Sponsored by the Office of Undergraduate Research.

This event includes 43 presentations, 56 Lamar University students, and 36 faculty mentors; all representing 20 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.
SECOND ANNUAL
UNDERGRADUATE RESEARCH
EXPO 2015
We would like to acknowledge and thank everyone for their participation in making this 2nd Annual Undergraduate Research Expo, a success.

Individuals listed have provided invaluable guidance and support throughout the development of this conference. We sincerely appreciate their time and expertise.

Stacey Haynes, Web Communications
Anita Brice, Mathematics Department
Lauren Pittman, Purchasing Department
Azadeh Semien & Chartwell's Catering, Cardinal Catering
Traci Breaux, Hernandez Office Solutions
Doug Mullins, Kirksey's Printing
DJ Moore, Kirksey's Printing
Rachel Short, Kirksey's Printing
Cocomoe Joe’s

A special thank you to Calen Brice for all of your assistance, guidance & patience throughout the development of this expo. Thank you a million times, thank you!

Vendors:
Cocomoe Joes
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April 20, 2015

Undergraduate Research Expo Participants:

It is my pleasure to welcome each of you to Lamar University's Second Annual Undergraduate Research Expo, sponsored by the Office of Undergraduate Research.

Today we will engage in the presentations of undergraduate students from all colleges and departments of their conducted research both finalized and in progress.

The Office of Undergraduate Research has a mission to inspire undergraduate students from all majors to explore their field of study and engage in research. Under the direction of Dr. Kumer Das, the department offers a wide range of opportunities, including workshops, keynote addresses and other activities for students to get involved.

We are so proud of all of the students who will present and we congratulate the mentors who have dedicated their time and efforts to assist in the conducting of these projects.

Best Wishes,

Kenneth R. Evans, Ph.D.
President
April 20, 2015

Dear Students, Colleagues, and Guests,

I would like to welcome you to the Second Annual Undergraduate Research Expo. We are pleased to include 43 presentations by 62 students working with 38 faculty mentors representing 20 academic departments.

The Office of Undergraduate Research (OUR) is dedicated to promoting and supporting student success through faculty-mentored undergraduate research, creative inquiry and other scholarly experiences. Such experiences can manifest in many ways, including co- or extracurricular projects involving one or more students mentored by LU faculty. Scholarship is achieved by using the tools of an academic discipline to answer questions that enhance knowledge and understanding. We seek to highlight the diversity of disciplinary scholarship for and through our students in order to help cultivate a culture of life-long inquiry.

The OUR offers financial assistance to promote activities surrounding faculty mentored student scholarship and creativity. This academic year, we have provided assistance to 52 students for travel to present the results of their inquiry at local, regional and national meetings. We have provided grant support for 15 undergraduate students. Our students have accomplished a lot during this academic year. Keeley Townley-Smith presented her research on Atomic Spectroscopy at the 2015 Texas Undergraduate Research Day at the Capitol on March 4, 2015. Nicolas Nikoloutsos, Maritza Aguilar, Lauren Richardson, Jamie Tran, and Gabriel Graham have been selected for the Poster on the Hill program, which is scheduled to be presented to the members of the congress in Washington, DC on April 22nd – 23rd of 2015. This is a prestigious competition where students from all over the country submitted abstracts. More than 600 applications were received, and only 60 posters were selected to be presented on Capitol Hill.

Today is your day for celebration of your scholarly accomplishments. I would like to thank all the students and their faculty mentors for taking the time to share your work with the university community. Many thanks go to Dr. Kenneth R. Evans, LU President and Dr. Stephen A. Doblin, LU Provost and EVPAA. My special thanks to all deans and chairs. I could not have done this without the support of the OUR Advisory Committee. Finally, I would like to express my deepest appreciation of the time, energy and dedication that Jasmine Fields gives toward the success of the OUR.

Throughout this conference, I ask you to stay engaged, keep us proactive and help us shape the future of the Office of Undergraduate Research. My personal respect and thanks goes out to all of you.

Sincerely,

Kumer Pial Das, PhD
Director, OUR
Steve Doblin, Lamar University’s Provost and Vice President for Academic Affairs, attended the University of Alabama in Tuscaloosa where he earned the B.S., M.A., and Ph.D. degrees, all in mathematics. While an undergraduate at Alabama, he was inducted into Phi Beta Kappa and Who’s Who Among Students in American Colleges and Universities, and as a graduate student was awarded a National Science Foundation Fellowship, a National Aeronautics and Space Administration Traineeship and a Graduate Teaching Assistantship.

In 1972, Dr. Doblin joined the faculty of the University of Southern Mississippi, where he served as chair of the Department of Mathematics for nine years and as dean of the College of Science & Technology for twelve years. He has published articles dealing with mathematics, mathematics education, and university administration, and received funding for a variety of mathematics teacher-training projects from the National Science Foundation and the U.S. Department of Education.

Doblin is a member of the American Mathematical Society, the Mathematical Association of America, the National Council of Teachers of Mathematics, Sigma Xi, Phi Kappa Phi and Phi Delta Kappa. His honors include membership in several who’s who societies, two university-wide Excellence in Teaching Awards, and selection as Mississippi Educational Administrator of the Year. While in Hattiesburg, he served on the local boards of directors of the Area Development Partnership, Forrest General Home Care, and the Salvation Army. He is a past president of both the Hattiesburg Area Education Foundation and the Mississippi Power Education Foundation Board of Directors. In 1995, Doblin retired from the U.S. Army as a Lieutenant Colonel, following more than twenty-three years of service.

Dr. Doblin joined Lamar University in July 2001 as Provost and Vice President for Academic Affairs. He is a graduate of Leadership Southeast Texas and the Senior Fellowship Program of the Division of Universities and Health Related Institutions of the Texas Higher Education Coordinating Board, and currently serves on the advisory board of the JASON Alliance of Southeast Texas, as a member of the Rotary Club of Beaumont and a Paul Harris Fellow, and as president of the Texas Council of Chief Academic Officers, and also served for two years as president of the Board of Trustees of Temple Emanuel of Beaumont. In addition, Dr. Doblin teaches a large section of freshman mathematics each fall.
Undergraduate Research Expo
Schedule

Monday, April 20, 2015 | Setzer Student Center, Ballroom

10:00 AM - 10:50 AM  Registration

11:00 AM - 11:20 AM  Welcome
Dr. Kumer P. Das
Director of Undergraduate Research, Lamar University

Dr. Kenneth R. Evans
President, Lamar University

11:20 AM - 11:25 AM  Introduction of Keynote Speaker
Keeley Townley-Smith
Undergraduate Student, Lamar University

11:25 AM - 12:00 PM  Keynote Speaker
Dr. Stephen A. Doblin
Provost, Lamar University

