective filtering in myoelectric prostheses**
Aleksander Allen | Mentor: Dr. Weihang Zhu
Electrical Engineering
- 8. Electrical Safety and EMF protection protocols**
Dylan Armstrong | Mentor: Dr. Mahdi Safa
Co-Authors: Mason Harris, Brittan Brown, Ryan Stanley, and Gabe Nevala
Construction Management
- 9. Compassion, Burnout, and Insurance: An In-Depth Analysis of the Doctor/Patient Relationship**
Andrea Bru | Mentor: Dr. Sara Hillin
Liberal Arts
- 10. The Effects of Hurricane Harvey on the Community of El Vista A Social Work Research Case Study**
Jordan Bryant | Mentor: Dr. Ginger Gummelt
Social Work
- 11. Comparison of three voice analysis software and their measures**
Alishia Bukhari | Mentor: Dr. Nandhakumar Radhakrishnan
Speech Language Pathology

12. The Evolution of Exorcisms

Marvin Calero | Mentor: Sara Hillin
Mathematics

13. Dynamics of the Brusselator System

Caitlyn Clark | Mentor: Dr. Jose M-Vega Guzman
Chemistry

14. Raising Awareness for Human Trafficking Victims and Survivors using Film and Media

Janiah Clarke | Mentor: Dr. Mahmoud Salimi
Communication Film and Theater

15. Fabrication of a Nanostructured Superhydrophobic Aluminum Surface with Corrosion Resistance

Robbie Clarke | Mentor: Dr. Chun-Wei Yao
Mechanical Engineering

16. A Little Chip Everyday Can Take the Doctor's Care Away: Exploring the Importance of Compassion and the Mechanisms That Gradually Drive Doctors to Insensitivity

Katherine Correa | Mentor: Dr. Sara Hillin
Biology

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

Madison Demel | Mentor: Dr. Christopher Martin
Chemical Engineering

18. Developing a Smartphone-Based, Low-Cost Device for Waterborne Pathogen Detection

Edward Doan and Jordan Curl | Mentor: Dr. Ian Lian
Biology

19. Synthesis of Various 1,4-Diaryl-2-(2-oxocyclopentyl)-1,4-butanediones

Edward Doan | Mentor: Dr. Christopher Doan
Chemical Engineering

20. Cardiovascular Exercise and Academic Performance at the Undergraduate Level

Frederick Donahey | Mentor: Dr. Shannon Jordon
Electrical Engineering and Mathematics

21. Statistically determining the shape of a glowing object

Daniel Dove | Mentor: Dr. Cristian Bahrim
Co-Authors: Zakary Noel, Suzanne Wheeler, Keeley Fairchild, and Nurul Azam
Physics

22. Transgenderism in America

Carter Dufilho | Mentor: Dr. Sara Hillin
Biology

23. Continuous Monitoring of Salinity in Salt Bayou Watershed: Impact of Hurricane Harvey

Keith Dugas | Mentor: Dr. Matthew Hoch
Co-Authors: Katelin Catching, Ricardo Saldana, and Emily J Smith
Biology

24. Preventing the Avoidable: Psychology of Medical Staff in Death-Typical Fields

Justin Dupuis | Mentor: Dr. Sara Hillin
Computer Science

- 25. Voice Analysis of TV Broadcasters: Gender vs Content**
Blaire Dykes | Mentor: Dr. Nandhu Radhakrishnan
Speech and Hearing Sciences
- 26. Restorative Discipline in Action at Odom Academy**
Carley Exiga | Mentor: Dr. Ginger Gummelt
Social Work
- 27. Using Data Mining Techniques to Predict Trends of Air Pollution**
Diego Fernandez | Mentor: Dr. Sujing Wang
Computer Science
- 28. Analysis of Phylogenetic Relationships and Population Genetics of the Californian Cypresses (*Hesperocyparis*; Cupressaceae)**
Alexander Sholl | Mentor: Dr. Randall Terry
Biology
- 29. Experimental Characterization of Silicone Phosphor**
Johnny Frazier | Mentor: Dr. Xuejun Fan
Mechanical Engineering
- 30. Five Minutes Of Exercise After Learning: Does It Improve Memory?**
Emily Gant | Mentor: Dr. Raymond Doe
Psychology
- 31. Analyzing the Buckling Steel Column Model**
Ana Garcia | Mentor: Dr. Jose Manuel Vega-Guzman
Mechanical Engineering
- 32. Correlating the Dichotomy of William Carlos Williams, a Creative and Physician**
William Gooch | Mentor: Dr. Sara Hillin
Computer Science
- 33. Creativity as Postoperative Therapy**
Antonio Gussman | Mentor: Dr. Mahdi Safa
Co-Authors: Rebekah Gonzales and Luke Nguyen
Psychology
- 34. Devolution of Medical Humanities: Examining How Progression Has Led to Regression**
Julianne Haidusek | Mentor: Dr. Sara Hillin
History
- 35. Statistical Analysis of Perceptually Normal Voice**
Shelby Hare | Mentor: Dr. Nandhakumar Radhakrishnan
Speech and Hearing Science
- 36. Electrical Circuits as an analogue of a modified duffing-holmes oscillator**
Trevor Hart | Mentor: Dr. Jose Vega-Guzman
Electrical Engineering
- 37. Mental Health: Diving into the Minds**
Hannah Hudgins | Mentor: Dr. Mahmoud Salimi
Communications in Film Studies
- 38. Charged Particle Tracking Efficiency in Proton-Proton Collisions at STAR**
Alek Hutson | Mentor: Dr. James Drachenberg

- 39. Dehydrogenation Properties of Ammonia Borane- Polyvinylpyrrolidone Composites: Comparisons Of Different Catalysts**
Emily Ingram | Mentor: Dr. Ozge Gunaydi-Sen
Co-Authors: Caitlyn Clark, Weslynn Taylor, and Ramanjaneyulu Seemaladinne
Chemical Engineering and Chemistry
- 40. Increasing Recruitment at Lamar University**
Cade Johnson | Mentor: Dr. Mahdi Safa
Co-Authors: Shelby Williams, Shelby Whitehead, and Naomi Raczkovi
Biology
- 41. Energy Drink Consumption in College Aged Males and Females: Evaluating Risk**
Cade Johnson | Mentor: Dr. Shannon Jordan
Biology and ESFM
- 42. Integration of 3d Printing in Micrafabrication to Produce a MEMS Pressure Sensor**
Nicholas Johnson | Mentor: Keivan Davami
Co-Authors: Tyler Palma, Michael Munther, and Praveen Damasus
Mechanical Engineering
- 43. Dredged Stone Erosion Mitigation**
Reid Johnson | Mentor: Dr. Mien Jao
Co-Authors: Brian Bonner, Dason Fernandez, Fernando Aleman, and Jared Defrancis
Civil Engineering
- 44. The Neglected Research: Gender and Sex Difficulties in the Medical Field**
Osha Jones | Mentor: Dr. Sara Hillin
Speech and Hearing Sciences
- 45. LED Light Fixtures & Lighting Improvements for Construction Industry Use**
Anthony Ledezma | Mentor: Dr. Mahdi Safa
Co-Authors: Leoany Alvarez, Joshua Frank, Esther Salazer, and Rhett Wood
Construction Management
- 46. Testing of 3-D Hybrid Tissues**
Julia Lin | Mentor: Dr. Clayton Jeffryes
Chemical Engineering
- 47. Fluid Dynamic Study: Inkjet Bioprinting of Lung Cancer Cells**
Alexus Locke | Mentor: Dr. Ping He
Mechanical Engineering
- 48. Our Truth in Entertainment: Literature, Movies, and Music Reflect Social Concerns**
Aurora Maldonado | Mentor: Dr. Melissa Hudler
Social Work
- 49. Using Solar Panels to Decrease Electric Bill at Lamar University**
Ryan Malone | Mentor: Dr. Mahdi Safa
Co-Authors: Lucas Sammons, Juan Hernandez, Erik Rodriguez, and Sam Thayer
Construction Management
- 50. Dynamics of the Chua's Chaotic System**
Anthony Marino | Mentor: Dr. Jose Vega Guzman
Electrical Engineering

- 51. The Synthesis of 2,5-Bis(4-methoxyphenyl)-3(2H)-furanone and 2,5-Bis(4-aminophenyl)-3(2H) furanone**
Katelyn Meaux | Mentor: Dr. Christopher Martin
Biology/Psychology
- 52. Time To Put The Cat Back In The Bag**
Nicodemus Meyer | Mentor: Dr. Sara Hillin
Liberal Arts
- 53. An analysis of the History, Psyche, and Outside Perspectives of Freak Shows**
Nolan Nowicki | Mentor: Dr. Sara Hillin
Accounting and Finance
- 54. Mutagenic Study of the Potential of Bacteria Cells on the Remediation of Heavy Metals**
Caroline Nwandu | Mentor: Dr. Thi Thuy Minh Nguyen
Biochemistry
- 55. A Comparative EEG-Based Study of Natural Speech Processing by Control vs. Persons with Hearing Loss**
Garrett Oliver | Mentor: Dr. Gleb Tcheslavski
Electrical Engineering and Mathematics
- 56. Biosynthesis of colloidal stabilizing agents for nanotechnology**
Zhen Wei Ooi | Mentor: Dr. Clayton Jeffryes
Chemical Engineering
- 57. Alternate Clothing Washing or Sanitizing System for Long Duration Space Missions**
Karli Overstreet | Mentors: Dr. Kendrick Aung, Dr. Ashwini Kucknoor, and Dr. Jenny Zhou
Co-Authors: Carlos Caballero, Erick Lopez-Garcia, and Wyatt Wales
Mechanical Engineering
- 58. Informative Abstract**
Zachery Parker | Mentors: Dr. Mein Jao, Dr. Qin Qian and Lisa Collins, P.E.
Co-Authors: Garrett Boudoin, David Tingle, Taylor Kane, and Garret Love
Civil Engineering
- 59. Friction and Durability Analysis of 3D-Printed Surfaces**
Kevin Peterson | Mentor: Keivan Davami
Mechanical Engineering
- 60. Efficiency of Solar cells in SE Texas**
Daniel Quispe | Mentor: Dr. Cristian Bahrin
Co-Author: David Quispe
Mechanical Engineering
- 61. Anorexia-Nervosa: The Glorified Monster**
Jasmine Razeghi | Mentor: Dr. Sara Hillin
Liberal Arts
- 62. Electrical Lockout/Tagout**
John Reichard | Mentor: Dr. Mahdi Safa
Co-Authors: Ashley Bailey, Lester Juneau, Blake Kight, and Benjamin Hodges
Construction Management

63. Strategic Port Asset Management Framework

John Reichard | Mentor: Dr. Mahdi Safa
Co-Authors: Shiblee Ahmed and Patricia Lauritzen
Construction Management

64. The Patient-Doctor Relationship is shifting; Why?

Cristian Romero | Mentor: Dr. Sara Hillin
Finance

65. An Investigation of the Target Group for Portable Data Breaches

Hannah Rumsey | Mentor: Dr. Kumer Das
Accounting and Finance

66. The War on War: An Analysis of the Societal, Economic, and Psychological Impacts of Warfare on America

Remingtyn Russell | Mentor: Dr. Sara Hillin
Liberal Arts

67. The Vitality of Flu Vaccines

Claudia Ford | Mentor: Dr. Sara Hillin
Liberal Arts

68. Point Cloud Mapping of Surrounding Space Using LiDAR with Application to Robotics

Juliana Silva | Mentor: Dr. Hassan Zargarzadeh
Electrical Engineering and Mathematics

69. The Future of Construction Management Information Technology

Levi Smith | Mentor: Dr. Mahdi Safa
Co-Authors: Matt Timmer, Austin Krautz, and Evan Achee
Construction Management

70. The Experiences and Perceptions of Peer-Mentors Participating in a Social Skills Group for Pre-Adolescents with Autism Spectrum Disorder

Maria Stamatis | Mentor: Dr. Monica L. Harn
Speech and Hearing Sciences

71. Frankenstein vs. Beowulf and Grendel: A time honored comparison

Emily Trahan | Mentor: Melissa Huddler
Speech and Hearing Sciences and Spanish

72. Pervious Concrete in Southeast Texas

Andre Trottier | Mentor: Liv Haselbach
Co-Authors: Hayden Rice, Presley Lundquist, Matt Jones, and Faustino Cisneros
Civil Engineering

73. Colonial Foods

Taylor Tucker | Mentor: Dr. Brendan Gillis
History

74. A Potential Drug Target for Alzheimer's Disease

Shreya Vakil | Mentor: Dr. Maryam Vasefi
TALH Student

75. Fabrication of Graphene Oxide Nanocomposites

William Van Hoozer | Mentor: Dr. Keivan Davami

Co-Authors: Tyler Palma and Praveen Damasus

Mechanical Engineering

76. Polyphenolic Phytochemicals for the Use of Preventing and Treating Neurodegenerative Disease

Amanda Warner | Dr. Maryam Vasefi

Biology

77. Learning to Market Education

Mary Catherine Wilbur | Mentor: Dr. Mahdi Safa

Co-Authors: Bra'ah Hamdan and Aruba Bukhari

Studio Art

78. Multilevel Humor: Analysis of Adult Humor in Children's Media

Alexandra Williams | Mentor: Dr. Sara Hillin

Liberal Arts-Psychology

79. Energy Efficient Design

Spencer Wommack | Mentor: Dr. Mahdi Safa

Co-Authors: Brett Rogers, Shawn Miller, Jeremy Zachary, and William Kappelman

Construction Management

80. Energy Efficient Design

Charlie Kapp | Mentor: Dr. Mahdi Safa

Co-Authors: Spencer Wommack, Shawn Miller, Brett Rogers, and Jeremy Zachary

Construction Management

81. Exploring Hippotherapy as an Intervention for Children with Special Needs: A Retrospective Descriptive Study

Kloé Woosley | Mentor: Dr. LeAnn Chisholm and Mrs. Rose Harding

Nursing

82. Mysteries of the Universe Revealed through Cosmic Background Radiation

David Yeakey | Mentor: Cristian Bahrim

Chemical Engineering

Abstracts

All abstracts are listed alphabetically by last name of student/primary author

Human Tended Inflatable Lunar Outpost

*Nasim Abedelwahab, Quaid Campbell, Will Newell, and Stephen Mays /
Mentors: Dr. Jenny Zhou, Dr. Kendrick Aung, and Dr. John Alred*

Since first landing on the Moon in 1969, man has worked and dreamed of ways to establish a more permanent residence on the lunar surface. However, one of the biggest challenges has been the design of a structure which can support a team of astronauts while they explore the lunar surface and conduct research. First, transporting things to the surface of the Moon is incredibly expensive, so something within a reasonable weight range is needed. Second, constructing a building would be time consuming and costly; it would also restrict the ability to reuse the building elsewhere. Utilizing inflatable technology is one way to work around these issues. An inflatable outpost would not only be easier to transport than a rigid structure, but also lighter, thus alleviating costs significantly. Being inflatable reduces the size while transporting it, as well as allowing the structure to be easily assembled, disassembled, and moved. The main design parameters for our outpost is to safely house four astronauts for fourteen Earth days, and weigh less than 10,000 Earth lbs. A working model has been constructed in order to demonstrate our design.

Computational Study of the Effect of Substituents on the Rearrangement of Acylcyclopropanones

Nathan Abshier | Mentor: Dr. Christopher Martin

3(2H)-furanones are a class of organic compounds found abundantly in nature that are currently being studied for their medicinal use in anti-tumor medication. However, a few known problems exist with medication containing 3(2H)-furanone, such as causing photosensitivity in the patients that take them. These compounds are known to undergo interesting rearrangements when exposed to specific wavelengths of light, but these rearrangements are not yet fully understood. The chemical literature on this topic shows that there are a few different pathways by which these rearrangements can occur, one of which involves the formation of an intermediate structure called an acylcyclopropanone. A study done in 1985 suggested that the size of the groups (carbon to carbon chains) attached to the acylcyclopropanone affected which rearrangement pathway would be chosen. The focus of this research project is to use computer-generated calculations to determine how the size of the groups attached to the acylcyclopropanone affects its photochemical rearrangement. This will be done by building acylcyclopropanones with different sized groups attached in a 3-D molecular building program, and studying the changes in potential energy among these different structures through computer-generated calculations. This data will provide a theoretical framework for our organic chemistry research laboratory where these 3(2H)-furanones are being synthesized and further studied, as well as aid in the broader understanding of the photochemistry of 3(2H)-furanones.

Human Effect on Supply Chains

*Nathan Adams, Cameron Walston, Jordin Pastorella, Pedro Escamilla, and Luke Potter |
Mentor: Dr. Mahdi Safa*

Supply chain management has always been a problem for general Businesses, but a greater problem in the construction business. Construction businesses need to be extremely competitive to gain work. To stay competitive prices and estimations must be on point to get the job. Where these problems start is in the beginning when ordering materials and other services to complete the job. Often, Materials are ordered in wrong ways, including quantities, material types, lead time, ect. These problems lead to inefficient working hours, lower profit margins and many other losses.

Many of the supply chain managers neglect to incorporate a system to reduce the amount of human error in their fields of work. When making these ordering decisions for a specific job, there are many factors that come in play such as, different vendors or suppliers, methods of shipment, and price. Keeping track of the quotes may be easy for small jobs, but for larger jobs they are almost impossible to keep with us. To reduce the amount of

problems, there must be a checks and balances system. This may include a simple excel sheet or larger program or procurement system to file, keep up, and organize the information. This will improve the autonomy of a company and make the business more competitive.

Insight on the Gender Bias in the Higher Professions of the Medical Field

Samira Ahmed | Mentor: Dr. Sara Hillin

In this research I explore the issue of gender bias in the workforces. It is no secret that women must work harder to earn what a man earns. Especially in the higher professions of the medical field women are looked down upon. Generally, in the past women were expected to take the caretaker role such as nurses. However, as time has progressed women are taking on authoritative roles in medicine. Also, they progress up through the ranks, they face a certain type of bias. I used "The History of Gender Discrimination in the Workplace" by Jonathon Lister and "A Two-Way View of Gender Bias in Medicine" by M Teresa Ruiz and Lois M Verbrugge to draw my information on the history of gender bias and where it stands today. Also, *Sympathy and Science* by Regina Morantz-Sanchez is a book that shows the inside life of female physicians and the struggles they often face. I explored many articles from the viewpoint of gender bias in the medical field, and I found "Letter to a Young Female Physician" by Suzanne Koven which gave me a firsthand perspective of the gender bias in medicine. Through my research, I will find the answers to why and when this gender bias started occurring in medicine and as well as what we can do as a society to resolve this issue. Overall, this research will analyze the treatment of women in the medical field and will answer the tough questions that come with gender bias.

Associations between Periodontal Pathogens and Alzheimer's disease

Roshney Ali | Mentor: Dr. Maryam Vasefi

Alzheimer's disease has become a significant health concern as more people are predicted to be in danger over the next years. To decrease its progressiveness, all possible factors associated with Alzheimer's disease should be identified so new approaches can be established for its treatment. Inflammation of the brain has a vital role in the propagation of Alzheimer's disease which leads to the destruction of brain cells. Recent studies have narrowed down to focus on the pathogenesis of chronic periodontitis and its association with Alzheimer's disease. Chronic periodontitis is a peripheral infection that can speed the onset of the deadly disease through the buildup of beta-amyloid deposition. In particular, certain gram-negative anaerobic bacteria happen to be linked with chronic periodontitis and display the capacity to activate the human immune response. As a result, the activation triggers the release of inflammatory mediators and thus cause tissue damage. The goal of this study is to expand on research by gaining experimental evidence and generating data through the use of creative synthesis. Through experimental approach, a minimum bactericidal concentration (MBC) followed by colony forming unit (CFU) assay is performed to measure the antibacterial effect of amyloid beta. The results suggest that the secretion of amyloid beta is a part of the immune defense against bacteria. The project will allow a better understanding of the pathology of Alzheimer's disease and the contribution of periodontitis for neuroinflammation. Ultimately, this research may help to develop new strategies for treatment of Alzheimer's disease.

Coxeter Groups

Destiny Allain | Mentor: Dr. Jacqueling Jensen-Vallin

Coxeter groups can be defined via free groups, graphs, or matrices. This poster will present both the free group and graphical representations of Coxeter groups. It will also briefly explore applications of Coxeter groups.

Effective filtering in myoelectric prostheses

Aleksander Allen | Mentor: Dr. Weihang Zhu

Devices used for improvement in quality of life of amputees have been at the forefront of research for many engineers and doctors alike. However, a large group of individuals with full and partial wrist amputations can have the motor function of their hand partially or completely restored via the use of myoelectric prosthetic devices. Fifty thousand people go through amputations every year in the US alone; of those, twenty percent are upper limb amputations. It is true that solutions already exist on the market, from versatile, high end devices, like the Michelangelo Hand, to the more affordable, but also more basic devices, like the OpenBionics Hero arm. However, the prohibitive costs and lack of functionality limit the affordability and thus the userbase of these devices. We use open source hardware and matched filtering to design a cheap and versatile prosthetic device that can be used as a replacement for the organic

hand. On-skin myoelectric sensors in a pair of MyoBand armbands are used to detect the signals generated by the muscles in the forearm of the user. Signals are then time-shifted and amplified. The matched filter that is derived from collecting stochastic noise samples from both armbands is then applied to filter the signal. These signals are then supplied to the four linear motors in the AdaHand for gesture generation. We believe that our alternative to the devices mentioned above is not only more functional but can be offered at a cost significantly less than that of the competitors.

Fabrication and Characterization of Metal-Coated Mechanical Metamaterials

Isaac A. Angeron and Tyler Palma | Mentor: Dr. Keivan Davami

This project focuses on the study of the mechanical properties of electroplated mechanical metamaterials. Mechanical metamaterials are artificial cellular structures with mechanical properties defined by their structure rather than their composition. In this project, an additive manufacturing (3D printing) method will be used to fabricate the polymer scaffold of the metamaterials. These materials were then coated in a conductive seed layer, allowing the non-conductive polymer to be electroplated with nickel, which added strength without adding significant mass. Various seed layers were investigated for their efficacy in enabling electroplating, including conductive nickel paint, graphite-based paint, and an electroless copper deposition technique. Mechanical metamaterials with high strength-to-weight ratio promise a great potential in all the applications that require lightweight accompanied by strength.

Fabrication of Novel Graphene Oxide-Based Nanofiltration Membranes for Water Desalination

Isaac A. Angeron | Mentor: Dr. Keivan Davami

The rapid global population growth has led to the increase of water demand and aggravation of water pollution. The scarcity of freshwater resources, which represent only 0.5% of Earth's overall water resources relative to seawater (97%), has already become a worldwide problem. Considerable efforts, therefore, have been afforded to utilize low cost water purification methods to purify contaminated water as well as desalination for seawater. Fabrication of large-scale graphene oxide membranes might open doors towards a more efficient water desalination technology. In this research graphene oxide membranes were fabricated and characterized and their efficiency for water desalination was evaluated. In this research, bacterial toxicity of the shear aligned graphene oxide membranes was also investigated and it was shown that shear aligned graphene oxide membrane reduces gene expression of the bacteria on the surface of the membrane. Shear aligned graphene oxide-based membranes expose a toxicity against bacterial gene expression and formation on the surface of the membrane during the contact interaction

Electrical Safety and EMF protection protocols

Dylan Armstrong, Mason Harris, Brittan Brown, Ryan Stanley, and Gabe Nevala | Mentor: Dr. Mahdi Safa

Safety in the construction industry is an extremely important factor to consider when planning and executing construction projects. With government organizations like OSHA, one would think that yearly reportable jobsite accidents would be reduced to zero, but this is not the case. Year after year the number of accidents on construction sites continues to grow because professionals within the industry are not proactively pursuing safer alternatives. In many cases, safer construction methods to complete a task are often overlooked by management due to the cost required to implement these plans. Although implementing safer work techniques can sometimes lead to costlier operations, the safety of workers should always outweigh monetary obligations. As diverse as the construction industry is, all its derivatives should adhere to the standards set in place by OSHA including the electrical construction division. According to OSHA, "an average of one worker is electrocuted on the job every day." To remedy this situation, OSHA has put in place special PPE and procedures that must be followed by those working with or around electrical equipment. But is it enough? What about the hidden dangers of electromagnetic fields? This poster discusses the various types of electrical related injuries, how these accidents occur, steps to prevent electrical accidents in the future and the hidden dangers of EMFs if any. This will be accomplished by doing a comprehensive review of the appropriate literature concerning EMFs and PPE in the electrical construction industry.

Compassion, Burnout, and Insurance: An In-Depth Analysis of the Doctor/Patient Relationship

Andrea Bru | Mentor: Dr. Sara Hillin

Doctors and patients interact every day in clinical settings. With this being said, doctors are often overflowed with patients, and the human connection fades as a physician starts considering a patient as just another illness. I address this relationship between patient and doctor because of the varying effects it can have on a patient's health, especially if other factors come into play. For example, if a patient has a solid relationship with their doctor where the patient trusts and feels respected, then interfering with that relationship could have damaging effects on both the doctor and the patient. Some of these relationship interferences that will be described in the research are change in a patient's insurance policy, physician burnout, and lack of compassion. I will also include solutions to those issues. I use various credible sources from researchers and experienced doctors who aid in conveying these issues, some of which contain statistical data and primary documentation from patients. One of these prominent sources that supports my research is Hamidreza Namazi's "The Doctor-Patient Relationship: Toward a Conceptual Re-Examination." I will organize this research into several sections, each of which contain a subtitle and its description. Overall, this research allows people to either relate to from previous experience or see how it sheds light on the imperative relationship between doctors and patients.

The Effects of Hurricane Harvey on the Community of El Vista A Social Work Research Case Study

Jordan Bryant | Mentor: Dr. Ginger Gummelt

Port Arthur, Texas, a city located on the southeastern coast of the Gulf of Mexico houses an array of different communities. One community that stands out in Port Arthur is El Vista. On August 29th, 2017 the events of Hurricane Harvey have left El Vista in shambles. Historic flood waters and the loss of homes has given the people of El Vista little hope for a better tomorrow. By researching the effects, a hurricane can have on a community based on race, age, social class, and social economic stature will reveal what it takes to truly rebuild a community that has been destroyed by a hurricane. This research used qualitative research methods to interview inhabitants of the El Vista community on the subject matter of Hurricane Harvey and the effects the hurricane has had on the community. Each of the participants was asked a series of questions. The questions were cornering Hurricane Harvey, their time living in El Vista, and social welfare policies that are being implanted to help rebuild. Findings in this research show how a hurricane can change the social dynamics of a community on a micro and macro level. Rebuilding a community must consist of not only the reconstruction of infrastructures but also the lives of the inhabitants who have called the community home. Implications of this research can improve communities affected by hurricanes and aid in the process of rebuilding the lives of citizens whose legacy has been lost.

Comparison of three voice analysis software and their measures

Alishia Bukhari | Mentor: Dr. Nandhakumar

Acoustic analysis is widely used to assess voice disorders. There are several types of commercial and free software available to do these analyses. This research compared three different softwares and their reliability in measuring voice. Samples of steady vowel phonation and speech recorded from 20 subjects were used to perform this research. Data shows that the numbers obtained from these softwares give different results. This poster will display the difference of three popularly used softwares in the field of voice analysis.

Alternate Clothing Washing or Sanitizing System for Long Duration Space Missions TSGC TDC-11

*Carlos A. Caballero, Erick Lopez-Garcia, Karli Overstreet, and Wyatt Wales |
Mentors: Dr. Kendrick Aung, Dr. Ashwini Kucknoor, and Dr. Jenny Zhou*

The Lamar Launderers have been competing in the Texas Space Grant Consortium (TSGC) Design Challenge during the Fall 2017 and Spring 2018 semesters. The design topic was an alternate clothing sanitizing system for long duration space missions. The project builds on the success of last year's team from Lamar University had with an ultraviolet light sanitation system. Astronauts aboard the International Space Station must remain physically active to counter the effects of bone as well as muscle density loss and, as a result, unsanitary clothes are accrued. The Lamar Launderers' goal is to better ascertain and test the viability of an ultraviolet light system as a method of

sanitizing clothing in space flight. Design objectives for the system include a redesign of the internal racks used to hold clothing, reducing weight and power consumption whenever possible, and the implementation of an air circulation system which, in addition to maintaining thermal stability, would loosen salt and skin particles from the clothing. While, at a minimum, the system should have the capacity to fit one set of athletic clothing, the possibility of increasing system capacity without increasing its footprint has been explored. The final design is expected to reduce the amount of live bacteria in clothing by 1000 times and have a lifetime of three years.

The Evolution of Exorcisms

Marvin Calero | Mentor: Dr. Sara Hillin

For my poster presentation, I will discuss the evolution of exorcisms over history and how new research has shown it can be a treatment for people with Schizophrenia. This poster will inform the reader, by using research on how exorcisms have been considered by some as a psychotherapeutic treatment for those with schizophrenia. It will also give an overview of what an exorcism is and its history. Sources that claim to provide information regarding this will be discussed. The project will also include the dangers of exorcisms and how doctors and priests plan to improve these rituals to make them safer. I will use sources, including an interview, three articles written by three different psychologists, and an essay composed by a scholar from Western Michigan University. Essentially, in this research, I explain what an exorcism is and I claim that there will be safer forms of exorcisms that will benefit those with schizophrenia in the near future.

Preparation & Characterization of Water Desalination Membranes using Graphene-Oxide based Nanosheets

Progga Chirontoni, Isaac Angeron, and Michael Munther | Mentor: Dr. Keivan Davami

To address the pressing global issue of clean water scarcity, water desalination and purification technologies are being used widely to turn seawater to drinkable water, yet we face challenges with the design of sustainable, energy-efficient technologies. Membrane-based separation methods for desalination can provide adequate clean water resources. Desalination technologies used today have high energy consumption and capital costs. Preparation of novel membranes which can reduce the energy consumption together with high water permeability and high salt rejection capacity is highly demanding. Graphene-oxide (GO) based nanofiltration membranes have high stability and high ion rejection for seawater desalination to surpass the present upper bounds for better membrane performance. Recently, GO materials have emerged as potential candidates with excellent desalination characteristics. In this research, graphene oxide is used to fabricate membranes for desalination. Subsequently, the nematic liquid crystalline phases of GO are produced and then exposed to shear-alignment using a film applicator to form large-area GO membranes and membrane modules are fabricated. These modules are characterized using a variety of tests, and water permeability and bacterial adhesion tests are also carried out to test the efficiency of the membranes.

Dynamics of the Brusselator System

Caitlyn R. Clark | Mentor: Dr. Jose M. Vega-Guzman

Within the last six decades, the subject of oscillating systems in chemical reactions has been prevalent in chemistry. Three parts are generally needed to study oscillating systems: a mechanism, a set of rate equations, and a set of integrated rate equations. In this work we revisit the dynamics of the Brusselator system, originally developed by I. Prigogine in 1967. The Brusselator Model is a direct example of an autocatalytic oscillating system. Autocatalytic reactions are chemical reactions in which at least one of the reactants is also a product. The rate equations used in an autocatalytic reaction are nonlinear, and this nonlinearity will lead to a spontaneous generation of order. This spontaneous order contradicts the Second Law of Thermodynamics which is why Prigogine and his collaborators work from 1967 was disregarded till much after Prigogine's death. To examine this system, we will determine the critical point and eigenvalues of the approximate linear system at the critical point, classify the critical point and its stability, and study how the critical point changes from stable to unstable in view of the phase plane and limit cycles. Early results suggest highly oscillating behavior in the reaction of the model.

Tapping into Memory

Sydne Clark | Mentor: Dr. Katherine Hoerth

Entering the poetic world for the first time, I experiment with free verse poetry by tapping into memory. Influenced by William Blake's "Songs of Innocence and Experience," my poems, "The Broken Dancer," "Grandma," and "Oak Tree," take my childhood memories, the truth and the distorted, and compare them to my experiences in the present. I use imagery to connect my experiences to the universal issue of time, and how time changes one's perception. "The Broken Dancer," tackles the issue of losing confidence over time, while "Grandma" describes my last time with a loved one. With those experiences, I come to a revelation in "Oak Tree," where I recognize that though time has changed both my physical and emotional being, my memories remain.

Raising Awareness for Human Trafficking Victims and Survivors using Film and Media

Jeniah Clarke | Mentor: Dr. Mahmoud Salimi

Human trafficking is an ever-increasing problem within our country, especially in the states of California, New York, and Texas. Thousands of children go missing every day and very few of them are recovered every couple of years. Not to mention, most of those that are recovered suffer major health issues and have a hard time adjusting to society because of psychological problems caused by all forms of trauma, such as physical, emotional, and psychological. This film proposal's main focus is to raise awareness for not only those whom are currently modern slaves, but also for those who have survived those trials and are in need of rehabilitation, such as medical care, psychological counselling, and social support. This film, being a realism fictional genre with documentary film elements, will address those issues listed above and the current proposed solutions.