12:00 PM - 12:25 PM  Lunch

12:30 PM - 1:30 PM  Poster Exposition
Setzer Student Center, Ballroom

1:35 PM - 3:25 PM  Oral Presentations
Room specifications listed on schedule

3:30 PM - 3:50 PM  Award Ceremony & Closing Remarks

All events, unless otherwise specified during oral presentations, will be held in the ballroom.
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<th>Topic</th>
<th>Presenter</th>
<th>Mentor</th>
<th>Presentation time</th>
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<td>Memory Dynamics of DTN Protocols in Deep-Space Communications</td>
<td>Tyler Doiron</td>
<td>Dr. Ruhai Wang</td>
<td>1:35 PM</td>
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<tr>
<td>Walking Tall: An Analysis of Jansen's Linkage</td>
<td>Thomas Michael</td>
<td>Dr. Jenny Zhou</td>
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<td>LED's Luminous Flux Lifetime Prediction of Using a Hybrid Numerical Approach</td>
<td>Theodore Kretshmer</td>
<td>Dr. Xuejun Fan</td>
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<td>Analysis of Toxic Chemicals and Metals in the waters of the Golden Triangle Area</td>
<td>Progga Chirontoni</td>
<td>Dr. Andrew Gomes</td>
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<tr>
<td>A Comparison of SVD and NMF for Unsupervised Dimensionality Reduction</td>
<td>Chelsea Boling</td>
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<td>Enumerating kth Roots in the Symmetric Inverse Monoid</td>
<td>Christopher York</td>
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<td>Drops on Polymers: Statics and Dynamics</td>
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<td>Dr. Rafael de la Madrid</td>
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<td>G-Graphs and Video Games</td>
<td>Johnathan Hodges</td>
<td>Dr. Jennifer Daniel</td>
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<td>Defining the Gastrointestinal Microbiome of the Teleost, Mugil cephalus</td>
<td>Datron Brown</td>
<td>Dr. Matthew P. Hoch</td>
<td>1:35 PM</td>
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Exploring mate selection among International Students in Southeast Texas
Wei Xiong, Mentor: Dr. Chiung-Fang Chang
Sociology
Presentation will begin at 1:50 PM

Career Self-Efficiency, Sex Role Identity, and Life Satisfaction
Joycelyn Joya, Mentor: Dr. Edythe Kirk
Psychology
Presentation will begin at 2:05 PM

A Primer to Radial Basis Function Networks
Jason Hatton, Mentor: Dr. P.J. Couch
Mathematics
Presentation will begin at 2:20 PM

Cultivation Theory: A Real Analysis of Reality Television’s Long-Term Audience Impact
Kara Timberlake, Mentor: Dr. Nicki Michalski
English/Communications
Presentation will begin at 2:40 PM

SETX Interactive Media and Technology in Education Research
Dougal MacGregor, Charles Bray, and Joshua Wilson
Mentors: Dr. Kumer P. Das, Dr. Timothy Roden, Mr. O’Brien Stanley
Communication/Computer Science/Mathematics
Presentation will begin at 2:55 PM

The symphony of Southeast Texas in 2015: A Regional Orchestra Navigating New Horizons
Kay Alana-Turner, Mentor: Mr. Craig Escamilla
Mathematics
Presentation will begin at 3:10 PM

Parental Involvement Children’s Education
Gregory Potter, Mentor: Dr. Chongmin Lee
Deaf Studies/Deaf Education
Presentation will begin at 2:40 PM

Burning the Candle at Both Ends: Interpreter “Burnout” and how it impacts the quality of work
Xavier Hagans, Mentor: Dr. Chongmin Lee
American Sign Language
Presentation will begin at 2:55 PM

“I am a part of all that I have met”: Tennyson’s Ulysses and the Evolution of a Victorian Hero
Molly Porter, Mentor: Dr. Amy Smith
English and Modern Language
Presentation will begin at 3:10 PM
1. Compressed Brick Earth  
   Kolby Smith, Mentor: Dr. Kendrick Aung  
   Mechanical Engineering

2. A survey of prevention and remediation of audiological habits in older adults of Jefferson County, TX  
   Kaitlin Taylor, Mentor: Dr. Ashley Dockens  
   Speech & Hearing Sciences

3. Anxiety in Children with Autism  
   Alexis Garrett, Mentor: Dr. Mamta Singh  
   Teacher Education

4. Picking the Pretty One: A Qualitative Study of Toy Selection Among Girls Ages 4 to 10  
   Savannah Anderson-Bledsoe  
   Psychology

5. A Novel in vitro Microenvironment for the Optimization of Cancer Stem Cell Formation  
   Nicolas Nikoloutos, Gabriel Graham, Mentor: Dr. Ian Y. Lian  
   Electrical Engineering/Physics

6. Self-Efficacy Beliefs of Pre-Service Teachers in Teaching Elementary Science: Preliminary Findings  
   Mallory Burnaman, Mentor: Dr. Mamta Singh  
   Teacher Education

   Audrene Edwards, Mentor: Dr. Kumer P. Das  
   Mathematics

8. Vocal loudness across breath support: An exploratory study  
   Alyssa Hughes, Mentor: Dr. Nandhu Radhakrishnan  
   Speech & Hearing Sciences

9. Update on recent field and lab results on the first Uinta C micro-mammal fossil locality from the Uinta Basin  
   Christopher Sanders, Casey Guillot, James Fairchild, Mentor: Dr. James Westgate  
   Geology

10. The Forgotten: Exploring the Role of Gender and Media Perception of Women in Prisons  
    Sarah Toben, Mentor: Dr. Robert Worley  
    Criminal Justice/Sociology

11. Exploring Spirituality and Spiritual Care in Nursing Students and Hospice Nurses  
    Augusta Broussard, Mentor: Dr. Eileen Curl, Mrs. Regina Hale  
    Nursing

12. Programming is a SNAP! Increasing Knowledge and Interest in Computer Science  
    Hannah Leleux, Alexander Strong, Timothy Holcombe, Collin Smith, Timothy Gonzalez, Greg Yera, Logan Smith, Mentor: Dr. Peggy Doerschuk  
    Computer Science
Cultural Differences in Promotion and Products in the Fast Food Industry: A Case of the U.S. and Sweden Dyad
Sebastian Norman, Mentor: Dr. Vivek Natarajan
Marketing

A Negative Binomial approach to optimizing a Bonus-Malus system
Jeremy Marks, Mentor: Dr. Kumer P. Das
Mathematics

Applications of Emission and Absorption Spectra in Astronomy and Environmental Science
Keeley Townley-Smith, Mentor: Dr. Cristian Bahrim
Physics

SETX Interactive Media & Technology in Education Research
Dougal MacGregor, Charles Bray, Joshua Wilson, Mentor: Dr. Kumer P. Das, Dr. Timothy Roden, Mr. O'Brien Stanley
Communications/Computer Science/Mathematics

Prediction of pitcher plant (Sarracenia alata) distribution in the Big Thicket National Preserve using a geographic information system
Emmy Hammonds, Uzma Quraishi, Rehan Quraishi, Mentor: Dr. Matthew Pyne
Political Science

Decreasing the Incidence of Trichomonas vaginalis Infection Through the Use of Periodic Acid
Momin Islam, Mentor: Dr. Ashwini Kucknoor
Biology

Determination of Pesticides in Conventional and Organic Tomatoes
Carra Curtice, Mentor: Dr. Andrew Gomes
Environmental Science

Nickel-Catalyzed Direct C-H Arylation of Heteroarenes
Jamie Stafford, Mentor: Dr. Xiangyang Lei
Chemistry