Fabrication of a Nanostructured Superhydrophobic Aluminum Surface with Corrosion Resistance

Robbie Clarke | Mentor: Dr. Chun-Wei Yao

Aluminum is a versatile metal owing to its light weight, high specific strength, and high electrical and thermal conductivity. Like other metals, aluminum is also susceptible to corrosion. Increasing the liquid-repelling nature of aluminum is an effective way to protect the material against corrosion. The main objectives of the proposed project are to 1) design and fabricate, 2) characterize superhydrophobic coatings on Aluminum substrates for enhanced corrosion. A third objective (3) is to evaluate the mechanical properties of Aluminum surfaces with superhydrophobic coatings. We will develop robust superhydrophobic Aluminum surface with durability, corrosion resistance.

Nurse Educators, Nursing Students, and Licensed Nurses Knowledge and Attitudes of Complementary and Alternative Medicine: A Comparative Study

Victoria Cornell | Mentor: Dr. Cynthia Pipkins

The use of Complementary Alternative Medicine (CAM) involves various medical healthcare systems, practices, and products outside of conventional medicine (National Center for Complementary and Integrative Health, 2016). Despite evidence proving the effectiveness of CAM, a gap still exists between the knowledge of licensed nurses and the integration of these complementary alternative medicines into practice (Trail-Mahan et al., 2013). The purpose of this cross-sectional evidence-based research study was to assess the knowledge and attitudes of nurse educators, nursing students, and licensed nurses regarding complementary alternative medicine. This study utilized a stratified sample of licensed nurses (nurse educator, practicing nurses, and nursing students). Participants (n = 178) provided self-reported quantitative data responses to demographics and CAM Health Belief Questionnaire (10-item) online via Qualtrics. Preliminary results were calculated using IBM-SPSS® 24. Cronbach's alpha was calculated for internal consistency for the CAM Health Belief Questionnaire in this nursing population yielding $\alpha = 0.85$; it was calculated at $\alpha = 0.75$ in a group of medical students (Lie & Boker, 2004). The median score for all participants was $M = 54.3$ with scores ranging from 19-70 on a scale of 10-70. The higher score depicts higher levels of knowledge and positive attitude towards CAM. Only 9 of the participants scored below 40 which is calculated as the midpoint on the scale. Interestingly, 35% of the participants could not recall any education regarding CAM with only 10% being opposed to using CAM in their nursing practice. Most participants strongly hold the belief that CAM is not a threat to the public (56%) and should be incorporated into the patient care

process to the extent of the patient's expectations (76%). The results represent a baseline level of the knowledge and attitudes of nurses regarding CAM and reveal its utilization in practice.

A Little Chip Everyday Can Take the Doctor's Care Away: Exploring the Importance of Compassion and the Mechanisms That Gradually Drive Doctors to Insensitivity

Katherine Correa | Mentor: Dr. Sara Hillin

Why do some doctors not care? This research focuses on answering the question of why some doctors become desensitized and the factors that contribute to that desensitization: factors such as the mentality established by medical professors, expectations from society, business, and burnout. Through essays and articles written by doctors telling of their own encounters with desensitized fellow physicians, I will provide a professional opinion on the gravity of non-compassionate doctors. One such narrative by a doctor, is the story of Dr. Anonymous. Dr. Anonymous provided insight to the dangers an insensitive doctor can hold, as she tells of her experience in killing a patient. Aside from exploring emotionally detached doctors, the research explores the negative effects a lack of compassion can cause the patient and the physician. Through primary sources from patients, the point of view of the patient is developed as by exploring the effects emotionally aware doctors have on the doctor-patient relationship and the quality of care provided. The primary sources, focus on patients who have experienced being treated by a desensitized doctor and an emotionally aware doctor. Overall, the research is focused towards finding the answer as to why doctors become insensitive, reassuring that the practice of compassion in medicine is a strength, and formulating a possible solution towards the problem of insensitivity

Gauging Pre-Service Teachers' Awareness of Dialectical Code Switching in An Undergraduate Teacher Education Program

Drake Curette | Mentor: Dr. Tilisa Thibodeaux

This study examined pre-service teachers' awareness of dialectical code switching in an undergraduate teacher education program, specifically as it related to African American English (AAE). Related literature confirms that dialect shifting actually provides advantages to students for the acquisition of literacy skills in measurable ways, especially for reading and spelling (Charity et al., 2004; Connor & Craig, 2006 & Washington, 2004; Kohler et al., 2007; Terry, 2006). Based on the literature, two research questions guided this study:

1. What knowledge do pre-service teachers have of dialectical code switching?
2. Is code switching important for teachers to understand?

To gauge pre-service teachers' awareness of dialectical code switching, 23 interns in an undergraduate educator preparation program ranked items on a survey instrument about their knowledge of current research, programs, and resources available about code switching and cultural teaching practices. Twenty-eight semi-structured brief interviews were conducted within the same group of pre-service teachers to identify whether they perceived code switching was important for them to know and understand. The preliminary results of both sets of data showed that while pre-service teachers were aware of cultural differences and some resources for helping students be successful in the classroom, many of the pre-service teachers were not fully aware of dialectical code switching and its impact on student learning. Further, findings revealed that pre-service teachers were interested in learning specific strategies to help students that spoke a dialect other than Standard American English (SAE).

First, our research team examined the history of African American English (AAE) and dialectical code switching in the classroom. Craig (2016), a renowned researcher on African American English and the Achievement Gap, found that code switching allows for students to use Black English while at the same time learning Standard American English; this practice enabled students to reap the benefits of bi-dialecticism. Second, it was important to gauge the awareness of pre-service teachers before they enter the classroom to make it known that students will need support as they transition from their native language to SAE. Therefore, the purpose of this research was to raise awareness of the history of dialectical code switching, specifically for AAE, and to assist pre-service teachers with identifying resources to help them understand dialectical code switching that include methods for learning how to work with students whose primary dialect is not SAE. Accepting every student for who they are no matter their primary language, giving them the advantage of pursuing an education without stigmas, and increasing teachers' awareness of students' native language and culture could help students make a major shift from their native language to Standard American English much easier for all.

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

Madison Demel | Mentor: Dr. Christopher Martin

A study of alkylated 3(2H)-furanones will be performed in order to determine if the size of groups on the 5-membered ring has a large effect on the ability of 2 identical molecules to undergo [2+2] cycloaddition, in which they become one larger molecule. This will be achieved by using the modeling program Gaussview and Gaussian 16 software to perform calculations on the molecules in their excited states to find the energy of the system as the two molecules approach each other for addition. This theoretical study will be supported by synthesis of the molecules and observation of their reactions in the laboratory. Past data support the hypothesis that the different groups did have a large effect on the photochemical (light induced) reaction that occurred, but these calculations were conducted in the ground state as opposed to the excited state, which was not acceptable to journal reviewers. New calculations have revealed drastic differences, as the excited state energy of the molecules creates a much different potential energy surface for the varying distance between the two identical molecules. Therefore, the previous data can be used only as a comparison, not to make a conclusion on the photochemical behavior of the molecules. However, much more work must be completed in order to make a final conclusion as to how the different groups really effect the chemistry.

Cultural Appropriation Among White Celebrities

Jamie Dixon | Mentor: Dr. Adrienne H. Blackwell-Starnes

Cultural appropriation is the stealing or representation of another culture by an outsider of the culture. But as of late it's become severely popular among celebrities, particularly white celebrities. While celebrities believe the decisions they make affect them and them alone, that isn't always true. Whatever they do the kids and teenagers who look up to them assume it's cool, which is why cultural appropriation among celebrities affect the kids and children who look up to them emotionally and socially because they are trying to be like their "heroes". White celebrities are appropriating a culture(s) they think they understand through watching the media and movies. They appropriate cultures without knowing the origins and the representations of the culture they are stealing from or how they are affecting the children that look up to them socially, emotionally and mentally. White celebrities appropriating cultures negatively despite either not understanding it or undermining it as something lesser than, especially black and tattoo culture. This paper will discuss white celebrities appropriating black and tattoo culture by representing it in the following: lip injections and challenges; braids and dreadlocks, gauges and big hooped earrings, and tattoos.

Developing a Smartphone-Based, Low-Cost Device for Waterborne Pathogen Detection

Edward Doan and Jordan Curl | Mentor: Dr. Ian Lian

Diseases resulting from waterborne pathogens are a substantial problem in both developed and undeveloped countries. The traditional methods of waterborne pathogen detection are costly and time-consuming, with the most-common method requiring lengthy sample incubation work normally taking days. In this project we optimized and tested an innovative mobile device for pathogen detection that can be used in tandem with a smartphone to provide quantitative water quality test results in under 10 minutes for a fraction of the price of any existing methods. The device utilizes the smartphone camera, as well as a narrow beam scanning microscope, membrane-filtration sampler, flexibly agglutinated latex microbeads, and a smartphone application to quickly capture and deliver the results in a simple, user-friendly way. In the current work, we specifically validated the platform for the quantification of 10 cells of E. coli O157:H7 in a 10 mL water sample. Further research and testing could improve the ease of deployment in the field, as well as expand the detection potential to various other waterborne pathogens.

Synthesis of Various 1,4-Diaryl-2-(2-oxocyclopentyl)-1,4-butanediones

Edward Doan | Mentor: Dr. Christopher Martin

3(2H) Furanones are a class of photochemical reactive compounds that are found in nature and have potential applications in pharmacological industries, but a certain class undergoes an unusual mechanism for when aryl groups are attached to the ring. In order to create the 3(2H) furanones for further study, building blocks in the form of 1,4-butanediones with various aryl groups need to be synthesized. 1,4-butanediones were synthesized

using benzene, toluene, chlorobenzene, bromobenzene, methoxybenzene, and t-butylbenzene as electrophiles for Frieden-Crafts acylation with fumaryl chloride. Some challenges were centered on the use of solvents, as the reactants other than benzene and toluene required to undergo Frieden-Crafts acylation, as well as the scarce literature surrounding the synthesis using methoxybenzene and t-butylbenzene. Future work includes using the 1,4-butanediones in a 3-step route in order to create the 3(2H) furanones and determine factors critical to determine the unusual photochemical mechanism the 3(2H) furanones undergo.

Cardiovascular Exercise and Academic Performance at the Undergraduate Level

Frederick Donahey | Mentors: Dr. Shannon L Jordan and Dr. Alan Moore

Past studies examining the relationship between physical activity (PA) and academic performance (AP) have been mostly focused on the K-12 school systems. The variance in results between published studies on the PA and AP of students can be partially explained by the different measurements of AP, such as placement exams, IQ tests, etc. No peer-reviewed published intervention studies have examined the direct effect of implementing PA on the AP of previously sedentary college students. We have recruited previously sedentary full time students at Lamar University to begin an exercise regimen during the spring 2018 semester of moderate physical activity for 30 minutes/day, 5 days/week. Participants will be wearing pedometers during spring 2018 and recording their step and distance into an activity log. At the conclusion of the spring 2018 semester, spring 2017, fall 2017, and spring 2018 GPAs will be analyzed using a dependent t-test (statistical significance set at $P < 0.05$) to determine if there is any effect of PA on AP in college-aged students.

Statistically Determining the Shape of a Glowing Object

Daniel Dove, Zakary Noel, Suzanne Wheeler, Keeley Fairchild, and Nurul Azam, | Mentor: Dr. Cristian Bahrim

We designed an experiment for finding the shape of glowing objects from measurements in the change of the polarization of light emitted. The methodology can be applied to identify the shape of stellar objects or hot objects which can be produced in plasma environments. The method uses the statistical analysis of changes in the polarization of light transmitted through polarizing sheets and the departure from a perfect Malus' law variation of the polarized light. For finding the contour of each shape, we calibrate the signal from a probe source to a control signal of a spherical symmetric opening. The ratio of the active area of the shape to the control signal indicates a decreasing value with the increase in the number of sides of the probe opening, thus converging to one when the opening degenerates into a circular-like shape (i.e. a higher degree polygon better resembles a circular disk than a lower degree polygon). This result can be nicely related to the theoretical ratio of the luminous area between a probe signal and the control signal, thus validating the identification of the object's shape. Our methodology and equipment allows to identify within 10% precision the shape of any object and within 1% precision we can resolve the difference between lower degree polygon-shaped openings of adjacent order (i.e. square and pentagon).

Transgenderism in America

Carter Dufilho | Mentor: Dr. Sara Hillin

I want to focus on issues surrounding people who are transgendered in the United States. To many people, coming out publicly as transgendered is seen as an act of bravery. On the other hand, others view being transgendered as not a natural variation of gender but as gender dysphoria. I want to take several sources arguing why being transgendered should not lead to discrimination, and also discuss the basics for arguments that lead to such discrimination. I also will include a story of a transgendered person who regrets getting reassignment surgery, as this story helps explore the complexity of the changes one undergoes during reassignment. Not only will I address the scientific/medical aspects of life as a transgendered person, but I will also discuss how the media views and portrays being transgendered in today's world.

Continuous Monitoring of Salinity in Salt Bayou Watershed: Impact of Hurricane Harvey

Keith Dugas, Katelin Catching, Ricardo Saldana, and Emily J Smith | Mentor: Dr. Matthew P. Hoch

Coastal marsh lands are inherently important for storm protection, ecological productivity, and outdoor recreational activities. Currently the existence of the Salt Bayou Watershed (SBW) marsh is being threatened by the increasing salinity level, which contributes to loss of vegetation. Two restoration projects are being implemented to lower salinity and preserve the remainder of SBW marshes. In the Keith Lake Fish Pass entrance,

a baffle system has been created to decrease the entry of seawater. Construction of inverted siphons are planned to cross the Intercoastal Waterway so to increase the inflow of freshwater to SBW. The target goal is to maintain salinity <10 psu for 80% of the year at our continuous monitoring site located between Keith and Johnson Lakes. From June 2016 to Jan 2017, the average salinity has been 10.2 ± 3.67 psu, but only < 10 psu for 47 % of the time. Variation in salinity in this shallow well mixed estuary is also affected by local weather patterns such as rainfall and wind, as well as tidal variation. Hurricane Harvey offered insights into the effects of extreme weather on salinity of SBW.

Preventing the Avoidable: Psychology of Medical Staff in Death-Typical Fields

Justin Dupuis | Mentor: Dr. Sara Hillin

Psychology in medicine has continuously centered on the wellbeing of patients, only occasionally acknowledging the mental states of the medical staff who tend to those patients. Even more rarely taken into account are the medical staff who work with patients who are either likely to die or terminal. It is very possible that the professionals that work in these fields could psychologically suffer even more than those in other fields, as the impact of death on an individual has significant mental consequences. However, there remains a critical lack of research on the issue. In response to this lack of research, I will provide an in-depth analysis into the psychology of workers in these fields. I am pulling my primary information from nine sources: seven research articles from medical journals, one discussion paper, and one meta-study from a medical journal. Although some of my sources also include statistics on medical staff such as social workers, this research will only focus on physicians and nurses. The main goal of my research is to reveal the psychological struggles that physicians and nurses in these fields typically have to work through and highlight any disparities between the mental conditions in those fields and physicians and nurses in medicine in general. Also under the umbrella of fields where death is typical, I will reveal any differences between physicians and nurses in adult and pediatric care, and I will uncover some of the additional struggles that nurses encounter, such as struggling with physician communication. I will concisely display these findings alongside potential coping and intervention strategies that can be used by professionals to improve their work-lives and reduce burnout, and I will demonstrate how an increase in the mental health of these medical staff will consequently improve the health of patients.

Voice Analysis of TV Broadcasters: Gender vs Content

Blair Dykes | Mentor: Dr. Nandhu Radhakrishnan

Voice parameters including intonation, intensity, rate of speech, and vocal frequency assist speakers in expressing their thoughts. This is clearly seen in broadcasters of radio and television.

Pedagogical training of students in broadcasting include use of voice in carrying the message. Apart from their signature voice, they should be able to vary their delivery based on the content. The goals of this study was to analyze vocal parameters of popular television broadcasters, both males and females, and identify voice patterns. Preliminary results indicate differences in rate of speech and pitch range across different types of news content. The poster will highlight these differences. Results of this study will add to basic science of voice production and pedagogy of broadcasting.

An Investigation Of Successful Information Technology Practices For Nonprofit Organizations And Small Businesses (Based On Findings From Yea! And the Cadets Drum & Bugle Corps)

John T. Ellis | Mentor: Dr. Kami Makki

Youth Education in the Arts (YEA!), a nonprofit organization in Allentown, Pennsylvania annually hosts performing ensembles, performance events, and educational clinics for students in the United States and beyond. This research was based on observations conducting during Winter and Summer of 2017 – including a brief observation and a summer-long internship with the nonprofit. This research will report my observations of how the participating organization(s) successfully assess the challenges of mobility, data security, and digital communication posed by the DCI summer tour and other instances through their IT infrastructures. These findings will provide information on how other nonprofits and small businesses can use information-communication-technology solutions that are effective, efficient, and cost-effective.