Work in Progress: Improving the Performance of the Radial Basis Function Network
Alexander Strong, Greg Yera, Logan Smith, Phillip Potter, Mentor: Dr. Peggy Doerschuk
Computer Science
Picking the Pretty One: A Qualitative Study of Toy Selection Among Girls Ages 4-10
Savannah Anderson-Bledsoe, Mentor: Dr. Donna Spheris

Children learn gender and social role types through a variety of influences including caregivers, media, and peers. Toy selection, particularly the choices of dolls by young girls, is also largely influenced by the child’s concept of beauty (Perez, 2012). Do they choose what looks most like them or what looks most like what they think is pretty? Are these the same or different concepts? Understanding the influences on preschool age girls is critical to educators working with this population. The presentation will focus on the foundations of a qualitative study that is looking into the following research questions: What are the factors that influence 4-10 year old girls’ doll choice? Do girls ages 4-10 of various ethnic and racial backgrounds prefer dolls that represent their racial and ethnic backgrounds over those that reflect mainstream white, European backgrounds? This grounded theory study will derive data from interviews with girls ages 4-10 in southeast Texas. The interviews will be transcribed and analyzed for themes to determine the process used by girls in this sample to make choices about doll selection based on beauty. The results of this study will impact social change by providing guidance to educators and caregivers who help shape the lives of preschool girls.

A Comparison of SVD and NMF for Unsupervised Dimensionality Reduction
Chelsea Boling, Mentor: Dr. Kumer P. Das

Dimensionality reduction techniques are necessary in discovering hidden patterns and possibly unknown correlations in “Big Data”, which is a popular term to describe extremely massive datasets that undergo computations to reveal these hidden patterns and that are also susceptible to irrelevancy and ambiguity. Dimensionality reduction is a type of analysis that organizes data in a way that decision-making about the data is easier. Data may come in structured and unstructured textual forms and may also be sparse, which could be problematic in regards to many computational aspects. Furthermore, some of the most straightforward techniques in dealing with “Big Data” rely heavily on matrix algebra to manipulate these textual forms. Matrix decomposition techniques, such as singular value decomposition (SVD) and non-negative matrix factorization (NMF), are well-regarded approaches that take original data and numerically transform it into unique components to better expose the important correlations of the data. In this study, we evaluate the performance of both SVD and NMF using 3,398 full-text articles from the PMC Open Access Subset. Our dataset consists of documents that contain at least one term occurrence of “herbicide”. As an exploratory analysis, we obtained interesting results regarding the similarity of several oncology and toxicology documents. Moreover, we find that both dimensionality reduction techniques do proper and substantial jobs of retaining this particular dataset’s intrinsic dimensionality.

Exploring Spirituality and Spiritual Care in Nursing Students and Hospices Nurses
Augusta Broussard, Mentor: Dr. Eileen Curl, Mrs. Regina Hale

Spirituality is a core competency for baccalaureate prepared nurses; however, registered nurses (RNs) and nursing students (NSs) may not always feel adequately prepared to address patients’ unique spiritual needs. The purpose of this descriptive, exploratory research study was to investigate RNs’ and NSs’ perceptions of spirituality using the Spirituality and Spiritual Care Rating Scale (SSCRS) to gain an understanding of the spiritual domain of nursing care. The SSCRS, a 17-item questionnaire, was distributed to 23 RNs at a Southeast Texas hospice facility and to 44 senior NSs enrolled at Lamar University. Forty nine (N = 49) surveys were completed (n = 21 [91%] RNs, n = 28 [64%] NSs) resulting in a return rate of 73%. Internal consistency for the SSCRS was analyzed; Cronbach’s alpha for this sample was 0.583. Nursing students scored higher than RNs on the spirituality (NSs’ M = 4.14, RNs’ M = 3.97) and spiritual care (NSs’ M = 4.76, RNs’ M = 4.67) subscales of the SSCRS. Furthermore, NSs’ (M = 65.68) scored higher than the RNs’ (M = 63.24) on the composite SSCRS score (t = -1.703, p = .096). Although not statistically significant, the findings suggest that NSs, despite a lack of clinical experience, value and understand spiritual care principles. Because the concept of spirituality is integrated into the nursing curriculum, this study demonstrates that NSs have achieved theoretical knowledge of the spiritual domain of nursing that is at least comparable to RNs with experience in hospice nursing (M = 4 years).
Defining the Gastroinestinal Microbiome of the Teleost, Mugil cephalus
Datron Brown, S. Islam, Mentor: Dr. Matthew P. Hoch

Gastrointestinal microbiota (GIM) of fish impacts intestinal immune response to pathogens and provides probiotics beneficial to efficient use of food. Mugil cephalus (striped mullet), a common forage fish of the Northern Gulf of Mexico, has become an important fishery and aquaculture species around the world. Ecologically, it’s an important prey item and consumer of plankton, detritus, and benthic sediments in coastal habitats. This study defines the GIM diversity among five populations of juvenile M. cephalus. Ten individuals were collected from each of five salt marsh sites along Southeast Texas coast. Culture independent approaches to GIM analysis involved DNA extraction from intestines, PCR amplification of 16SrDNA variable regions, DGGE, and next generation sequencing. The mean (± SD; n = 5) Shannon index and richness of OTUs (>97% sequence similarity) for GIMs from the five populations was 3.97 ± 0.79 and 376 ± 217. There were 17 predominant orders (>3% total sequence reads) among the populations, but not one order was predominant in all. The abundant orders varied among fish population GIMs: Cytophagales were 33% and 21% of SP and KL, respectively; Rickettsiales were 13% of SP; Clostridiales were 71% of SP2; Lactobacillales were 39% of GB, and Vibrionales were 17% and 37% of GB and MF. The influence of environmental variables of water quality and fish size on predominant orders was explored with canonical correspondence analysis. Specific OTUs of the M. cephalus GIMs provide insight to risk of human pathogen exposure, health, and potential probiotics for the aquaculture industry.

Self-Efficacy Beliefs of Pre-Service Teachers in Teaching Elementary Science: Preliminary Findings
Mallory Burnaman, Mentor: Dr. Mamta Singh

While there are metals that are essential for our body, there are also metals such as lead, cadmium, copper, and arsenic that are emitted to the environment and are harmful to our bio-system. Additionally, chemicals in our everyday life such as herbicides, pesticides, preservatives and pharmaceuticals which are hazardous for our health also end up in our drinking water. This study is designed to collect and analyze water samples from natural, industrial, and residential sources in the Golden triangle area and measure the level of accumulation of inorganic heavy metals and some organic chemicals. For metals, a process called “Anodic Stripping Voltammetry (ASV)” was used, where the working electrode is placed in the water sample and the dissolved heavy metals then deposit around the electrode. A “Trace Detect nano-band Explorer-II” is used to measure the current needed to deposit each metal separately and shows us the peak height of the current. Some tap water samples from houses in Beaumont were tested. Samples from different locations in the Golden Triangle area were also collected and anodic stripping voltammetry is being used for each of the samples to measure the concentration of the heavy metals in them. Three organic chemicals which are commonly used as herbicides/pesticides are also being measured using Liquid Chromatography-Mass spectrometry (LCMS) method, and the calibration curves are being prepared. Results should illuminate the generally-ignored part of water quality report in Southeast Texas, and help grow awareness about toxic metals and organic chemicals in drinking water.

Analysis of Toxic Chemicals and Metals in the waters of Golden Triangle Area
Progga Chirontoni, Mentor: Dr. Andrew Gomes

While there are metals that are essential for our body, there are also metals such as lead, cadmium, copper, and arsenic that are emitted to the environment and are harmful to our bio-system. Additionally, chemicals in our everyday life such as herbicides, pesticides, preservatives and pharmaceuticals which are hazardous for our health also end up in our drinking water. This study is designed to collect and analyze water samples from natural, industrial, and residential sources in the Golden triangle area and measure the level of accumulation of inorganic heavy metals and some organic chemicals. For metals, a process called “Anodic Stripping Voltammetry (ASV)” was used, where the working electrode is placed in the water sample and the dissolved heavy metals then deposit around the electrode. A “Trace Detect nano-band Explorer-II” is used to measure the current needed to deposit each metal separately and shows us the peak height of the current. Some tap water samples from houses in Beaumont were tested. Samples from different locations in the Golden Triangle area were also collected and anodic stripping voltammetry is being used for each of the samples to measure the concentration of the heavy metals in them. Three organic chemicals which are commonly used as herbicides/pesticides are also being measured using Liquid Chromatography-Mass spectrometry (LCMS) method, and the calibration curves are being prepared. Results should illuminate the generally-ignored part of water quality report in Southeast Texas, and help grow awareness about toxic metals and organic chemicals in drinking water.
Determination of Pesticides in Conventional and Organic Tomatoes

Carra Curtice, Mentor: Dr. Andrew Gomes, Dr. Shyam Shukla

Tomatoes are used as salad ingredients, in soup, and for preparation of several other food items. They are well known for their antioxidant properties. During cultivation and storage of tomatoes pesticides and other hazardous chemicals are being used. In this study, we investigate the pesticide content of conventionally grown tomatoes, and tomatoes grown in organic or environment friendly way. For both the case we have purchased tomatoes from the grocery market. We have used Agilent LC/MS/MS instrument (6460C) for analysis of pesticides, and extracted them from tomatoes using modified QuEChERS (quick, easy, cheap, effective, rugged, and safe) method originally developed by Anastassiades and Lehotay in 2003. Calibration curves used for the analysis of pesticides and statistical variance of the analyzed data have been provided.

Memory Dynamics of DTN Protocols in Deep-Space Communications

Tyler Doiron, Mentor: Ruhai Wang

Delay/disruption tolerant networking (DTN) was proposed as an end-to-end networking architecture providing file delivery service in and/or through stressed communication environments. Bundle protocol (BP) of DTN utilizes the well-known store-and-forward mechanism together with custody transfer option for which a node agrees to hold a file in memory (disk storage in this paper) until its successful reception is acknowledged by the next node. The variation in memory occupancy constrains the volume of memory that is available for other DTN functions. It is crucial to characterize the memory dynamics of BP during file transfer. In this paper, we present a study of memory variation dynamics and transmission performance in the operation of BP for file transmissions over a typical relay-based deep-space communication system characterized by multiple data source nodes, an extremely long signal propagation delay, and lossy data links with both symmetric and asymmetric channel rates. Analytical models are built to estimate the memory variation dynamics and the total file delivery time (and goodput) characterizing BP transmission in deep space. The models are validated by running file transfer experiments using a testbed.

Shakin’ Things Up: Using the Statistical Approach to Model Natural Disasters

Audrene Edwards, Mentor: Dr. Kumer P. Das

The study of extremes has attracted the attention of scientists, engineers, actuaries, policy makers, and statisticians for many years. Extreme Value Theory (EVT) deals with the extreme deviations from the median of probability distributions and is used to study rare but extreme events. EVT’s main results characterize the distribution of the sample maximum or the distribution of values above a given threshold. In this study, EVT has been used to construct a model on the extreme and rare earthquakes that have happened in the United States from 1700 to 2011. The primary goal of fitting such model is to estimate the amount of losses due to those extreme events and the probabilities of such events. Several diagnostic methods (for example, QQ plot and Mean Excess Plot) have been used to justify that the data set follows generalized Pareto distribution. Three estimation techniques have been employed to estimate parameters. The consistency and reliability of estimated parameters has been observed for different threshold values. The purpose of this study is threefold. Firstly, to investigate whether a data set follows EVT. Secondly, to propose a reliable model for the risk dynamics of the magnitude of earthquakes. And thirdly, to quantify the uncertainty in the inference of extreme return levels of earthquake losses. The result is particularly useful because it can be used in many applications (for example, disaster management, engineering design, insurance industry, hydrology, ocean engineering, traffic management) with a minimal set of assumptions about the true underlying distribution of a data set.
Anxiety in Children with Autism
Alexis Garrett, Mentor: Dr. Mamta Singh

Autism spectrum is fascinating, especially how children on the same level have different characteristics relating to their disability. The present research investigated two research questions: (1). How some autistic children have extreme anxiety and some do not? (2). What causes anxiety in some children with autism? To address these questions, secondary sources of data and information were used through scholarly journals search form LU library and use of google scholar search engine. The preliminary findings based on review of selected journal articles suggested that anxiety is linked to Autism Spectrum Disorder. Anxiety may not be present in every child with Autism because every child is unique and has their own triggers that set them off and cause the anxiety to overwhelm them. Some children may cope with anxiety better and not show any symptoms at all or simply do not have triggers that induce the anxiety side of their disorder. Furthermore, in-depth research is recommended for to get better understating of the cause and effect.

Burning the Candle at Both Ends: Interpreter “Burnout” and how it impacts the quality of work
Xavier Hagans, Mentor: Dr. Chongmin Lee

In many situations interpreters are exposed to high stress related assignments often due to lack of available, and qualified, interpreters. This shortage is due to a phenomena called “burnout.” This lack of availability is not just local; it is happening in various communities around the United States. I believe research is necessary to identify the factors causing “burnout” and the ultimate shortage of Sign Language Interpreters here in the United States. The cause of burnout can be possibly be placed in one of four quadrants that researchers Robyn K. Dean and Robert Q. Pollard Jr. have classified in their “Demand Control” theory. This research will be conducted through a survey administered to a group of 100 certified Sign Language Interpreters selected randomly through Texas Society of Interpreters for the Deaf, a statewide organization for interpreters. The purpose of the proposed research is to identify the factors causing “burnout” and additional information on how the quality of work is affected. The data will be analyze for common themes and results will be discussed.