Restorative Discipline in Action at Odom Academy

Carley Exiga | Mentor: Dr. Ginger Gummelt

Educators need to be provided with resources that address disruptive behaviors, since they are the ones spending the highest amount of time with students compared to other adults, in most situations. With guidance, educators can actively participate in discovering the root causes of challenging behavior(s) in students. A preventative intervention program that focuses on repairing harm and strengthens relationships is called Restorative Discipline. Restorative Discipline is a relatively new approach to discipline that fosters social engagement and meaningful accountability through a positive peer community. With Restorative Discipline (RD) in place, students with recurring disruptive behaviors participate several times a week in a small group discussion known as “circling”. Discussions about effective communication, conflict resolution, and good citizenship become the focus of each discussion.

Previous research on the use of Restorative Discipline in school settings inspired this project, which consequently led to my field of study internship. During the semester, I have worked and continue to work with students on behavior modification. The participants include instructors and students of a socioeconomically disadvantaged middle school. In the next few weeks, secondary data provided by the school district, will be analyzed to compare school suspension and home suspension rates. A comparison will be made regarding the students’ suspension rates before and after the program was started. Findings from this study will be used to support the use of Restorative Discipline practices in the public school system as well as a way to engage Lamar University students in internships working with at-risk youth.

Almodovar’s representation of women’s progress in post-Franco Spain

Laura Fiedler | Mentor: Dr. Catalina Castellón

After nearly forty years of oppression and restriction under the dictatorship of Francisco Franco, Spain underwent dramatic economic, governmental, and societal changes in its attempt to redefine itself. The spirit of this progressive movement is embodied in the work of Pedro Almodovar (1949-present), a globally recognized Spanish film director famous for contradicting the strict social norms reinforced during Franco’s regimen. As a homosexual in a country steeped in Catholic tradition, Almodovar takes an interest in the struggle of society’s marginalized members; as a result, his work provides insight into the obstacles of women who challenge Spain’s traditional gender expectations. Almodovar’s production *Mujeres al borde de un ataque de nervios* depicts a woman who desperately pursues an ex-lover who impregnated her, but who evades her at all costs. When she finally meets him, she has already decided to leave him and raise the child on her own. A study of this film as well as others reveals the difficulty women faced in post-Franco society as they attempted to reconcile tradition with a need for liberation and independence.

Comparative Analysis of Children’s Diets in Texas and Andalusia

Amorette Fernandez | Mentor: Dr. Catalina Castellón

The research conducted will help determine how the difference in children’s diets, from two distant parts of the world, affect their health. The analysis will specifically compare the diet of American children (Texas) vs. Spanish children (Andalusia). The study will focus on four main categories: what the culture of each place is, what the children’s official dietary guidelines are, what the children are actually consuming, and what prevalent illnesses are related to their diet. By comparing these two locations’ eating habits, we will be able to form a more educated opinion about their positive and negative effects. Diet related illnesses are a worldwide problem, and this study aims to determine how the different lifestyles of Andalusia and Texas affect dietary habits.

Using Data Mining Techniques to Predict Trends of Air Pollution

Diego Fernandez | Mentor: Dr. Sujing Wang

This research intends to investigate the trends of various air pollutants in Southeast Texas and make predictions for these trends. Machine learning and data mining techniques will be used to develop the prediction model. These techniques will be applied to various pollutants to create individual prediction models for each pollutant in Southeast Texas. The data is collected from the Environmental Protection Agency and the National Solar Radiation Database’s public datasets.

The Vitality of Flu Vaccines

Claudia Ford | Mentor: Dr. Sara Hillin

As everyone can clearly tell, it has been an eventful year with the spread of the influenza virus. This research paper's purpose is to emphasize the need throughout America for people to get flu vaccinations, and simply to draw attention to the subject matter, I have decided to dedicate my research towards providing factual reasoning to take the flu vaccine. Many parents now hear "facts" about how the flu shot is harmful, so they make the decision not to take one, along with their children; however what parents hear are most often myths. This parental action can cause a massive spread of the virus as it moves from person to person within our daily interactions. I aim to provide credibly based evidence from my sources to attempt to persuade readers and listeners that there is nothing to fear when it comes to the flu vaccine.

Experimental Characterization of Silicone Phosphor

Johnny Frazier | Mentor: Dr. Xuejun Fam

Phosphor/silicone composites play a critical role in white LED packages with the functions of light-conversion and chip-protection. Under elevated temperature and humidity conditions we observed that silicone/phosphor composites used in white light LEDs undergo hygroscopic swelling and permanently stay in the swollen state even after moisture is removed. We investigated the phenomena and attributed it to incompletely cured silicone, which, under conditions of elevated temperature and humidity, undergoes final cure, permanently assuming the swollen shape. Furthermore, these results suggest that Ce:YAG acts as an inhibitor that causes more silicone to remain uncured until exposed to elevated temperature and humidity which then causes greater permanent hygroscopic swelling than observed in pure silicone samples.

Five Minutes Of Exercise After Learning: Does It Improve Memory?

Emily J. Gant | Mentor: Raymond Doe

This study investigated the effects of exercise on memory and the role of gender. Problem: The impact of exercises on memory has been studied at length, but recent studies suggest that less intensive exercises after the initial encoding stage of learning improves memory. Method: In this experiment, male and female participants engaged in a 5 minute exercise after encoding to test its effect on recall of short term memory. Participants were randomly assigned to four conditions and exposed to 16 full color 258 x 350 pixel photographs collected from the Karolinska Directed Emotional Faces database (Lundqvist, Flyt & Öhman, 1998) paired with names. Participants then recalled names after an exercise or no exercise manipulations. Results: The preliminary findings of the 48 participants data collected so far were analyzed using a 2x2 between-subjects ANOVA. The results showed that even though there were no significant interaction or main effects found, participants in the 5 minutes exercise condition and females recalled better than the non-exercise group and males respectively. Conclusions: These differences are consistent with the extant literature that suggests reliable benefits of acute exercises on our overall cognitive performance.

Analyzing the Buckling Steel Column Model

Ana Garcia | Mentor: Dr. Jose M. Vega-Guzman

Columns are used as major elements in trusses, building frames, and sub-structure supports for bridges. The work of a column is simpler than the work of a beam. However, on occasion the loads acting on a column can include axial forces, transverse forces, and bending moments that affect the building's overall performance and stability. One of the basic models to study such effects in steel columns is the Buckling system. Buckling usually leads to failure when compression of a material is done due to the instability. The instability is characterized by the compressive stress and the absence of the equilibrium of the load and the material. Slenderness ratio is therefore important when designing the structure. In this work, we revisit the Buckling Steel column model, and analytically explore the equilibrium solutions as well as the corresponding stability. In addition, numerical results will complement the analytical aspects of the project.

Correlating the Dichotomy of William Carlos Williams, a Creative and Physician

William Gooch | Mentor: Dr. Sara Hillin

William Carlos Williams hardly pervades the public conscious to the extent of T. S. Elliot, so little documentation on his life and times exists compared to his more influential contemporaries. This disappoints me, because I grow ever enamored by his meta-narrative, but I lack an abundance of documentation to research for my own constructed

assessment. Predominantly, he is celebrated as a poet and novelist, but his work as a physician constitutes an equally significant and disproportionately underappreciated facet of his narrative. Nevertheless, I have garnered several biographies of his life which tangentially allude to his medical work. In this research, I have used those, and the mass of documentation on his creative writing, to construct a narrative relating his writing to his medical practice.

Creativity as Postoperative Therapy

Antonio Gussman, Rebekah Gonzales and Luke Nguyen | Mentor: Dr. Mahdi Safa

A fact that most people overlook when conversing about a surgical procedure is how a person will recover. Not every successful operation will have a fairytale ending with the patient coming home and resuming his or her life like nothing ever happened. Post-operation depression occurs more often than people think. They most likely worry about things such as being in a lesser healthy state or having to pay off hospital fees, just to name a few. This is a huge problem due to many more people going under surgical procedures.

According to the PubMed electronic database, there is a clear link between high rates of depression and surgeries that require anesthesia. This idea coupled with the fact that nearly all Americans will undergo a surgery that requires anesthesia in their lifetime presents a massive problem that is not being adequately addressed. According to the U.S. National Library of Medicine, 15% to 20% of patients that receive surgery for a cardiovascular disease suffer from depression after the operation. Treatment of this complication is critical to the success of the recovery of the patient because several of the symptoms of Major Depressive Disorder can exacerbate issues of surgery recovery. Statistically, depression after surgical operations is common and must be addressed. Given the unique nature of post-operative depression, alternative methods of treatment such as the facilitation of creativity must be explored.

The use of creativity as postoperative therapy has shown great positive impact in those who are open to the innovative method. More and more surgical hospitals are incorporating creativity into their therapy curricula, and some have even dedicated areas of their hospitals as creative centers. Stanford Health Care has developed the Art for Health Program that provides patients with creativity focused art therapy sessions. Some of the patients' works can be found on Stanford Healthcare's website, along with stories of how and why each piece was made, and the impact it had on the patient. Many health professionals suggest art therapy to patients who don't take well to traditional depression remedies, such as meditation or psychotherapy. Art therapy allows patients who struggle with anxiety and other mental health issues to express their feelings through color, shapes, sound, and even movement rather than what might be a painful conversation. This option has been a true lifesaver for some who struggle with post-operational depression. The hope is that this unconventional method could become a viable and accessible option, open to all who are in need of its cure.

Freedom of Expression and Rap Music: A Comparative Analysis of Spain and The United States

Briseida Gutierrez | Mentor: Dr. Catalina Castillón

In this presentation we will analyze recent oppressive actions towards the freedom of expression in Spain. We will examine the conditions in which these types of oppression occur most frequently. This presentation will focus on the punishments that the rapper Valtonyc received for expressing himself against the government and against those in power. We will see the difference in the severity of the consequences in Spain versus in the United States of North America and the possible reasons for these differences.

Devolution of Medical Humanities: Examining How Progression Has Led to Regression

Julianne Haidusek | Mentor: Dr. Sara Hillin

While it is true that medicine has faced significant improvement over time, evidence indicates that this progress has been accompanied by a critical regression in medical humanities. This poster focuses on the changes medical humanities have faced since the Renaissance—which here acts loosely as the beginning of modern medicine's progression—and the false assumption that medical progression guarantees greater humanitarianism. Firstly, this poster will define medical humanities in both a modern and historical context. It will then explore modern prose and its examination of the medical humanities. Following this, the poster will discuss research articles that examine the changes made in medical humanities over time as well as current practices and efforts to reintroduce humanities into the medical field. This poster began in response to claims made in prose authored by

modern medical practitioners, claims which insist upon the glaring lack of humanities currently found within the field. Upon examining this topic further, it was found that these claims are supported by modern research, and that many researchers believe that medical humanities have decreased as medical practices improve. This poster explores the belief that as the art of healing has been confined to sterile, efficient, impersonal institutions, the humanity that should encourage what is arguably one of the most humane professions of all has been lost.

The Demographic Collapse of the Indigenous Peoples of America

Taylor Handy | Mentor: Dr. Gwiniyai Muzorewa

In this work, the author took a closer look at expulsion of Native Americans during early settlement, and how it resulted in the coercion and ethnocide of the American Indian people which in turn led to the mild extinction many of the native tribal peoples. Placing a magnifying glass over the scar on the face of American history - using primary and accessory sources, the writer was able to determine the implications of her findings. Therefore, this paper will emphasize the development and ramification of the United States government executing federal policies to maintain a docile union of the Native American peoples in the name of Manifest Destiny; kindling the Demographic Collapse of the Indigenous Peoples of America.

Statistical Analysis of Perceptually Normal Voice

Shelby Hare | Mentor: Dr. Nandhakumar Radhakrishnan

The 'normality' of voice is determined by acoustic, perceptual, and endoscopic variables. Twenty participants who reported that they had normal voices underwent acoustic, perceptual, and endoscopic testing. Of the twenty participants, only six of them were identified as having statistically normal voices according to the tested parameters. This research suggests that many people have minor voice abnormalities that they are unaware of. Further examination could suggest that, without treatment, these abnormalities could progress into actual voice problems or disorders.

The Evolution through Emotional Distress

Mariah Harris | Mentor: Dr. Katherine Hoerth

Poetry is an outlet that for years has allowed me to express and experiment with experiences and subjects that we as a society sometimes shy away from. From my influence of Maya Angelou and her unique tactics to addressing ideas of empowerment and self-esteem, my poems "Finished", "Fear of Dependency", and "My Taker's Den" intertwine personal experiences into emotional abuse through a new light. I use imagery and figurative language to weave my experiences into addressing common impacts and struggles within these types relationships. In "Finished" I address the change made to a victim's personality after being in abusive relationship overtime. In "Fear of Dependency" I use a repetitive scheme to show the lasting impact of the low self-esteem and anxiety that are sometimes results of these relationships. Lastly, in "My Taker's Den" I use imagery and figurative language to depict overcoming this relationship as though it were a war.

Electrical Circuits as an Analogue of a Modified Duffing-Holmes Oscillator

Trevor L. Hart | Mentor: Dr. Jose Vega-Guzman

During the last few decades, many people have spent a lot of efforts in both theoretical research and implementation techniques fields to study nonlinearity of models describing electric circuits. It is widely known that electrical circuits generating complex and chaotic waveforms are convenient tools to mimic time evolution of nonlinear systems and for simulating differential and difference equations. Electrical circuits can be treated as an electrical analogue of the Duffing-Holmes mathematical oscillator. Even though the simplicity of the Duffing oscillator, the dynamical behavior is very splendid and research is still going on today. In this work, we explore the dynamics of a modified Duffing-Holmes oscillator, both analytically and numerically. Equilibrium points, as well as corresponding stability will be illustrated. Early results suggest atypical behavior of oscillating and chaotic behavior.

Carbon Black: Properties and Applications

Nathan House | Mentor: Dr. Cristian Bahrim

Carbon Black is a unique and vitally important material to the modern world of electronics due to its unique properties. In particular, it is used in polyfuses, key parts of modern electronic devices such as phone chargers, speaker systems, and rechargeable Lithium Ion batteries. They serve to protect systems from excessive electrical current and are different from traditional fuses because they experience a reversed transformation to the original phase, after tripping. A polyfuse protects from excess current by breaking the circuit through sharp increase in resistance (thus cutting off the current) due to the change from the crystalline phase to amorphous. Carbon Black's most important properties are, the dramatic spike in resistance when tripped in a system, and its functionality regeneration after the system no longer suffers from excess current. Carbon Black has these properties due to its atomic structure, which is similar to graphite except with greater space between molecular hexagonal structures. Carbon Black in its crystalline phase is very good conductor, however when the temperature increases, due to a current increase, the material becomes amorphous. When amorphous, the distance between the molecular structures increases significantly, breaking the conductive pathways, but without alteration of the hexagonal structures. When the current returns to normal conditions, and low temperatures, Carbon Black returns to its crystalline phase, thus permitting the current to flow again. With such unique properties, Carbon Black will continue to become of even greater use in modern circuitry.

Mental Health: Diving into the Mind

Hannah Hudgins | Dr. Mahmoud Salimi

I have been studying people with Post Traumatic Stress Disorder to see how their Mental Illness has effected them in their past and present life. I was inspired by my friend Jared Webb who has been suffering with PTSD and I was curious to know what he has to deal with in his day to day life. I have been making a documentary on Jared and some other of his friends that have been suffering with PTSD. I have learned that there are a lot of mental demons that Jared has been struggling with and we both agree that it the outside world should be informed about PTSD. A lot of people who are not suffering with PTSD don't truly understand the true effects that PTSD can have on a person and a documentary about PTSD could be a way to get the word out. My goal is to get a 10 minute documentary to help Jared get his story out and to help others who don't truly understand PTSD to bring them to a better understanding of the Mental Illness.

Charged Particle Tracking Efficiency in Proton-Proton Collisions at STAR

Alek Hutson | Mentor: James Drachenberg

Distributions of charged particles within jets produced in proton-proton collisions may provide new insight into the process of hadronization, e.g. improved constraints on gluon fragmentation functions. The Solenoidal Tracker at RHIC (STAR) is well equipped to identify charged particles produced within the aforementioned jets. One instrument within STAR, the Time Projection Chamber (TPC), provides a means to track these charged particles by measuring the time of detection and energy of ionized electrons. A crucial component to this analysis is understanding the charged particle tracking efficiency within the TPC. This can be studied with tools such as Monte Carlo simulations embedded into real data, e.g. those collected during the 2011 RHIC run of proton-proton collisions at $\sqrt{s} = 500$ GeV. The presentation will include the status of the described analysis.