Prediction of pitcher plant (Sarracenia alata) distribution in the Big Thicket National Preserve using a geographic information system
Emmy Hammonds, Uzma Quraishi, Rehan Quraishi, Mentor: Dr. Matthew Pyne

Pale pitcher plants (Sarracenia alata) survive in low nutrient soils by supplementing their nutritional needs with carnivory. The presence of pitcher plants represents the existence of a unique and sensitive ecosystem, known as a pitcher plant bog, which is at risk due to climate change, fire suppression, deforestation, and the intrusion of upland and agricultural plant species. Only one confirmed pitcher plant bog is known in the Big Thicket National Preserve. The goal of this project is to conduct a pitcher plant survey that will help locate more potential bog sites for the preserve. We used data from a recent survey of the preserve's known pitcher plant bog to identify environmental characteristics suitable for pitcher plant bogs, namely soil types, distance from streams, slope, and distance from controlled fire ignition points. We layered these characteristics into a geographic information system (GIS) to predict locations with the environmental conditions appropriate for pitcher plant establishment and growth. We selected 5 potential sites using our GIS predictions and during the month of April, 2015, we will conduct field surveys at each site to confirm the presence of pitcher plants or characteristics that would make the site suitable for pitcher plants in the future if managed properly. We will evaluate each site's vegetation, canopy cover, soil characteristics, and search for signs of fire or standing water. The Big Thicket National Preserve can use the results of our study to more effectively protect these areas through restoration or management plans.
A Primer to Radial Basis Function Networks
Jason Hatton, Mentor: Dr. P.J. Couch

As computer science and its influence over society grows, the amount of data to be collected and classified becomes ever larger and more unwieldy. Classifying data so that scientists and mathematicians may understand the patterns in such a set remains no trivial task. However, our tools for mitigating complexity give us insight into how multi-variable data sets with large amounts of samples can be distilled down into something useful. Without such tools, our profession would drown in a sea of spreadsheets, unable to breathe the air of understanding without the life-preserver that is context and classification. Radial basis function networks, first invented in 1988 by researchers Broomhead and Lowe at the Royal Signals and Radar Establishment, use Euclidean distance and a weighting system for a series of nodes in order to create a neural network which can approximate functions, do pose space deformation in 3D graphics, or classify a set of n-dimensional data into partitions. This allows us to make confident assertions about data sets without necessarily comparing every element in the set to every other element. The network continues to add nodes for the approximation until the benefit of adding additional nodes becomes negligible. The end result is a neural network which outperforms other comparable networks (e.g. sigmoid/linear networks) as long as the range of the input does not become too large.

G-Graphs and Video Games
Jonathan Hodges, Mentor: Dr. Jennifer Daniel

A group G with a generating set $S = \{s_1, s_2, \ldots, s_n\}$ has a graph whose vertices are the distinct cosets of each element of the generating set. This graph is called the G-Graph of G, denoted $\Gamma(G, S)$. Two distinct vertices are joined by an edge when the intersection of the cosets is non-empty. I believe that theory behind G-Graphs could be used in connecting certain aspects in video games including but not limited to environments and quests. This is an introduction to G-Graphs as well as how I believe that they can be applied to video games.

Vocal loudness across breath support: An exploratory study
Alyssa Hughes, Mentor: Dr. Nandhu Radhakrishnan

Vocal loudness is a derivative of interaction between several parameters of voice production. One of the significant measures is percentage of vital capacity utilized to produce voice. Breath support is the non-technical term used to reflect this measure. In general, greater percentages of vital capacity increases vocal loudness along with lung pressure, airflow, and vocal fold contact. Patients with voice disorders exhibit discrepancy in this relationship. They engage greater levels of vital capacity to produce voice at normal levels of loudness. This research is exploring the physiology of voice at different levels of vital capacity. This poster presentation will share voice measures of vocally healthy subjects producing vowels at different levels of vital capacity, however, vocal loudness will be maintained at conversational levels. Measures like subglottal pressure, laryngeal airflow, glottal contact, and endoscopic views of the larynx will be correlated to the subjective change in percentage of vital capacity i.e., high, low, and normal. The project is still under progress; however, based on the data explored so far, the researchers have seen changes in voice measures and perceptual level of vocal effort across different levels of breath support.

Decreasing the Incidence of Trichomonas vaginalis Infection Through the Use of Periodic Acid
Momin Islam, Mentor: Dr. Ashwini Kucknoor

Trichomonas vaginalis is a pathogenic protist that is sexually transferred into human hosts. Its infection incites genital inflammation in both genders. T. vaginalis begins infection by adhering to epithelial cells with the help of a lipophosphoglycan on its surface. This lipophosphoglycan is not protected from exposure to chemical reagents, making it possible to deter adherence by altering the chemical structure of this compound. Inherent in its structures are cyclohexane rings riddled with hydroxyl groups, which could undergo oxidative cleavage through use of periodic acid. Thus, chemically altering the coat of T. vaginalis may prevent this organism from infecting its host. An experiment model was constructed and included cancerous HeLa cells to represent human epithelial cells. In order to see what amount of periodic acid is required to inhibit Trichomonas adherence without harming human epithelial cells, standardized concentrations of this reagent were set to 0.05%, 0.10%, 0.50%, and 1.00%. After being treated with periodic acid during an adherence assay, the Trichomonas and HeLa cells were allowed to sit for certain time periods in order to see if the reagent became more effective at preventing adherence over time; these times included 30 minutes, 60 minutes, and 120 minutes. Once the adherence assay has been completed, a dye will be used to tag Trichomonas nuclei in order to quantify the extent of adherence to HeLa cells by Trichomonas. With these sitting times and reagent concentrations standardized, the adherence assay is in progress.
Career Self-Efficacy, Sex Role Identity, and Life Satisfacion  
Joycelyn Joya, Mentor: Dr. Edythe Kirk

The “glass ceiling phenomenon” is a construct that describes barriers to career advancement for women (Morrison, White, & Von Velsor, 1987). Career satisfaction may adversely impacted by barriers to career advancement. However, personality variables such as career self-efficacy (Betz, 1992), affective commitment (Conklin, Dahling, & Garcia, 2013), ego identity (Wiljanen, 1996), and sex role identity (Bem, 1974) may also impact career satisfaction and overall life satisfaction. This exploratory correlational study explores relations between career self-efficacy and identification with traits more traditionally described, as masculine would be positively related to life satisfaction.

LED's Luminous Flux Lifetime Prediction Using a Hybrid Numerical Approach
Theodore Kretschmer, Mentor: Xuejun Fan

Light-emitting diodes (LEDs) have several advantages over traditional incandescent and compact fluorescent lamps such as superior energy efficiency, environmental friendliness, and particularly long lifetimes (between 25,000 to 100,000 hours). These long lifetimes prove inconvenient to manufacturers for conducting reliability tests which require the entire life of the bulb to complete. To overcome this inconvenience, this research presents a hybrid numerical approach that combines numerical modeling with analytical analysis to predict the lifetime of LEDs. To do this, a 60W-equivalent 10W phosphor-converted white LED bulb was studied using two numerical approaches. A one-dimensional thermal-resistance circuit analysis and a three-dimensional hybrid finite element analysis model (FEA) were employed to estimate the LEDs’ junction temperature in accordance with data obtained through the experiment. By employing a sensitivity study, the numerical results showed that both the 1-D thermal-resistance circuit and the hybrid FEA model were in agreement with the experimental data, thus proving that this study is invaluable to manufacturers who need to carry out reliability testing because the estimated junction temperature is used to determine the LED luminaire’s lifetime according to the known LM-80 data and the TM-21 method.