Dehydrogenation Properties of Ammonia Borane-Polyvinylpyrrolidone Composites: Comparison of Different Catalysts

Emily Ingram, Caitlyn Clark, Weslynn Taylor, Ramanjaneyulu Seemaladinne | Mentor: Dr. Ozge Gunaydin-Sen

In recent years, Ammonia Borane (NH_3BH_3 , AB) has been attracting attention as a use in hydrogen fuel cells because of its hydrogen storage capabilities. However, while AB has a hydrogen content of 19.6 wt%, it has a slow hydrogen release along with the formation of unwanted byproducts and gases. Various studies have showed that adding polymers improve the hydrogen release properties. In this study, bulk composites of AB, polyvinylpyrrolidone (PVP) and a catalyst were evaluated using thermal and infrared studies to test for any dehydrogenation improvements, i.e. enhanced kinetics. The results of using different catalysts, magnesium chloride (MgCl_2) and calcium chloride (CaCl_2), were compared. The bulk polymer composites were prepared by mixing AB with PVP in different proportions and drying each under vacuum. The catalyst (MgCl_2 or CaCl_2) was added to improve kinetics as well as hydrogen release at lower temperatures. A differential scanning calorimeter

(DSC) was used in a high temperature decomposition study to measure the heat flow and dehydrogenation kinetics of the composites with and without catalyst between 25 °C and 300 °C. These experiments were carried out at different heating rates to calculate the activation energies (Ea). Decomposition properties were also studied via FT-IR as well as to characterize the composites and investigate the interaction between AB and the polymer.

“The Work of F. Isabel Campoy: Using Children’s Literature in the Spanish Language Learning Process.”

Emily Jacobs-Ramos | Mentor: Dr. Catalina Castellón

F. Isabel Campoy [1946-Present] is a native Spaniard who has published over 150 children’s literature titles. She began her work in the realm of children’s literature to provide her young readers with keys to interpret the world in a fun, challenging, and affirmative way. As Campoy states on her website, her professional focus narrowed to ages K-6 in 1994. This age group tends to read picture books, but her works should not be limited to K-6 readers since they have great potential to be utilized with Spanish language learners of all ages. Specifically, her works titled, “Yes! We are Latinos,” “Maybe Something Beautiful,” “Pío, Peep!,” and “Tales our Abuelitas Told” have many educational applications. For decades, language educators have advocated for the use of cognates in the language learning process of native Spanish speakers learning English and vice versa (e.g., Corson, 1997; Johnston, 1941). Campoy’s books contain an abundance of cognates, thus accrediting them to be useful to a Spanish educator. Furthermore, the illustrations in Campoy’s books support comprehension of the written text and communicate relevant aspects of Hispanic culture, which is a crucial component of language education. Thus, F. Isabel Campoy’s children’s books are not limited to ages K-6, but should be incorporated into Spanish classrooms in upper level education as validated literature and instructional tools.

Energy Drink Consumption in College Aged Males and Females: Evaluating Potential Risk

Cade Johnson | Mentor: Dr. Shannon L Jordan and Dr. Rick Carter

The popularity of energy drink (ED) consumption continues to escalate in the United States and elsewhere in the world. Over 50% of college aged students report consuming EDs, which are generally soft drinks, typically carbonated and composed of a variety of ingredients such as caffeine, guarana (both stimulants), taurine (an amino acid), carbohydrates (sugar) and vitamins (B complex). Red Bull, the most commonly consumed ED, contains taurine (1 g, 8.4 oz; 2.3 g, 20 oz) which is an amino acid associated with neuromuscular development in infants and is found naturally in human breast milk and fortified in infant formula. The typical adult diet provides a healthy adult with significantly higher levels of taurine than found in Red Bull (20-200 mg taurine/day). It also contains 9.5 mg of caffeine per ounce. An 8.4 oz can of RedBull contains 80 mg of caffeine. RedBull is currently classified as a conventional food with the Food and Drug Administration rather than an ED or dietary supplement. To put this in perspective, a typical can of soda contains 30-50 mg of caffeine and a tablet of Excedrine contains 65 mg of caffeine and the instructions suggest a dose is 2 tablets every 6 hours for ages 12 and up, resulting in 130 mg of caffeine in the recommended dose of Excedrine. Previous research on the effects of energy drinks containing caffeine and taurine on athletic performance have been equivocal. We are investigating energy drink consumption (RedBull) on cardiovascular indices as reflected in the electrocardiogram (ECG), blood pressure, blood biomarkers, exercise gas exchange (VO₂), and sleep quality in college aged students.

Increasing Recruitment at Lamar University

Cade Johnson, Shelby Williams, Shelby Whitehead, and Naomi Raczkov | Mentor: Dr. Mahdi Safa

Often compared to schools such as Stephen F. Austin State University and Sam Houston State University, Lamar University in Beaumont, Texas, traditionally has much lower recruitment numbers. Recruitment is the life-blood of any organization, company, or institution and is a constant cyclic process that involves many factors to be discussed later. Without recruitment, any group of people is bound to die out, and the same can be said for a college or university. This research review consisted of a literature review and analysis as means for determining simple, but major ways that Lamar University’s recruitment efforts can be modified, changed, or added to in order to increase the recruitment numbers of incoming freshmen through the paradigm of service and social media.

Combining Microfabrication and Additive Manufacturing Processes for the Low-Cost Mass Production of MEMS Pressure Sensors

Nicholas Johnson, Tyler Palma, Michael Munther, and Praveen Damasus | Mentor: Dr. Keivan Davami

Pressure sensing devices represent an essential and vastly diverse research field with applications in multiple areas such as soft robotics, biotechnology, electronics, and more. By utilizing the advantages of additive manufacturing, it is possible to create pressure sensing devices with inexpensive materials and short manufacturing times. Our work concerned the creation of a MEMS pressure sensor fabricated with additive manufacturing techniques that is capable of detecting pressure changes on the microscale using a resistance-based sensor design. Creation of resistive MEMS sensors have been researched less in comparison to sensors based on piezoelectric and capacitive effects, and so there is an opportunity for further growth in this respect. Using a stereolithography (SLA) 3D-printer, several sensing devices can be created simultaneously. These device bases are made of a resin with properties similar to ABS plastic and are printed as an open cubic shape with a hollow center. The base is open and 5 mm × 5 mm. The device's diaphragm, the top face of the cube which is considerably thinner than the other walls, is as thin as 170 μm. After the printing of the devices is completed, the sensor bases are then removed from printing supports, washed and dried completely, and then post-cured according to manufacturer's recommendation. At this point resistive sensor leads, based on a Wheatstone bridge circuit and made of conductive nickel paint, are deposited on the diaphragm using a small, soft applicator. Testing of resistance change as a function of pressure is done using a compression test apparatus. Both square and circular diaphragms were printed and tested. A square diaphragm showed better results. Prior research has also shown that this geometry performs better than circular or rectangular diaphragms when comparing displacement, sensitivity, and stress output responses. When a pressure is applied to the flexible diaphragm, the length of the resistive leads is altered and this difference outputs a readable variation of electrical resistance. It is seen that the devices created are able to detect pressure changes in the microscale, in a range comparable to other devices designed and tested previously. These micro-pressure sensing devices present a low-cost alternative to MEMS sensor fabrication facilitated by additive manufacturing technology. This has the potential for much broader impacts – allowing the manufacturing of useful sensing devices without the need for complex and expensive equipment or a cleanroom setting.

Dredged Stone Brick Erosion Mitigation

Reid Johnson, Brian Bonner, Dason Fernandez, Fernando Aleman, and Jared Defrancis | Mentor: Dr. Mein Jao

RBDF investigated the properties of dredged material, such as grain size distribution, optimum moisture content, specific gravity, liquid and plastic limit and various additives such as fly ash, cement, and lime to create a stabilized brick that meets U.S. Army Corps of Engineers standards for strength and size. Although there is no specific brick size, the strength goal for the bricks is 1000 psi. This is acceptable for the bricks because they are only being used to resist erosion, and not for any structural purpose. Seven mix designs using different amounts of fly ash, lime and cement were tested in order to determine the optimum brick mix design based on the amount of dredged material used and the strength to best protect against erosion. Mix design number 6, containing a ratio of 100:80.5:35 dredge material to fly ash to lime, as well as 10% cement by mass, was determined to be the best mix because it met the strength requirement with a compressive strength of 1197 psi and only contained 10% cement. PVC piping running in both the X and Y direction was placed in the mold when the bricks were formed in order to create a hole in the bricks to run a cable through. This can be used to cable the bricks together in a mat and then theoretically placed on a river bank to help prevent erosion.

The Neglected Research: Gender and Sex Difficulties in the Medical Field

Osha Jones | Mentor: Dr. Sara Hillin

This research concentrates on gender and sex problems in the medical field and why there is more research needed in this area. Doctors invent new medicines, believing they will work for everyone, yet there is not enough research on gender to really know how these medications would affect an individual based on gender and sex. Many people are frightened to go to the doctors' because the medicine prescribed does not always work for them. I would like to use this research to bring awareness to why there is a lack of research on gender and sex and how this lack negatively affects medical care. I have researched articles from doctors, teachers, researchers and those who have conducted surveys on the lack of gender and sex research in medicine. This research will be divided into

parts of each way that gender research lacks in health care. Altogether this research will break down in depth the lack of research there is in health care and the affects it has in the medical field.

Energy Efficient Design

Charlie Kapp, Spencer Wommack, Shawn Miller, Brett Rogers, and Jeremy Zachary | Mentor: Dr. Mahdi Safa

Throughout the world, the construction industry uses a vast amount of the earth's natural resources. With population increasing across the globe, the design and construction industry will also increase to keep up with urbanization. This will mean that natural resources are being used up faster than ever before in the history of the earth. If we are to continue to thrive as a civilization we must take drastic steps to a more energy efficient and sustainable environment.

As designers and constructors move further into the twenty first century it is paramount that we strive for a more sustainable infrastructure. This not only means using ecofriendly construction methods and materials but also designing long term sustainable energy sources. This poster will show innovative design concepts, such as solar and wind energy, and other ecofriendly and efficient energy sources. It will also show the benefits all of these things will have on the environment. In doing this we will provide valuable research, which is the first step in creating a more sustainable future.

Presence of flesh eating bacteria *Vibrio vulnificus* in water bodies of South East Texas aftermath of Hurricane Harvey

Yves Jordan Kenfack and Jami Brown | Mentor: Dr. Ashwini Kucknoor

Alongside destruction, the aftermath of a storm often brings pathogenic bacteria that will invariably increase the amount of human infections. The consequences of Harvey go beyond the destruction of homes, a spike in vibrio infection usually follow such natural disasters. Exposure to this pathogenic vibrio or pathogens from contaminated water could be detrimental to the health of those residing in the affected areas. Open wounds exposed to contaminated waters also leaves humans susceptible to infections. This project was aimed at detecting *Vibrio vulnificus* in the water samples from brackish water-bodies in and around Jefferson County, by using both culture-based techniques as well as molecular methods. Five different sites were sampled at two separate times and assayed for the presence of *Vibrio*. The two different collection times was to accurately compare the abundant of *Vibrio vulnificus*. The sites included the Neches River, Sabine lake, Pleasure Island, J.D Murphree wildlife management area, and the Gulf of Mexico off Martin Luther King Jr Dr. in Port Arthur, TX. These areas per Texas Wildlife laws are considered brackish water bodies. Areas considered to be brackish are the ideal location for *Vibrio vulnificus* to thrive in, therefore, the best locations to test the presence of this flesh eating bacteria. The results we obtained show that some of the water bodies are safe, and do not harbor *Vibrio*. Results from this study will be further discussed.

Assessing Elementary Pre-Service Teachers' Science Content Knowledge and Teaching Readiness

Zara Killman | Mentor: Dr. Mamta Singh

The purpose of this study was to investigate elementary pre-service teachers' science content knowledge and teaching readiness. Participants were students enrolled in science methods course offered in Teacher Education Department. Twenty-seven junior students enrolled in this course participated in the study. Content knowledge pre-posttests based on four science domains: Life Science, Physical Science, Earth, Space Science, and Science and Technology Applications along with elementary science teaching efficacy instrument were used to measure research objectives. The results suggested that pre-service teachers are more confident to teach life science and earth & space science and less confident to teach physical science and science and technology applications.

Personal Reflections through Poetry

Shachi Kulkarni | Mentor: Dr. Katherine Hoerth

As a newcomer to the world of poetry, I chose to use my poems to express my personal experiences through free verse poetry. I use my previous experience in writing prose to tap into a narrative style of poetry that paints my personal experiences in a format that is accessible to all audiences. In my poems, I detail my stories as a first-generation immigrant in Texas and how I dealt with the cultural differences. My poetry is influenced by Rupi Kaur who also writes about her experiences as a South Asian immigrant woman. Her writing about embracing her

culture is what led me to examine my own relationship with culture in the poem “Where I’m From” while I write a more personal reflection about my high school experience and my struggle with mental health in the poem “Letter to Myself.” Lastly, in my poem, “Interlude of a Broken Heart” I convey my emotions in their rawest form after my first break up, an important moment in my young life.

LED Light Fixtures & Lighting Improvements for Construction Industry Use

Anthony Ledezma, Leoany Alvarez, Joshua Frank, Esther Salazer, and Rhett Wood | Mentor: Dr. Mahdi Safa

The purpose of this research is to show the different outcomes, opportunities and consequences available for companies and residents by investing into new lighting technologies for commercial and/or residential use.

Lighting is often never a thought that never comes to mind when construction companies think about how to cut costs, or improve working conditions. However, lighting technologies have come far in recent years with countries pushing towards a “green” future. With many seeking ways to cut down on things such as light pollution, and cut down on energy costs, great strides have been made to advance lighting fixtures. With recent lighting standards revised by the U.S. government in 2012, business have seen an impact with having convert over to new modern lights, Light-Emitting Diodes or LEDs. Some small businesses have noticed, despite the large upfront costs, new LED lighting fixtures save them money over time. With LED light fixtures not only using less electricity to save money, it also improves safety factors by decreasing the amount of voltage an individual may come in contact with if something were to go astray. Fluorescent bulbs contain small amounts of mercury that can become poisonous if the bulb is broken. With these couple factors taken into consideration, when applied in the construction world, improvements can be made all over.

Studies have shown that the lifespan of a LED light bulb is three times more extensive than regular fluorescent light fixtures. An incandescent light bulb uses around 60 watts whereas a LED light bulb only requires around 10 watts. It’s also shown that over a 25,000 hour time frame that LED lights will only go through one bulb over the span of time, whereas a normal incandescent bulb may require up to 21 total bulbs over the time frame. Many LEDs have a rated life of up to 50,000 hours. This is approximately 50 times longer than a typical incandescent, 20-25 times longer than a typical halogen, and 8-10 times longer than a typical Incandescent when used 12 hours a day, a 50,000 bulb will last more than 11 years. So since one LED can last that long, it shows that the money spent on the LED bulbs are worth the value. For big business such as warehouses or office building the change can be tremendous in a tight budget. The energy that is required to run LED lights is also converted more efficiently than a incandescent or a halogen bulb by converting 90-95% of the energy into light and only 5-10% into heat. It is highly unlikely that an LED bulb will overheat and cause a fire to break out. LED light bulbs might be hot to the touch, but they are nowhere near as hot as CFL, halogen or incandescent bulbs.

The introduction of this new technology has impacted the electrical systems throughout the country since more and more industrial, commercial and residential buildings continue to change the type of bulbs they utilize within their facility or home. This small but significant exchange has multiple results that are both bad and good and will be explored in this journal.

Testing of 3-D Hybrid Tissues

Julia Lin | Mentor: Dr. Clayton Jeffryes

An emerging topic in tissue engineering is the use of mixed trophic culture systems to create living, 3-dimensional tissue cultures. Compared to conventional artificial 2-dimensional tissue systems, these chimeric systems more sufficiently represent the metabolic rate and cell-cell interactions inside the body. The metabolic rates of two algae species, *Synechococcus elongatus* and *Spirulina platensis*, were characterized and mathematical models to optimize and control growth conditions were developed. To better replicate living tissue, physiological characterization of the cell cultures and development of a method for the co-encapsulation of the phototroph and heterotroph will be studied to optimize the activity of the total consortia.