Biochar of Corncob for Supercapacitors
Logan Bryant, Sindhuja Katikaneni, Vamshikrishna Avuthu, Likhith Nalluri, Dan Rutman, Dr. Andrew Gomes  
Mentor: Dr. Ramesh Guduru

Supercapacitors are excellent charge storage devices with high power density. Often these are made of activated carbon and transition metal oxide materials, which usually tend to be very expensive. Here we conducted research on bio-waste of corncob for supercapacitor electrode applications because of its easy availability and relatively very inexpensive compared to any other materials currently used in the supercapacitors. We have made biochar by thermally treating corncob at 625 0C under nitrogen atmosphere. Subsequently it was ground and used for making supercapacitor electrodes. We have also synthesized oxide based electrodes for comparison purposes. Details on synthesis and electrochemical char-

Work in Progress: Programming is a SNAP! Increasing Knowledge and Interest in Computer Science
Hannah Leleux, Alexander Strong, Timothy Holcombe, Collin Smith, Timothy Gonzalez, Greg Yera, Logan Smith, Mentor: Dr. Peggy Doerschuk

Manipulation of the microenvironments where cancer cell cultures are grown can produce a variety of genetic and phenotypic outcomes, including 3D configurations that are known to contain Cancer Stem Cells (CSCs) – specialized cancer cells with the ability to differentiate into all cancer cells of their type. Currently, the ability to study CSCs is hindered by the lack of a reliable procedure to produce and maintain such cells in vitro. We hypothesize that certain in vitro micro-environments are capable of yielding CSCs and that these can be utilized to develop a new method of obtaining CSCs for research and therapeutic purposes. Our method of potential CSC formation involves carefully selecting the Young's Modulus, or physical stiffness, that cells are grown on to mimic the values experienced by cells in vivo. Silicon coatings are used to alter the stiffness of the substrate and this modifies the morphology of the cells that are grown on them. In the process of cancer stem cell identification, we have designed Epithelial-to-Mesenchymal Transition (EMT), Pluripotency, and CSC specific qPCR primers that resulted in single peak qPCR melting curves and single-banded DNA Electrophoresis gels. This shows that our primers for quantifying the expressions of these genes in our samples is specific to the genetic markers in human cancer cells that would be prevalent in CSC populations. With these specific primers we can begin to characterize the cancer cell populations that arose in the different in vitro microenvironments we tested.
A Negative Binomial approach to optimizing a Bonus-Malus system
Jeremy Marks, Mentor: Dr. Kumer P. Das

The Bonus-Malus System is a merit-based system used worldwide by insurance companies to better assess individual risk of their drivers. It is a reward-based system that awards discounts to good drivers and penalizes the bad. This can be done by partitioning off the insured into a finite number of classes called a Markov chain. By doing this, a transition matrix can be formed which can give us valuable information about future expectations. This paper will look into how a Bonus-Malus system is formed, and how the implantation of a system like this can benefit drivers here in the United States.

Walking Tall: An Analysis of Jansen’s Linkage
Thomas Michael, Jonathan Evans, Dr. Jenny Zhou

This study is intended to examine the transmission of motion and power in Jansen's linkage and its potential viability in locomotive applications. Theo Jansen designed his mechanism in such a way as to produce a smooth motion that resembled a walking gait; this is suited for applications where added weight is minimal. Jansen used his mechanism to build large mechanical animals he called Strandbeests. These Strandbeests “live” on beaches and get their power exclusively from the wind. The linkage these Strandbeests employ can be used to replace conventional wheels and do work in robotic applications if the power that produces the mechanism's motion is also capable of transmitting adequate power through the linkage. A kinematic analysis of the mechanism is utilized to test this claim via both the construction of a model in the computer simulation software Working Model 2D, and the development of an analytical model. The computer model is shown in the figure. The comparison of these two methods and the results obtained therein helps substantiate the validity of our hypotheses. Jansen's linkage provides one viable option for producing a fluid walking motion that can be refined and modified for further applications such as motion generation in robotics, or in assisted human locomotion. Knowing this, it is possible that this analysis could lead to the further development of biologically-inspired robotic mechanisms, or even human walking assistance instruments.
A Novel \textit{in vitro} Microenvironment for the Optimization of Cancer Stem Cell Formation  \\ \textit{Nicolas Nikoloutsos, Mentor: Dr. Ian Y. Lian}

Manipulation of the microenvironments where cancer cell cultures are grown can produce a variety of genetic and phenotypic outcomes, including 3D configurations that are known to contain Cancer Stem Cells (CSCs) – specialized cancer cells with the ability to differentiate into all cancer cells of their type. Currently, the ability to study CSCs is hindered by the lack of a reliable procedure to produce and maintain such cells in vitro. We hypothesize that certain in vitro micro-environments are capable of yielding CSCs and that these can be utilized to develop a new method of obtaining CSCs for research and therapeutic purposes. Our method of potential CSC formation involves carefully selecting the Young's Modulus, or physical stiffness, that cells are grown on to mimic the values experienced by cells in vivo. Silicon coatings are used to alter the stiffness of the substrate and this modifies the morphology of the cells that are grown on them. In the process of cancer stem cell identification, we have designed Epithelial-to-Mesenchymal Transition (EMT), Pluripotency, and CSC specific qPCR primers that resulted in single peak qPCR melting curves and single-banded DNA Electrophoresis gels. This shows that our primers for quantifying the expressions of these genes in our samples is specific to the genetic markers in human cancer cells that would be prevalent in CSC populations. With these specific primers we can begin to characterize the cancer cell populations that arose in the different in vitro microenvironments we tested.

Cultural Differences in Promotion and Products in the Fast Food Industry: A Case of the U.S. and Sweden Dyad  \\ \textit{Sebastian Norman, Mentor: Dr. Vivek Natarajan}

The purpose of my research is to see if fast food in Swedish culture is advertised differently than in American culture. I compared 86 TV advertisements of fast food chains in both countries using the variables; fries, drinks, cheese, and vegetables to see how much nutrition and health is promoted. I also did a comparison how much much time the different advertisements devoted to males and females. Last, I also compared the appeals used, as well as what was promoted, if celebrities were used, and if any cause was promoted.

“I am a part of all that I have met:” Tennyson’s Ulysses and the Evolution of a Victorian Hero  \\ \textit{Molly Porter, Mentor: Dr. Amy Smith}

This thesis project examines the character of Odysseus as he is represented in Homer’s Odyssey and Alfred, Lord Tennyson’s poems, “Ulysses” and “The Lotos-Eaters.” Despite an abundance of scholarship concerning Tennyson’s life and personality in reference to his poetry, scholars analyzing “Ulysses” and “The Lotos-Eaters” have not adequately addressed the impact of the Victorian mindset and ideology on Tennyson’s revisions to the character of Odysseus in the poems. The differences between Homer’s and Tennyson’s versions of Ulysses first become evident in “The Lotos-Eaters.” The 1842 version portrays the mariners who eat the lotos very negatively. Tennyson places a

Parental Involvement Deaf Children’s Education  \\ \textit{Gregory Potter, Mentor: Dr. Chongmin Lee}

For five decades, it is well documented that academic achievement of most deaf and hard of hearing students lagged behind their hearing peers. A number of the research indicated that language (i.e., reading comprehension) is at the heart of the difficulty of learning in deaf and hard of hearing students. Unfortunately, 95% of deaf and hard of hearing children are born to hearing parents who do not know about deafness and visual language. These children are more likely to have language delays that will adversely affect academic achievement in subject matters. Several studies indicated that parental involvement affected their children academic success. The purpose of the proposed research is to explore how parental involvement affects their children’s academic achievement and social emotional development. More specifically, this study will be explored from the perspectives of deaf college students and their experience. It will be a case study design that is one of qualitative research methods. Since there is only a few deaf and hard of hearing students on campus, five deaf students on campus will be selected based on parental hearing status, learning experience, and language used at home and school. The interview will be conducted using structured interview questions. Themes emerged from the data will be analyzed. Education implications will be discussed.
Update on recent field and lab results on the first Uinta C micro-mammal fossil locality from the Uinta Basin

Christopher Sanders, Casey Guillot, James Fairchild, Mentor: Dr. James Westgate

The WU-26 micro-mammal fossil locality provides a unique glimpse into the mammal community which inhabited the Uinta Basin about 40 million years ago near the end of deposition of the Eocene Uinta Formation. WU-26 is the first micro-mammal site discovered in the Uinta C Member of the Uinta Formation and indicates that several micro-mammal species thought to be restricted to the Uinta B Member actually continued to inhabit the Uinta Basin throughout the deposition of the formation. In 2014, our field crew collected samples from WU-26 and two nearby localities in attempt to get a larger and more diverse fauna. The crew excavated 1350 kg of bulk sample from WU-26. After concentrating the samples by locally screen-washing them in the Green River, we trucked the concentrate to the Lamar University Paleontology Lab. By soaking the concentrate in naptha, then water, and rescreen-washing, it was reduced to a few kilograms of bone and tooth-rich sample. It was then sorted by size using Standard screens and prepped for specimen discovery. Mammalian fossils are identified to genus and or species. This fall we increased the sample size of identifiable mammal specimens from WU-26 by 50 specimens. The total sample size currently exceeds 500 mammal specimens. WU-26 is stratigraphically located in the uppermost portion of the Uinta C member of the middle Eocene Uinta Formation and lies 40m below the base of the Brennan Basin Member of the Duchesne River Formation. Uinta Formation mammals define the Uintan North American Land Mammal Age.

Compressed Earth Brick

Kolby Smith, Mentor: Dr. Kendrick Aung

The goal of this project is to create a compressed earth brick (CEB) press that is both modular and light weight. This will allow the device to be cheaply transported into developing regions of the world that may lack the infrastructure necessary to transport or power typical industrial-grade CEB presses. There is a great need for affordable building materials in developing regions of the world to allow for stability and economic growth. Humanitarian groups that seek to aid these places are limited by the overall cost of purchasing and transporting equipment and material to these sites. The goal of this project is to create a solution to this problem; this can be done in two ways, by using modular and light weight tools that can easily be taken apart to be transported and reassembled onsite, and by using local resources as building materials. The project intends to create a workable model of the designed CEB press which can create construction quality compressed earth bricks; that is bricks capable of withstanding 300 psi, as per New Mexico building code “R1100 Earthen Building Materials”. In order to achieve this first the press will be designed using engineering software and analysis will be performed on design; after which the model will be constructed and the brick products will be tested for compressive strength.

Nickel-Catalyzed Direct C-H Arylation of Heteroarenes

Jamie M. Stafford, Mentor: Dr. Xiangyang Lei

The goal of this research project is to develop cheap, environmentally friendly, and highly reactive nickel-based catalytic systems for the direct C-H arylation of heteroarenes, which is beneficial to the chemical industry, pharmaceutical industry, and material industry. We have worked on optimizing the reaction conditions, such as bases, solvents, and ligands. Future work includes further optimization of reaction conditions to achieve the highest yield and investigation of the scope of substrates.
Work in Progress: Improving the Performance of the Radial Basis Function Network

Alexander Strong, Greg Yera, Logan Smith, Phillip Potter
Mentor: Dr. Peggy Doerschuk

Machine learning studies methods that enable a machine to improve its performance without human intervention. The Radial Basis Function Neural Network (RBFNN) is a general-purpose machine learning algorithm that can be used for pattern classification and curve fitting. Its advantage over other neural network models is that it has relatively few parameters affecting its performance. Its disadvantage is that it may require more training data in large dimensional spaces. This is problematic because sufficient data may not be available. The RBFNN learns to classify inputs from examples. Each example includes an input vector of discriminating features and a target response that represents the class of the example input. For instance, irises can be classified based on 4 features: the length and width of their petals and the length and width of their sepals (outer leaves of flower). Each example includes an input vector of length 4 and an associated target response representing class 1, 2, or 3. This work studies the effect of several different parameters on the accuracy of the RBFNN in classification. It investigates several novel variations of the algorithm with a view to determining whether accuracy can be maintained and/or improved in large dimensions without increasing the amount of training data. The algorithm in its different variations is applied to classification problems from several different domains and of differing dimensions (small, medium and large). This work in progress builds upon the work of two Lamar University masters’ theses that are nearing completion.

A survey of prevention and remediation of audiological habits in older adults of Jefferson County, TX

Kaitlyn Taylor, Mentor: Dr. Ashley Dockens

In the geriatric population, hearing loss has been associated with dementia, social isolation, and reduced quality of general health. The research conducted in this project has determined the prevention and remediation services in older adults residing in Jefferson County, Texas. Surveys were provided to seniors over the age of 65 to assess information on demographics, audiological care, preventative measures, and the hearing habits and behaviors of seniors. Participants were obtained from direct face-to-face contact at four different senior center locations within the county. Data from the surveys were analyzed against available nationwide data on audiological care and discussed. A focus group was conducted, creating a recorded dialog of the seniors’ barriers and solutions to audiological care. The total data were compiled and used to further understand that audiological care is financially out of reach for the majority of senior citizens.

Cultivation Theory: A Real Analysis of Reality Television’s Long-Term Audience Impact

Kara Timberlake, Mentor: Dr. Nicki Michaliski

In my university study, I have researched the effects of reality television. From the research collected, it can be inferred by means of the cultivation theory that reality television exudes an extensive influence on perception of romantic relationships, everyday life, and body image. As confirmed in my findings from a review of the literature, dissatisfaction is cultivated over time by watching a reality television show that avows to portray actuality. According to the cultivation theory, exposure to reality television produces long-term effects for the audience, shifting viewers’ perceptions of reality to correlate with the onscreen depiction of reality. Examining three relevant shows, my research investigates the extensive influence reality television has on perception of romantic relationships, everyday life, and body image. The misinformed conception of reality developed by the audience consequently results in the establishment of deluded thoughts and behaviors that reach far into the future. For these reasons, the resulting discoveries can unveil the misrepresentation of reality devised by reality television and help viewers discern the consequent negative impact that audience members might cultivate. In my current research, I have employed literature searches, utilizing discoveries found in published scholarly articles. However, my hope is to enhance my research by collecting data through secondary participation, more than likely by way of web-based surveys or electronic mail. Thus far, my research has consisted of studying earlier findings. However, my plan is to perform qualitative research utilizing a survey to gather direct data to support the information found in my literature review section.
The Forgotten: Exploring the Role of Gender and Media Perception of Women in Prisons
Sarah Toben, Mentor: Dr. Robert Worley

In the American prison system, female offenders constitute approximately 7% of the overall inmate population; and as a result of is, they receive reduced funding and reduced media exposure compared to male offenders. Due to the fact that the overwhelming majority of prisoners are male, most fictional films and television shows depict the prison experience from the male point-of-view. When female inmates are depicted in films and television shows, it often tends to be highly sexualized. This poster presentation analyses the pilot episode of the popular Netflix show “Orange is the New Black,” and compares it to the two films “Brokedown Palace,” and “Paradise Road,” both of which depict the female prison experience in other countries. The author uses the Bechdel test to ascertain whether or not gender bias is present in any of the above works.