Fluid Dynamic Study: Inkjet Bioprinting of Lung Cancer Cells

Alexus Locke | Mentor: Dr. Ping He

Cancer is innately complex, and even with many advances in treatment, it is still the leading cause of death worldwide. In the past decade, bioprinting has emerged and has enabled the creation of high-resolution 3D structures that effectively test cancer genesis, growth, metastasis, and drug responses. In this work, the process of

printing cancer cells using an inkjet printer has been examined using a fiberscope at the 100-micrometer scale. The growth of cancer cells on the printed structures has been compared with traditional ways of cell culturing. This study concludes the feasibility of fabricating cancer cell testing beds with user-defined geometries using the modified inkjet printer.

Poetry of Neorealism

Cedric Lyons II | Mentor: Dr. Katherine Hoerth

In film, Neorealism is a description of reality conceived as a whole by a consciousness disposed to see things as a whole. This term is sought in many forms of art. In literature, as one who writes poems, the term realism is the closest to it, however, as defined by Andre Bazin, a French film critic, neorealism is like a window whereas realism is like a frame. Bazin's theory on neorealism has intrigued me not only through film, but also through my writing. My poems "I am a Definition," "Cor-poor-ate house," and "Subliminal Solitary Alignment," challenge neorealism as a political form by putting Self vs. Society through free verse and iambic-tetrameter. "I am a Definition," looks at the social media outbreak and how it truly affects the individual through similes and metaphors. "Cor-poor-ate House," views the setting of a city metaphorically as it's filled with its desk jobbed workers, and lastly, "Subliminal Solitary Alignment," asks the question of what education has become through uses of imagery.

Our Truth in Entertainment: Literature, Movies, and Music Reflect Social Concerns

Aurora Maldonado | Mentor: Dr. Melissa Hudler

The novel Grendel by John Gardner portrays the character Grendel in a different perspective than that in the original epic Beowulf. This vast difference and insight to the character— a cruel, reckless monster in Beowulf and a misunderstood, lost individual in Grendel— intrigued me to explore how themes presented in the novel correlate with some depicted in modern movies, novels, and music. This in turn, will serve as a reflection of today's social concerns. Drawing inspiration from the illuminated manuscripts of medieval times, I will use several of these art forms, such as Texas Chainsaw Massacre and the animated film Megamind, to illustrate the themes from Grendel. In addition, I will be bringing a psychological and social work approach- the use of the psychological self-fulfilling prophecy and the idea of empowerment in social work- to my research to tie in my academic interests as social work and psychology are my major and minor respectively. I will be presenting my final work on a poster to effectively convey the research and illuminations. My purpose for the project is to remind my audience of or expose it to the fact that our preconceptions not only impact how we interact with people, but they can also affect how others think about themselves. Hopefully, my audience can try losing any assumptions they might have, and instead interact with individuals based on what they have learned after meeting them.

Using Solar Panels to Decrease Electric Bill at Lamar University

Ryan Malone, Lucas Sammons, Erik Rodriguez, Juan Hernandez, and Sam Thayer | Mentor: Dr. Mahdi Safa

As society embraces a greener and sustainable mind set, the construction industry must change to meet these societal standards. The rise of solar power was eminent but took long to take off due to its nuance. When the solar industry was first introduced the idea of solar power was daunting, making many denounce the idea of possible integration in construction. The installation and cost of these solar panels was not only costly it was a difficult task requiring special skills. As the industry started gaining traction the number of experts in the field increased. As the awareness of climate change and sustainability rises so does the need for solar energy incorporation. Many companies have started using solar power as a source of alternative energy.

We plan to research the cost effectiveness and sustainability that is used within solar panels. We can use this information to compare to the current electric bill that is generated for one classroom at Lamar University. There are several factors that will need to be implemented to completing this process.

We will need to factor in where the panels would be placed, how the energy will be stored, and most importantly would it be effective and worth the investment. Lamar has a spread out campus, which would be idea to place solar panels around the campus. We could also use the rooftops since most of the buildings are flat. We have to factor in that we are located near refineries that produce chemical clouds that could affect the absorption process that we are in search for.

We can use this in turn to help Lamar become more sustainable campus wide, cut down on electricity costs, and potentially lower tuition by cutting once cost and replacing it with the other cost. These steps will have to be thought-out and planned very well. How can we manage such a big project in such a timely manner? We can take

the average electric cost and divide it by classroom. We can then compare this to the amount of energy produced by solar cells and stored in internal batteries for electrical usage. Once all of this data is gathered we can then complete an analysis of how we can implement these across the campus. We can factor in cost of each unit and effectiveness with each unit. Each building will vary at Lamar on how many solar cells and batteries it will need. This will cause us to only be able to research the cost for one building at Lamar during this research period. We can use this to become more sustainable and be an example for other colleges as well.

Dynamics of the Chua's Chaotic System

Anthony Marino | Mentor: Dr. Jose Vega Guzman

Analog electronic circuits are widely-known examples of systems exhibiting chaotic behavior. Among these systems, the Chua's circuit, an autonomous circuit with an inductor, two capacitors, a resistor and a single nonlinear resistor, has become a cornerstone for experimental applications. Chua's circuits have a special significance in the studies of modeling dynamical systems, and chaos-based science and engineering applications. In this work, we revisit the Chua's Chaotic System, and explore the equilibrium solutions as well as the corresponding stability. Numerical results illustrating highly oscillatory, and chaotic dynamics will be illustrated. Early simulations indicate the possibility of several periodic regimes, and a very oscillatory behavior of the system.

Microfabricated Sharklet Patterns for Marine Antifouling Applications

Craig Martin, Tyler Palma, and Michael Munther | Mentor: Dr. Keivan Davami

Biofouling is the undesirable accumulation and growth of cells and organisms such as diatoms, algae, barnacles or tubeworms that accumulate on clean surfaces submerged in seawater. This process takes place readily on unprotected surfaces in both the marine and physiological environments such as hulls of ships and aquaculture nets. The control of fouling is of particular concern to marine shipping operations and marine engineering (i.e. offshore constructions, etc.). In this project, we will design, fabricate, and evaluate various nature-inspired engineered topographies and investigate their durability and potential applications as antifouling marine coatings. Our design relies on nano/microfabrication techniques and our characterization techniques benefit from advanced microscopy methods.

The Synthesis of 2,5-Bis(4-methoxyphenyl)-3(2H)-furanone and 2,5-Bis(4-aminophenyl)-3(2H) furanone

Katelyn Meaux | Mentor: Dr. Christopher Martin

The purpose of this project is the multi-step synthesis of 2,5-Bis(4-methoxyphenyl)-3(2H)-furanone and 2,5-Bis(4-aminophenyl)-3(2H)-furanone. The first step in this process involves performing a Friedel Crafts reaction using chlorobenzene, fumaryl chloride, and aluminum chloride. This is then refluxed for a period of 2-3 hours. Following this reflux period, a photoisomerization step is performed in order to convert the trans isomer to the cis conformation. With the chlorine being oriented para to the acyl group, which are good electron withdrawing groups, the molecule is setup nicely for Nucleophilic Aromatic Substitution through the addition-elimination pathway. In this process, the methoxy or amino group acquires a negative charge, making the desired group a good nucleophile. The negative charge attacks the carbon containing the chlorine bond. The electrons are then transferred, through resonance, into the electron withdrawing group. The electrons will then begin to flow back through the molecule. Rather than traveling back into the nucleophile, the electrons are pushed to the chlorine and the bond between the chlorine and the carbon is broken. After this is completed, an acid catalyzed dehydration is performed to produce 3-acetoxy-2,5-diaminophenylfuran or 3-acetoxy-2,5-dimethoxyphenylfura. Through an air-sensitive hydrolysis reaction the acetoxy group will be converted to an alcohol which tautomerizes to form a ketone. In a final photochemical step, it is hypothesized that rearrangement will take place wherein biradicals from alpha cleavage form an epoxyketene. Ring rearrangement produces the final desired structure of 2,5-Bis(4-methoxyphenyl)-3(2H)-furanone or 2,5-Bis(4-aminophenyl)-3(2H)-furanone. The production of these groups with varying attachments will aid in studying this photochemical mechanism.

Time to Put the Cat Back in the Bag

Nicodemus Meyer | Mentor: Dr. Sara Hillin

This research focuses on the growing problem of stray cats on a local, national, and worldwide scale. Cats are a focus of adoration and pampering among society, regardless of how they act indoors or outdoors. However, their behaviors and influences on their surroundings pose a serious problem many disregard or remain unaware of. Although stray cats may not attack humans directly very often, their habits are typically much more grisly than their admirers may expect. I want to use this research to shed light on stray cats' more shocking and hazardous behaviors, detail just how vast this problem is, and offer solutions to the problem. I have researched articles by doctors and professional cat handlers, many of whom collaborate to produce statistics covering both wide and enclosed locales, and I offer multiple interpretations of the data from several angles to ensure a balanced view of the issue. Overall, the research will summarize the sources, using prime quotes from each to better illuminate the subject matter, and help the reader determine for themselves the best course of action to endorse. The research will also analyze people's predispositions towards the topic, mainly focusing on views towards cats from people of specific cultures.

The Spanish Economic Boom

Alexander Neiford | Mentor: Dr. Catalina Castellón

Can self-sufficiency really harm a country? The answer to this question is not very clear, as many countries, including the United States, desire more of a closed borders policy with less dependence on foreign products and services. Several countries, including Spain, have taken the opposite approach with a more open door policy to stimulate economic growth. My project will focus on Spain's incredible economic growth from 1959-1975, known as "The Spanish Miracle". Several important factors, including the joining of the IMF and the World Bank led to growth that was second only to Japan at the time. I will also be examining how surging oil prices incited by OPEC in the mid 1970's halted the boom and marked a turning point in Spain's Economic stability. Spain has enjoyed several periods of economic prosperity in the 1980's and 2000's, and I will end my project by demonstrating how these booms and busts have led to Spain's current economic conditions. There is no doubt that the good has outweighed the bad as living conditions in Spain today are considered quite good making it one of the most desirable places to live on the planet.

Development of the Hudson River Valley during Dutch rule

Alexander Nispel | Mentor: Dr. Brendan Gillis

The question I ask is, how did the Hudson River Valley develop during Dutch rule (1609-1664)? To answer this question, I will be looking at a variety of primary and secondary sources. Primary sources range from legal documents and charters, to a compilation of correspondence from Petrus Stuyvesant, Director General of New Netherlands. As well, I look at the Transatlantic Slave trade Database to determine for additional info on labor. My secondary sources are comprised of articles from the William and Mary Quarterly on the politics and regulations of New Amsterdam, from which the Hudson River Valley was governed. I also bring in several works articles from American Universities, namely the University of Massachusetts Dartmouth, on an article detailing the history of the Dutch West India Company, and the University of Nebraska-Lincoln, on an article covering the Dutch in America, starting from New Netherland. Through my research, I intend to grow the historiography of the region as a part of Colonial history, and to develop a greater understanding on how the Dutch went about colonization, what their priorities were and what actions they took to advance toward their goals.

An analysis of the History, Psyche, and Outside Perspectives of Freak Shows

Nolan Nowicki | Mentor: Dr. Sara Hillin

This research essay focuses on three different areas in regards to the popularity of Freak Shows. The first of these areas is the complex history of Freak Shows in America. These shows began to surface and rise in popularity by around 1860. These shows displayed different oddities, deformities, and gifts that many of the performers had. However, by around 1950, the shows began to wane in popularity, in part due to the moral grey area that surrounded these shows. However, by the late 2000s, these shows began to have a renaissance of sorts. The second of the three areas deal with the psyche of the performers. From an outside perspective, an assumption can be made that many of these performers were mistreated and forced into performing. However, most of the performers were treated very well and were considered mini celebrities in some places. The last of the three areas deals with the confusing curiosity that people had with these shows. From my initial research, I was perplexed by the strange

popularity these shows maintained. My initial thoughts were that these shows would be too morally compromising for people to pay money and watch. But, through the popularity of these shows and through their legacies, I argue in this research that explaining these three areas gives us an important triangulation of issues, through which we can better understand about Freak Shows.

Mutagenic Study of the Potential of Bacteria Cells on the Remediation of Heavy Metals

Caroline Nwandu | Mentor: Dr. Thi Thuy Minh Nguyen

Heavy metal contaminations of waterways pose great health risks. Several studies have been conducted to develop low-cost yet effective methods to remediate toxic compounds. Microorganisms are capable of binding to and absorbing metal ions. The proposed research will focus on determining the capability of treating four different kinds of bacteria, *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Bacillus cereus*, to consume heavy metals. Analysis of the mutagenic effects and the consequences on the sterol biosynthetic pathway of the absorption of heavy metals on each organism will also be investigated. Metals will be transferred into each bacteria cell in a nutrient broth medium in different concentrations. Using a metal specific dye, each media and cell culture will be analyzed using a microscope and UV-visible spectrophotometer to determine the level of metal absorbed and that left behind. The mutagenic effects of metal absorption will be investigated following the culture of several generation of cells. DNA will be extracted and purified at Lamar and each sample will be sent for analysis. Finally, the effect of metal absorption and mutation on the sterol biosynthetic pathway will be determined by extraction of the lipid sterols of interest and analysis using gas chromatography.

A Comparative EEG-Based Study of Natural Speech Processing by Control vs. Persons with Hearing Loss

Garrett Oliver | Mentors: Dr. Gleb Tcheslavski, Dr. Ashley Dockens, and Dr. Lilian Felipe

In this study we are analyzing electrophysiological phenomena that occurs when the brain processes natural speech in non-hearing impaired individuals. This data has established our methodology for the experimental correlation between EEG and natural speech along with two sets of data; neurological and behavioral in non-hearing impaired subjects. This pilot group has established what equipment is required to acquire data from hearing impaired subjects who utilize hearing technologies such as hearing aids and cochlear implants. This study has been aimed only at non-hearing impaired subjects.

Phase two is to acquire neurological and behavior data from hearing impaired subjects. This was initially problematic due to the headphones used in the pilot group creating feedback, however we are currently creating an environment in which accurate data can be collected. Long-term research will be aimed at developing a “smart hearing apparatus” that will operate its microphones based on the user’s attenuation to sounds in their environment.

This will be made possible through research in brain-computer-interface (BCI) systems. BCI’s are systems fitted to a user’s audiogram by an audiologist and provide continuous inputs from the brain in the form of a mobile EEG, but at this point in time BCI’s are still experimental and are not intended for general use.

Biosynthesis of colloidal stabilizing agents for nanotechnology

Zhen Wei Ooi | Mentor: Dr. Clayton Jeffryes

Nanomaterials are integral to today’s state of the art technology, but conventional synthesis routes are energy intensive, generate toxic wastes, and must undergo complicated stabilization chemistry to enhance their storability and biocompatibility. However, benign biological polysaccharides that are produced by algae provide nanoparticles a stabilizing coat. Proof of concept experiments in the PI’s laboratory demonstrate that these polysaccharides impart permanent stability to nanoparticles, even in solvent or high salt solutions. However, these polysaccharides and their stabilizing and storage properties are still almost completely uncharacterized. The purpose of this project is to characterize the ability of algal polysaccharides to stabilize nanoparticles (NPs). The goal will be achieved by carrying out the following specific tasks: (i) Produce algal exopolymeric substances (EPS) and characterize the production rate, (ii) Test the ability of the EPS to stabilize NPs produced by a microwave-assisted synthesis route, (iii) Test freeze-dried NP solutions for stability. The produced nanoparticle solutions can also be used for further experimentation, such as bio-conjugation chemistry and antibacterial and antifungal activity.

Alternate Clothing Washing or Sanitizing System for Long Duration Space Missions

TSGC TDC-11

*Karli Overstreet, Carlos A. Caballero, Erick Lopez-Garcia, and Wyatt Wales /
Mentors: Dr. Kendrick Aung, Dr. Ashwini Kucknoor, and Dr. Jenny Zhou*

The Lamar Launderers have been competing in the Texas Space Grant Consortium (TSGC) Design Challenge during the Fall 2017 and Spring 2018 semesters. The design topic was an alternate clothing sanitizing system for long duration space missions. The project builds on the success of last year's team from Lamar University had with an ultraviolet light sanitation system. Astronauts aboard the International Space Station must remain physically active to counter the effects of bone as well as muscle density loss and, as a result, unsanitary clothes are accrued. The Lamar Launderers' goal is to better ascertain and test the viability of an ultraviolet light system as a method of sanitizing clothing in space flight. Design objectives for the system include a redesign of the internal racks used to hold clothing, reducing weight and power consumption whenever possible, and the implementation of an air circulation system which, in addition to maintaining thermal stability, would loosen salt and skin particles from the clothing. While, at a minimum, the system should have the capacity to fit one set of athletic clothing, the possibility of increasing system capacity without increasing its footprint has been explored. The final design is expected to reduce the amount of live bacteria in clothing by 1000 times and have a lifetime of three years.

Embankment Erosion Protection along SH 87

*Zachery Parker, Garrett Boudoin, David Tingle, Taylor Kane, and Garret Love /
Mentors: Dr. Mien Jao, Dr. Qin Qian, and Lisa Collins, P.E*

Embankment erosion has been a persistent problem along SH 87, threatening to wash out the highway that runs parallel to it. Loss of this roadway would be catastrophic to the community of Sabine Pass as this is their only way in or out. There are many factors that are leading to this extreme erosion but the main variables are the ships that travel along the Intracoastal Canal causing waves that are constantly hitting the shoreline. The other major factor is the type of soil that is in this area, labeled as gumbo soil. Our research and discussions led us to believe the best solution to solve this issue would be to formulate different alternatives other than just putting up sheet piling and backfilling with rocks, because this is what has been done in this area for the past 20 years with little benefit and ends up costing the Texas Department of Transportation (TxDOT) millions of dollars each year in maintenance. We have several different proposed designs that we have come up with to solve this issue, a few of which include geotechnical foam as a backfill, a long-term concrete revetment blanket, and steel sheet pile where needed. Geotechnical tests conducted confirm boring log data issued by TxDOT and erosion characteristics of the channel were calculated using BSTEM. A sheet pile design software, SPW 911, was used in the design of each alternative using the geotechnical foam and soil's strength characteristics. We hope to arrive with the best alternative solution in terms of cost efficiency, design life, and serviceability.

Friction and Durability Analysis of 3D-Printed Surfaces

Kevin Peterson / Mentors: Dr. Ali Beheshti and Dr. Keivan Davami

3D printing is one of the most advanced manufacturing techniques for producing complex parts at low cost and high precision. The surface durability and friction of surfaces in contact is critical as they directly impact the efficiency and longevity of any mechanical or biomechanical system. This study seeks to systematically investigate the surface friction and durability of 3D-printed polymeric parts and compare them with their traditionally manufactured counterparts. The study was conducted using the universal tribometer pin-on-disk sliding tests of 3D printed ABS at a force of 35N, with ABS bar stock as a control. The study currently shows the 3D printed ABS to be less durable than standard bar stock, yet with a lower coefficient of friction.

Dramatic Poetry Readings

Cortney Prescott / Mentor: Dr. Katherine Hoerth

My poems are direct events that have happened in my life. They tell of funny anecdotes or strong emotions. Being in theatre my whole life, my poems have a flair for drama and are best when read aloud. I like to structure my poems by writing around the subject. I will rarely ever disclose the subject of my poems, except in "Stale Coffee and Out-of-Place Flowers," where it's obvious I'm in at court. Examples of this are in "Sunrise" where I talk of falling in love with the wrong person, without mentioning the word love, and "Creeping" which is about noticing how all my friends look like they're getting older without mentioning age or ageing. My long-term goal in poetry is to

experiment with the English language, much like E.E. Cummings, but for now, I am still working on meter, rhyme and imagery. All three of these are shown in "Primary," which uses color to symbolize making the best of what you have.

Efficiency of Solar cells in SE Texas

*David Quispe and Daniel Quispe | Mentor: Dr. Cristian Bahrim**

The solar energy industry is growing rapidly which calls for the investigation of environmental effects on solar cells. This project aims to analyze the efficiency of solar cells in variable conditions related 1) to the orientation of the cell to the Sun and 2) the weather. We used a polycrystalline silicon solar cells rated 1Watt.

First we built a setup for experiments done in a controlled lab environment, for creating a control data set. Thus we used two prongs for holding the solar cell in front of a lamp (which acts as the Sun), and connected wirelessly the solar cell to a voltmeter and ammeter through two decade resistance boxes. We chose two experimental arrangements where the solar cell was rotated about either a vertical axis or a horizontal axis with respect to the position of the light source. Data was collected with a frequency of 2 Hz for each experiment. In these experiments, we saw that when the solar cell was rotated horizontally with respect to the light source, the average current increases by 70% as compared to a vertical rotation of the solar cell.

Out-door experiments were conducted in the Quad in three environmental conditions: clear sky, very cloudy sky, and after rain. The results found will be reported. One important conclusion is that the cloud cover affects the efficiency of the solar cell the most.

Anorexia: The Glorified Monster

Jasmine Razeghi | Mentor: Dr. Sara Hillin

Social media and other various media outlets such as magazines and television shows prove to be a supportive platform for anorexia nervosa, possibly creating an increasing population of people who are diagnosed with this eating disorder. The mentality and words that encourage such practices are analyzed in this research in their connection to the large population of people diagnosed or openly discussing this disorder. Featured are the components of pro-anorexia nervosa communities, blogs, and further insight on the patients' perspectives. Specifically, I will be utilizing research on anorexia in Persian medicine done by Masshad University of Medical Sciences. Additionally, I will include primary sources such as pro-anorexia blogs. Though the blogs are anecdotal generally and are not necessarily peer reviewed academic research, I feel that they are imperative to prove my points for this essay.

Electrical Lockout/Tagout

John Reichard, Ashley Bailey, Lester Juneau, Blake Kight, and Benjamin Hodges | Mentor: Dr. Mahdi Safa

In the construction industry, safety hazards are always present; specifically, electrical hazards. In 2016, electrocutions were third on the list of Construction's "Fatal Four" (Occupational Safety and Health Administration (OSHA), 2018). By increasing training and electrical safety protocols, the number of electrical related injuries and deaths can be diminished. One safety protocol that is readily available to all companies is the lockout/tagout method. According to OSHA, lockout/tagout "covers the servicing and maintenance of machines and equipment in which the unexpected energization or startup of the machines or equipment, or release of stored energy, could harm employees" (Occupational Safety and Health Administration, 1989). It is estimated that lockout/tagout protocols have prevented over 50,000 injuries and 120 deaths annually in the United States since adoption (Total Safety, 2017).

Our group will research reported electrocution accidents from OSHA and note which accidents were caused by negligence. We will analyze the trend of the data and determine if more training is required on safety and lockout/tagout procedures.

Strategic Port Asset Management Framework

John Reichard, Shiblee Ahmed and Patricia Lauritzen | Mentor: Dr. Mahdi Safa

As a practicality, port asset management has often been handicapped by the overhead required to support it in terms of communications and information management. Some key trends in the last ten years have changed this. Asset management is now both a necessity and an opportunity to add value to the industry. Information technology has made it feasible to collaborate and to exchange information among many stakeholders. For ports, universities and similar organizations to maintain success and cope with the increasing risks related to operation

complexity, shorter deadlines, shrinking budgets, and limited skilled resources, asset management becomes very important because a small mistake, or a lack of coordination among the various parties, may result in inefficient business to all stakeholders involved. Therefore, the primary research objective is to develop a comprehensive framework that aims at being a systematic and generic reference to the practice of asset management. It is anticipated that this will lead to enhancement and standardization of the currently available asset management tools of central repository for the information, life-cycle analysis and long-term service-life prediction, managed risks associated with asset performance, sustainable use of physical resources, continuous improvement in asset management practices, and developed cost-effective management strategies for the long term.

Liquified Natural Gas' (LNG) Impact on Construction in South East Texas and the Surrounding Region

John Reichard, Chris Albright, Ashley Bailey, Jean Kim, and Brandon Choate | Mentor: Dr. Mahdi Safa

The global gas market is on the upsurge right now, and it is no surprise that the United States has entered the market. The Liquified Natural Gas, or LNG, market is expected to triple through 2040, to approximately 100 billion cubic feet per day (Beaumont Business Journal, 2018). With the expansion of the LNG market, Southeast Texas and Southwest Louisiana, is one of the only locations in the United States that can export the product. The Facilities that are currently in place to export in Southeast Texas are Shell, Cheniere, and Golden Pass.

The growth in the LNG industry is causing a demand for qualified employees. Employees would be responsible for building, maintaining, and running the facilities. Construction projects that are currently in progress or approved in South East Texas and Southwest Louisiana are Sabine Pass Liquefaction, Sothern Union in Lake Charles, and Magnolia LNG in Lake Charles (Federal Energy Regulatory Commision , 2018). Other areas of construction that will benefit from the increased export of LNG are railroads, and waterway improvements, including berth, dock, bulkheads, and dredging (Texas Department of Transportation Maritime Division, n.d.).

It is anticipated that the Southeast Texas and Louisiana economy will grow due to the LNG Market expansion. The primary research objective is to determine the economic impacts that LNG will have on the Southeast Texas and Southwest Louisiana.

The Patient-Doctor Relationship is Shifting; Why?

Cristian Romero | Mentor: Dr. Sara Hillin

This research paper reviews the evolution of the patient-doctor relationship; it mainly focuses on the possible factors that have caused the shifting of this relationship. Many patients are not satisfied with the relationship that they have with their doctors: Possible factors could be the gap between generations, medical technological advancement, and low appointment ability. This research is very important to acknowledge who is being affected or what is causing the relationship between the doctor and the patient to shift. I will be using journal articles, patients, and doctor's testimony to support the claim. This research is divided into sections, starting off with a Journal Article that studies how the generations gap between the younger and older generations are being affected as time progresses. The second part will address how the advancement of technology affects the doctor-patient relationship and has led to a lack of communication. The third part will focus on how doctors are overloaded with patients who cause low appointment ability and rushed doctor visits. Overall, I will reveal the real factors that have caused the shift between the doctor and the patient relationship.

The Impact of Mexico's National Housing Institution on the Country's Working Class

Samuel Rueda | Mentor: Dr. Terri Davis

The National Institution for Workers' Housing, or better known as INFONAVIT, is the federal institution in Mexico that provides housing for the country's working class. The institution finances seven out of ten homes sold in Mexico. Although the institution is effective in building homes, various issues have emerged concerning INFONAVIT's treatment of home buyers particularly with respect to institutional fairness in homes for low income workers that are financed by the Mexican government. In my research, I provide a descriptive study of INFONAVIT and call attention to the treatment of the working class in Mexico. My study concludes with an examination of the equality and relative fairness of Mexico's national housing project as it relates to the country's working class.

Investigation of Target Group for Portable Data Breaches

Hannah Rumsey | Mentor: Dr. Kumer Das

The purpose of the Investigation of Target Group for Portable Data Breaches research is to quantify factors that make a student subject to a data breach. Through literary research, these factors have been identified and displayed on a likert type scale on qualtrics surveying software. Through implication of a sampling method, the sample size has been determined to be 384 participants that meet the following criteria: undergraduate status, on-campus student, and own a cell phone. The survey will be distributed to classes varying in classification and college. The results of this survey will identify the group, by classification, that is most susceptible to data breaches. Once this is identified, education and awareness of risk factors can be distributed.

The War on War: An Analysis of the Societal, Economic, and Psychological Impacts of Warfare on America

Remingtyn Russell | Mentor: Dr. Sara Hillin

“The War on War”: An Analysis of the Societal, Economic, and Psychological Impacts of Warfare on America
This presentation, based on the compilation of ideas within a second semester research essay, brings war into question. In recent times, World War III is looming over America. With my research, I picked three categories in our everyday lives that are influenced by war: psychology, society, and economy. I did this firstly, to gauge its effect on the U.S., and to ultimately decide the necessity of war. The psychology portion of my research will be centered around the behavioral and psychological effects that develop as a result of participating in the military. For example, the most prominent effect, PTSD which I will also explore. The societal aspect of my research will stress war’s direct effect on the population. Considering the American population has been in several wars, this information will be based on Americans’ reactions to these past wars. I will use that information to predict what effects future wars bring, and how it influences America’s being. Lastly, I explored the economic side of war involvement in the United States. In this part, I will investigate the costs that go into fighting a war and explain their impact on the economy of the U.S. From these factors, I will determine how drastically a war alters the U.S., and offer up alternative solutions.

Reusable Metal Ion-Imprinted Polymer Sponges for Selective Removal of Heavy Metals

Austin Seaux | Mentor: Dr. Gino Martin Canlas

Removal of heavy metals in solution are laborious and involve additives affecting pH, ion concentration, and capability to sustain aquatic life. Use of polymers which selectively and consistently remove these metals are invaluable; however, metal-ion-imprinting of polymers still remain a challenge due to their spherical shape. Furthermore, other materials used to remove heavy metal ions in solution are generally non-reusable. Coordination chemistry of lead, mercury and cadmium with functionalized monomers and ligands will be exploited to increase selective single ion removal. Processed materials will be subjected to cycles of uptake and washing to determine the optimal material for water remediation.

Analysis of Phylogenetic Relationships and Population Genetics of the Californian Cypress (Hesperocyparis; Cupressaceae)

Alexander Sholl | Mentor: Dr. Randall Terry

The New World cypresses (*Hesperocyparis*; Cupressaceae) are a group of seventeen species from western North America, Mexico, and Central America. Six species are endemic to California, four of which are endangered or threatened. Relationships among the Californian populations are uncertain, and given the imperiled status of many species, there is an urgent need for genetic information from the group. The goals of the study are to 1) determine the extent of genetic variation in and between populations and species and 2) examine evolutionary relationships among species by assessing genetic variation in noncoding chloroplast DNA for six populations and three species of California cypresses. DNA sequences from four plastome intergenic spacers were amplified by PCR, commercially sequenced by dideoxy chain terminators, and compared between individuals, populations, and species. Genetic variation measured by mutation rate and overall genetic distance was greatest for the *ycf1-trnL* IGS. Mean genetic distance within species across all gene regions was greatest in *H. abramsiana* and lowest in *H. goveniana*, while mean interpopulational distance in *H. macrocarpa* was over twice as high as *H. goveniana*.

Parsimony analysis of aligned sequences distinguished *H. macrocarpa* from the other species with moderate to strong support, but did not resolve relationships among populations of *H. abramsiana* and *H. goveniana*. Interestingly, the genetic distance between one individual of *H. abramsiana* and other conspecifics is greater than the mean distance between species. These findings suggested the gene regions included will be useful in assessing genetic variation and phylogenetic relationships in the cypresses of California.

Point Cloud Mapping of Surrounding Space Using LiDAR with Application to Robotics

Juliana Silva | Mentor: Dr. Hassan Zargarzadeh

Advanced technologies in navigation and control have reached new heights, and their application to improve our safety and quality of life is inevitable. While outdoor mapping and navigation are fully addressed, the indoor (GPS deprived areas) localization and navigation has remained a challenge. While the available solutions such as imagebased and ultrasonic sensors have limitations, I am using light detection and ranging (LiDAR) in order to develop an accurate and cost effective mapping and navigation system. The first step was designing the electromechanical system in Solid Work Software, and then 3D printing them. After assembling the mechanics of the system, the stepper and servo motors were programmed using Arduino in order to generate the desired motion of the electromechanical system. The most challenging part was communicating with the LiDAR because it is only a sensor, so in order to extract the needed data points, the Processing software was added for graphic representation. With Processing, I am able to receive the data from the LiDAR, and create a plot using the received data at the same time. So far, communication with LiDAR has been successful, and the system can generate a 2D graphical representation of surrounding area; however, there are still improvements to do. This technology has promising applications in navigation and control in robotics, such as unmanned aerial vehicles (UAVs), as well as surveying and inspection.

Where the World Found Peace: The 1948 Olympic Games

Emily Smith | Mentor: Dr. Rebecca Boone

How did World War II and Hitler affect the Olympics, specifically the 1948 London Games? I will answer this question by analyzing the 1936 Olympic Games and the 1948 games. The different sources I used included: newspapers, documentaries, books, and articles. After World War II, London was devastated. The city of London was still recovering from the war when it was chosen as the host city. Other countries were apprehensive to have a Games so soon after WWII. This apprehensiveness came from the devastation caused by the war, the financial situations of the different countries, and the remembrance of the previous political Olympic Games that the Nazi's hosted in Berlin. Even with doubt following the war, the 1948 Olympic Games proved the resilience of people, athletes, and countries, by carrying out a strong determinative Games for the world to enjoy.