Applications of Emission and Absorption Spectra in Astronomy and Environmental Science
Keeley Townley-Smith, Mentor: Dr. Cristian Bahrim

Atomic emission spectroscopy is a field of physics which allows the study of light emitted from hot gaseous environments, such as stars' outer atmosphere, in order to determine their chemical composition. Every neutral atom, isotope, or ion has a unique energy structure and emission spectrum, which can be used to identify it. Using a GLX Xplorer (for data acquisition) and Red Tide Ocean Optics Spectrometer (for data analysis), purchased in part with the UG grant, I analyzed emission spectra obtained from discharges of various elements that we would expect to find in our atmosphere and from other elements we had available in lab. From calibration of our setup, our instrument has a spectral resolution of 0.6 nm. I compiled a list of key transitions used to identify each element. An unknown air sample was compared to other pure spectra obtained from known discharges in order to identify its chemical composition. For some spectra, both their neutral atom and their first ions were observed. In atomic transitions of neutral chlorine and its singly ionized atom, there is an energy gap. The existence of such gap could be used as a window for the identification of emission lines from impurities. I also studied absorption spectra, with the purpose of finding the chemical composition of the Sun's photosphere and pollutants in the Earth's atmosphere.

The Symphony of Southeast Texas in 2015: A Regional Orchestra Navigating New Horizons
Kay-Alana Turner, Mentor: Mr. Craig Escamilla, Dr. Henry Venta

The Symphony of Southeast Texas, based in Beaumont, is the area's only professional symphony orchestra between Houston, TX, and Lake Charles, LA. From 2010-2014, the organization focused on resolving internal management and financial challenges. Additionally, the orchestra identified 3 major goals: (1) To be an orchestra able to play anything, (2) To be an orchestra reaching 1/3 of the local population each season, and (3) To be an orchestra hosting a music school with a full youth orchestra. As the 2014-2015 season began, these initiatives created a position full of possibilities for the new executive director. He could now reach beyond simply solving problems within the organization, in order to bring the community of Southeast Texas a new perspective on classical music and the Symphony. This case study describes the progress of the orchestra and studies the opportunities and challenges still facing the Symphony of Southeast Texas in light of this new era. The information presented in the case study was obtained through interviews with staff and board members of the organization, along with a case study of the orchestra conducted in 2010. The findings were then analyzed to identify trends in opinions among members of the organization and to gather facts about the current management and the future of the Symphony of Southeast Texas. The study finds that the Symphony is well-managed, but must find new, exciting ways to fulfill its mission of reaching the community.

Drops on Polymers: Statics and Dynamics
Benjamin Vizena, Mentor: Dr. Rafael de la Madrid

When a liquid drop is in contact with a solid surface and we try to slide the drop relative to the surface, there appears a lateral retention force that opposes the motion of the drop and can be thought of as the liquid-solid analog of the frictional force between two solids. The purpose of this project is to construct a drop accelerator that will allow us to study the retention forces of liquid drops on polymers. Our drop accelerator is a variation of Dr. Tadmor's Centrifugal Adhesion Balance.
Work in Progress: Machine Learning in Robotics  
Greg Yera, Hannah Leleux, Alexander Strong, Timothy Holcombe, Collin Smith,  
Timothy Gonzalez, Logan Smith, Phillip Potter, Mentor: Dr. Peggy Doerschuk

This work investigates combining reinforcement learning (RL) and radial basis function neural network (RBFNN) learning to improve the performance of a robot that learns to perform its task. In RL, the robot experiments by trying different actions. Actions that brings the robot closer to its goal are rewarded positively, those that take it further from its goal are negatively rewarded. The rewards are accumulated over time and stored in a table. Once the robot is trained, it uses the table to determine the best action to take in its current state. The performance of the algorithm depends heavily on the rewards and the size of the table. The RBFNN learns from a set of examples. Each example consists of an input representing the current state of the robot and a target output representing the action the robot should take. The RBFNN can generalize to produce a response to states that it has not seen during training. Therefore it can create more fine-grained accurate control than the table-limited reinforcement learning. This work builds upon the work of a LU master’s thesis and graduate project. A new robot simulator is used for this study. Work will progress in several stages:
1. Design and implement the robot world and controller
2. Design, implement, test and refine the RL algorithm on a robot task
3. Design, implement, test and refine the RBFNN learning algorithm
4. Design, implement, test and refine the combined algorithm on a robot task
5. Analyze results, draw conclusions

Enumerating kth Roots in the Symmetric Inverse Monoid  
Christopher York, Mentor: Dr. Valentin Andreev

The symmetric inverse monoid, SIM(n), is the set of all partial one-to-one mappings from the set {1,2,...,n} onto itself under the operation of composition. Earlier research on the symmetric inverse monoid delineated the process for determining whether an element of SIM(n) has a kth root. The problem of developing formulas for the number of kth roots of a given element of SIM(n) has since been posed, which this research aims to solve. The number of kth roots of a given element of an important submonoid of SIM(n), called the Symmetric Group, will be delineated in this presentation and be invaluable to enumerating kth roots in SIM(n). Overall, this research will uncover fascinating connections between the mathematical fields of combinatorics and abstract algebra and will even expand upon inverse semigroup theory.

Exploring mate selection among international students in Southeast Texas  
Wei Xiong, Mentor: Dr. Chiung-Fang Chang

This research is intended to exploring the mate selection process among international students in southeast TX. As we know that more and more international student come to U.S every year, without family and friends in a new environment, it is lonely for them in the U.S. campus. I am interested to know how they choose friends, especially if they would prefer to look for mates from their own cultural background. Decision making on mate selection is the dependent variable of this research, particularly, whether they would prefer to choose someone from the same or different cultural background will be the major focus of my study. Language problem, level of adaptation, financial problem, physical attraction, emotional support, race/ethnicity, and social network are my independent variables. The objective of this study is to learn how and what condition can we help international students better adjust to the US environment, and through the process of mate selection, how racial and ethnic difference play its role in decision making. Whether looking for better social support from the same cultural background or choose from different cultural background to help them better assimilate to the host culture will affect their choices. This research will adopt both quantitative and qualitative approaches by using self-administered survey on 60-100 international students in the Lamar University, combined with an in-depth interviews for additional 30 students.
Get Involved!
Upcoming dates for conferences, events, faculty workshops & much more!

3rd Annual Texas STEM Conference
October 3, 2015

2nd Annual Humanities, Arts & Social Sciences Conference
November 14, 2015

Faculty/Peer Talk Workshops

Thursday, August 27, 2015
3:30 PM - 5:30 PM
Landes Auditorium

Thursday, September 24, 2015
3:30 PM - 5:30 PM
Landes Auditorium

Thursday, October 29, 2015
3:30 PM - 5:30 PM
Landes Auditorium

Thursday, November 19, 2015
3:30 PM - 5:30 PM
Landes Auditorium

OUR Grant 2015-16
Request for Proposals
Application Deadline: September 30, 2015