The Future of Construction Management Information Technology

Levi Smith, Matt Timmer, Austin Krautz, and Evan Achee | Mentor: Dr. Mahdi Safa

On a construction site there are many forms of information technology that aid the building process. With the introduction of Computer Aided Drafting (CAD) blueprint drawing has evolved from a 2D sketch on paper to a 3D computer environment that can be explored. On construction sites laptops and tablets are becoming a more common sight. Foremen and superintendents use this technology to give more accurate instructions to tradesmen and laborers. Building Information Models (BIM) provides an avenue to communicate in a more plumbing) engineers incorporate departmental workflow into a collaborative project, simultaneously and progressively building the structure.”(The Evolution and Future of Architectural Drafting and Detailing (CAD)). Advances such as this have changed the landscape of the construction industry by bringing design and planning into the computer age. In our field this technology has streamlined the way that information is passed from manager to worker. Information technology has managed to extend its uses to just about all aspects of the construction field, from the planning all the way to the execution of a project. One of the main advantages of CAD is that while planning, each department can trade drawings that are later added to a single master drawing. “The single most influential occurrence which fueled the movement of computer-aided drafting forward was the introduction of file-sharing. File sharing allowed each desktop computer operator access to the architectural plans without edit privileges. Architects could now design floor plans while MEP systems” (The Evolution and Future of Architectural Drafting and Detailing).

The Experiences and Perceptions of Peer-Mentors Participating in a Social Skills Group for Pre-Adolescents with Autism Spectrum Disorder

Maria Stamatis | Mentor: Dr. Monica Harn

This research project examined the perceptions and experiences of peer-mentors participating in a group-based social skills program for adolescent students with high-functioning Autism Spectrum Disorder. A qualitative research method was followed. The program was conducted at two schools and six peer-mentors were included. Pre- and post-program semi-structured interviews were conducted with peer-mentors. Additionally, peer-mentors participated in debriefing sessions to discuss their experiences at the end of each session. Preliminary analysis of the pre-interviews resulted in two major themes: autism as a difference, not a disability and leadership. Analysis of post-interviews and debriefing sessions is ongoing.

Frankenstein vs. Beowulf and Grendel: A Time Honored Comparison

Emily Trahan | Mentor: Dr. Melissa Huddler

While it is easy for most people to imagine a fictional character who is a monster, most people also have differing ideas about the characteristics of the monster. How many different images have you seen of monsters? Are they the same or different from ideas of others? Are they mental images gained from pre-existing art or are they original mental images? I believe that often time's characteristics of monsters vary immensely because there are no real accounts of what a monster looks like, with the exception of the hidden Big Foot and Loch Ness Monster for believers. My presentation will focus on the physical characteristics of the monster characterized in Beowulf and compare the monster to the same one characterized in the novel Grendel by John Gardner. I will further connect the images of the monster from Mary Shelley's Frankenstein to the mental characterization of the monster in Grendel. Images of these monsters from art and movies will highlight the different ideas about how the same monster appears in Grendel and in Beowulf. For Frankenstein in comparison with Grendel I will focus on the mental characteristics of the monster that make the two monsters similar and different. I was led to research on this topic because I immediately drew similarities between Frankenstein and Grendel. By the end of my presentation I hope the audience will better understand that characterization of the same figure can be different because of the author's perspective of the character, and the time period when the piece was written. Literature is timeless, and I hope to influence the audience to appreciate the different characterization of the same monster.

Pervious Concrete Abstract:

Andre Trottier, Hayden Rice, Presley Lundquist, Matt Jones, and Faustino Cisneros | Mentor: Dr. Liv Haselbach

In August of 2017 Southeast Texas experienced record breaking rainfall with the hit of Hurricane Harvey and devastated our cities with flood waters. Having the reminder of this storm all around us we used this design project as an opportunity to explore infrastructure to help reduce flood waters and, quickly took advantage of having one of the leading experts in pervious concrete as the chair of our department. Pervious concrete is a type of pavement that is increasing in popularity and solves several environmental issues. Its unique porous surface allows water to freely flow into its base reducing water runoff and recharging groundwater. This research discusses a proposal for the use of pervious concrete as a patio slab at the Lamar University campus. A methodology is provided discussing the tasks of the project including; how to select a quality location for the pervious concrete, geotechnical considerations, and hydraulics and hydrology. A mix design was designed, created, and tested based on standards achieving different strengths and permeability characteristics to find a good mixture. A process for construction and maintenance of pervious concrete will be followed based on research on other pervious concrete construction projects done. An overall design was created showing the drainage options along with all the design specifications needed to make this project possible given our specific conditions. Our pervious concrete pour is scheduled for early April at the Sustainability Garden on the Lamar University campus to research the efficiency of implementing this technology in SE Texas.

Colonial Foods

Taylor Tucker | Mentor: Dr. Brendan Gillis

Paleolithic diet, also known as the paleo diet, is the caveman and stone age diet, but has anyone ever tried the Colonial diet? The market for new nutrition ideas is growing, and researchers are always finding new diet plans. The purpose of my research is to compare the social classes and look at the nutrition of the meals that are have eaten throughout the day. In my presentation, I will gather information on how the colonialist ate and

compare the different social classes. The methods of exploring my research are I have found a colonial food blog that two historians have done different recipes; also I have research colonialists from the 17th century from different social classes. I have also found stories about different foods in the colonial period. Lastly, my paper will answer these questions how the colonist ate in the 17th century between social classes. I hope my research can provide new nutritional ways for future diets that can help people to have a healthier lifestyle.

A Potential Drug Target for Alzheimer's disease

Shreya Vakil | Mentor: Dr. Maryam Vasefi

Alzheimer's disease is the most prevalent neurodegenerative disease mediated by soluble beta-amyloid oligomers. Glutamate, a brain chemical, plays an important role in learning and memory. Glutamate receptors interact with beta-amyloid oligomers to disrupt normal neural signaling. Two types of glutamate receptors are involved in the pathogenesis of Alzheimer's disease: metabotropic glutamate receptor (mGluR5) and ionotropic receptor, N-methyl-D-aspartate (NMDA). The interaction of mGluR5 and NMDA receptors, through intracellular signaling, play an important role in the development of Alzheimer's disease, but the underlying mechanisms are vague. We hypothesized that mGluR5 may potentiate NMDA receptor activity through NMDA receptor trafficking. A CaMKII-dependent pathway was investigated to determine the connection between mGluR5 and NMDA receptors. Research was conducted by collecting scientific information, through literature review, and experimental evidence to investigate the interaction between mGluR5 and NMDA receptors. Western blot was used to determine crosstalk between mGluR5 and NMDA receptor in cells. DHPG, a mGluR5 agonist, activates mGluR5 and activates NMDA receptors through intracellular signaling. Once activated, NMDA receptors release calcium, disrupting normal neural signaling. We found that blocking mGluR5, a glutamate receptor, improves cognitive performance and reduces beta-amyloid pathology in Alzheimer's disease. This study is fundamental to understand how glutamate receptors function in Alzheimer's patients and can be used to develop new strategies to treat Alzheimer's disease.

Fabrication of Graphene Oxide Nanocomposites

William Q. Van Hoozer, Tyler Palma, and Praveen Damasus | Mentor: Dr. Keivan Davami

Interest in tailoring the properties of polymers has grown steadily in the past several years, as alternatives to more expensive and difficult to manufacture materials have become more desirable. Polymers, while advantageous in several areas, often lack sufficient mechanical properties, and so polymer structures suffer from material degradation due to friction and wear. Research has seen that nanocomposite additives are a useful way to increase relevant mechanical properties. Graphene oxide (GO) specifically has excellent functionality as a corrosion resistant, lubricative additive with hydrophobic surface properties. In this work several reduced GO-epoxy nanocomposite coatings were synthesized and their tribological properties analyzed through steady state wear testing and nano-indentation and scratch testing. Various wt. % of RGO were used to determine if a relationship between the amount of RGO and the resultant properties could be optimized. The results of these tests showed that RGO, when added to a polymer substrate, enhances the friction characteristics of said polymer at the nano level.

Quasi-Static and Dynamic Force Analysis of 3D Printed Metamaterials

William Villa, Mehrdad Mohsenizadeh and Federico Gasbarri | Mentor: Dr. Keivan Davami

Technology is changing every day, bringing with it improvements to daily life and new methods of manufacturing items quicker and less expensive than ever before. Nowhere is this more evident than in the case of additive manufacturing, commonly referred to as 3D printing. The focus of this research was to evaluate the behavior of 3D Printed metamaterials made from photosensitive resin when exposed to quasi-static and dynamic forces. Theoretical models were chosen, fabricated, and tested to determine if their behavior under a load would be the same as predicted. A face-centered-cubic (FCC) structure was selected and printed in multiple geometries then submitted to compression tests. The results from these tests were compared to test results of an octet-truss structure. The results show the FCC model has a lower Young's Modulus and Yield Strength than the octet-truss structure. During fatigue tests, the FCC model showed behavior opposite than that of the octet-truss structure.

Polyphenolic Phytochemicals for the Use of Preventing and Treating Neurodegenerative Disease

Amanda Warner | Mentor: Dr. Maryam Vasefi

Neurodegenerative disease is the progressive and irreversible loss of neurons that leads to cognitive motor deficits. Drug development is urgently needed for the prevention and treatment of neurodegenerative diseases such as Alzheimer's disease because of the lack of an effective drug. Research indicates that there are several polyphenols that may be useful in preventing and treating neurodegenerative diseases. Inflammation and oxidative stress play important roles in the initiation and propagation of these diseases. This research seeks to identify polyphenolic phytochemicals that can reduce inflammation and oxidative stress to prevent and treat neurodegenerative diseases. Polyphenols' lack of side effects makes them appealing in medicine, where most treatments have significant side effects. A literature search and creative synthesis were conducted to isolate polyphenols with the desired properties. Big data file was developed by using Journals, scientific books, and the library catalogue. After amassing a large number of possible polyphenolic phytochemicals, the list was culled. This was accomplished by using computer software to create several cognitive organizers to determine all polyphenols that possess anti-oxidant and anti-inflammatory properties. This model indicates the intracellular signaling pathways that can be modulated by these polyphenols as well. This project indicates that there are several polyphenols that may be useful in preventing and treating neurodegenerative diseases and could benefit patients suffering from these diseases such as Alzheimer's disease. Polyphenols may provide the treatment not only for neurodegenerative diseases, but also for other diseases that are caused or propagated by oxidative stress and inflammation.

American Sign Language Comprehension and Spatial Skills in Regards to College Students

Brooke White | Mentor: Dr. ChongMin Lee

American Sign Language (ASL) is often thought to be another form of English, but this is in fact not true. ASL is a visual-gestural language that has its own grammatical structure, but differs from English. Due to differences in modalities in both languages, ASL is particularly hard for students to learn as a second language. This study focuses on ASL comprehension skills and spatial skills of college students taking ASL for a foreign language requirement. A total of 37 hearing college participants who were enrolled in an ASL 1 class were involved in this study. Participants were asked to complete a background survey and a Woodcock-Johnson III spatial task. Final comprehension exam scores were obtained during the following week. Participants were separated into two groups, higher and lower ASL comprehension groups, based on their final comprehension scores. The results collected from this study indicated that the higher ASL comprehension individuals did have a higher spatial skillset when compared to the lower ASL comprehension group. Our findings are supported by previous studies on ASL comprehension and spatial ability (Emmorey 1998), indicating that ASL leads to enhanced spatial skills. This study has educational implications in ASL Education and ASL interpreter education, as educators can modify their teaching tactics to adjust to the student's language learning needs. Learning ASL will in turn benefit the increased knowledge in spatial skills as well as spatial cognition for students.

Learning to Market Education

Mary Catherine Wilbur, Bra'ah Hamdan, and Aruba Bukhari | Mentor: Dr. Mahdi Safa

The goal of this project is to market Kelly Week's educator-oriented web platform NERC (National Educator's Resource Center). NERC is a web service geared towards providing educators tools to function successfully in their workplace and evaluate the quality of educational resources. Students will work together with Weeks to develop a marketing plan which includes:

- -Public outreach and distribution of pamphlets. Pamphlets contain a reference code encouraging recipients to pass along the information for a \$5 award per referred user.
- -Researching public locations to advertise
- -Development of promotional materials: Flyers, cards, digital media, banners, etc.
- -Social media campaigning on platforms such as Facebook, Twitter, and educator-oriented social media

These actions will stimulate public interest and allow Weeks' to gauge the viewership of NERC's initial launch.

Multilevel Humor: Analysis of Adult Humor in Children's Media

Alexandra Williams | Mentor: Dr. Sara Hillin

Recently, The Avengers has been one of the most popular movie series. It is actually a children's movie, yet some of the most ardent fans are adults. At the same time, shows like Veggie Tales and Teletubbies show that children's media does not always appeal to adults. In consideration of this interesting contrast, I am planning to examine how childhood media is appreciated by adults. One of the ways in which such media appeals to adult is shown by youtube: movies have increasingly found themselves subject to 'dirty mind tests' where people cut scenes from the movies and cause the adult viewer to notice the jokes and implications they missed as children. I am also examining how the different techniques, such as intertextuality, amuse adults but go unacknowledged by children.

Prospectus

Suzanne Williamson | Mentor: Dr. Rebecca Boone

I will be researching the pirates, buccaneers, and privateers of the Caribbean. I will specifically be looking at Henry Morgan, and his time as a privateer in Jamaica and his subsequent pardon for the sacking of Panama by the English Crown. I will also be examining his governorship of Jamaica, and how these events affected piracy during this period. I believe the Jamaican governor and the King of England perpetuated piracy in the Caribbean by their leniency towards Henry Morgan and the privateers. I anticipate using numerous 17th century legal documents including royal proclamations and trial documents, memoirs of the pirates and their victims, and contemporary books written about piracy. In addition to these primary sources I will be evaluating several secondary sources including scholarly articles, and books written on Morgan and the English government during the 17th century. This research is important because it shows that governments are not infallible. It is relevant today because piracy still exists, governments still condone it (though maybe not publicly), and people still have to deal with the ramifications of decisions made by their leaders.

Energy Efficient Design

Spencer Wommack, Shawn Miller, Brett Wrogers and Charlie Kapp | Mentor: Dr. Mahdi Safa

Throughout the world, the construction industry uses a vast amount of the earth's natural resources. With population increasing across the globe, the design and construction industry will also increase to keep up with urbanization. This will mean that natural resources are being used up faster than ever before in the history of the earth. If we are to continue to thrive as a civilization we must take drastic steps to a more energy efficient and sustainable environment.

As designers and constructors move further into the twenty first century it is paramount that we strive for a more sustainable infrastructure. This not only means using ecofriendly construction methods and materials but also designing long term sustainable energy sources. This poster will show innovative design concepts, such as solar and wind energy, and other ecofriendly and efficient energy sources. It will also show the benefits all of these things will have on the environment. In doing this we will provide valuable research, which is the first step in creating a more sustainable future.

Exploring Hippotherapy as an Intervention for Children with Special Needs: A Retrospective Descriptive Study

Kloe' Woosley | Mentor: Dr. LeAnn Chisholm and Mrs. Rose Harding

Method: A retrospective descriptive study design was used to analyze demographic characteristics and physical/occupational therapy standardized assessment scores of pediatric subjects participating in hippotherapy in Southeast Texas from January 1, 2014 through December 31, 2016.

Data Collection: Once informed consent/assent was obtained, demographic data including age, gender, ethnicity, primary diagnosis, and comorbidities was collected along with standardized assessment data, session type, time in minutes, and number of hippotherapy sessions. Data was coded and stored securely in a locked box.

Results: Demographic characteristics of this sample will be discussed along with therapy characteristics, number of sessions, prior enrollment in program, grooming time, and riding time. For each standardized test and subscale, the mean, frequency of administration, and follow-up assessment scores will be discussed. Analysis of the relationship between therapy amount and type with standardized assessment scores will be discussed.

Conclusions: Due to the small sample size and restricted geographic location, the results are limited to this sample of pediatric clients utilizing hippotherapy. Valuable trends and information regarding the consistency of assessment and reassessment will be presented. In addition, the reason for decreases in reassessment scores could not easily be identified in the chart and may have contributed to inconsistency in the findings.

Implications: The standardized assessments used to evaluate physical and emotional status of this population may not be sensitive enough to detect subtle improvement in functioning; therefore, additional tests need to be identified or developed. Longitudinal research and larger samples are needed to identify potential relationships.

Mysteries of the Universe Revealed through Cosmic Background Radiation

David Yeakey | Mentor: Dr. Cristian Bahrim

Understanding the origin and evolution of our universe has been an intriguing topic for research throughout history. John Mather and George Smoot launched a NASA project, called Cosmic Background Explorer (COBE), which successfully led to the identification of the fundamental blackbody radiation curve for our universe, thus serving as validation that the universe originated from a single, infinitely dense point, and underwent rapid adiabatic expansion resulting in today's landscape of the cosmos. My presentation emphasizes the rich science involved in understanding the significance of the cosmic microwave background radiation that fills our universe as remnant of the Big Bang.

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