TEXAS Undergraduate Research Day

AT THE CAPITOL
TRANSFORMING TEXAS THROUGH UNDERGRADUATE RESEARCH
SCHEDULE OF EVENTS
(subject to revisions)

Thursday, April 25, 2013 (Optional)

6:30 p.m. Dinner Gathering/Social Opportunity (meet at the Hampton Inn Lobby, 1701 Lavaca Street)
• Students and event participants are welcome to meet and form informal groups to socialize over dinner and explore Austin. Access to transportation may be necessary, depending upon restaurants/locations selected.

Friday, April 26, 2013

8:00 a.m. – Noon Registration and Poster Set-Up (Capitol Rotunda, Ground Floor)
• Students may leave their posters while visiting the Capitol

8:40 a.m. – 9:30 a.m. Capitol Tour (Optional) (Advance Reservation Required)
• Meet in the West hallway of the Capitol Rotunda (First Floor); the Tour will end in the Extension Building, approximately 9:30 a.m. (a good time to stop for refreshments) Self-guided tour information is available online

9:00 a.m. – 10:00 a.m. Light morning refreshments provided in the Capitol Grill (Extension, Second Floor)
• Note: Lunch is “on your own”, perhaps at the Capitol Grill

9:30 a.m. – 10:15 a.m. Researcher Panels A & B (repeat at 11:00 a.m.)
(Supreme Court Room and Court of Criminal Appeals, Capitol 3rd Floor/North Wing)
• Internationally recognized university researchers will provide their insight, challenges and guidance related to a career dedicated to research. Attend one panel discussion at 9:30 a.m. and the alternate panel at 11:00 a.m.

10:30 a.m. – 11:00 a.m.* Student Recognition by the House, House Gallery (by Chairman Dan Branch)

11:00 a.m. – 11:45 a.m. Researcher Panels A & B (repeat from 9:30 a.m.)
(Supreme Court Room and Court of Criminal Appeals, Capitol 3rd Floor/North Wing)
• Internationally recognized university researchers will provide their insight, challenges and guidance related to a career dedicated to research. Attend the panel session that you did not attend at 9:30 a.m.

11:45 – 12:30 p.m. Open for Lunch

12:30– 2:30 p.m. Poster Display/Exhibit Open to the Public (Capitol Rotunda, Ground Floor)
• Students may use this time to escort officials to their poster

2:30 p.m. Event Take Down / Departure

Optional Activities:
(TBD) Meet with legislative officials (After Registering, before the Researcher Panel, etc.)
• Coordinate with your campus representatives to schedule these visits

10:00 a.m.* House of Representatives Daily Meeting (House Gallery, 2W)
11:00 a.m.* Senate Daily Meeting (Senate Gallery, 2E)
• *These are anticipated start-times for the daily meetings of the two Chambers
Texas Undergraduate Research Day

AT THE CAPITOL

TRANSFORMING TEXAS THROUGH UNDERGRADUATE RESEARCH
Texas Undergraduate Research Day at the Capitol
Welcome

April 26, 2013

Greetings,

Members of the Council of Public University Presidents and Chancellors (CPUPC) and the Independent Colleges and Universities of Texas (ICUT) are pleased to welcome you—our student and faculty participants—to the 2013 “Texas Undergraduate Research Day at the Capitol” event. We, with our colleagues from the Texas Association of Community Colleges, proudly recognize each of our student participants as among the most talented undergraduate researchers across the state. And, we are grateful for the dedication provided by all faculty mentors and advisors who serve as inspiring role models in each Texas institution of higher education.

We encourage you to explore the State Capitol and to absorb the rich history created by dedicated state leaders who so strongly support higher education, undergraduate student learning and high-quality research efforts. Today you can visit an historic setting and experience a day in the midst of the 83rd Legislative Session which will lead to additional policy directives for higher education and ultimately, the advancement and economic development of the citizens of Texas.

We are happy that you are here and hope that you enjoy your time at the Capitol, as well as the special activities planned for you throughout the day.

Sincerely,

Flavius C. Killebrew, Ph.D.
Chairman
Council of Public University Presidents and Chancellors

Victor Boschini, Ph.D.
Chairman of the Board
Independent Colleges and Universities of Texas, Inc.
April 26, 2013

Welcome Students!

On behalf of the Texas Senate, I would like to welcome you to Texas Undergraduate Research Day at the Capitol. We are pleased to have this opportunity to honor your hard work and efforts and congratulate you on a job well done. Today is the day to showcase the contributions of undergraduate research to academia and the future of Texas.

This day is special because it highlights the unity between the public and private institutions of higher education. Additionally, it brings together a wide array of academic disciplines. Although the areas of research may vary, the skills you are using will serve you tremendously in your future endeavors.

The Texas Legislature is committed to providing all Texans quality, affordable access to higher education in order to strengthen our state’s future workforce. Your contributions to academia assist our efforts in having a world-class higher education system. I congratulate each one of you on your accomplishments and look forward to your future successes. I also wish to recognize faculty members for their continuous commitment to students across the state. Faculty contributions help build stronger graduates and stronger institutions of higher education.

We are honored that you are here today and hope that you enjoy your time at the Capitol. We look forward to seeing more great things from you!

Sincerely,

Kel Seliger
April 26, 2013

Dear Undergraduate Researchers,

Welcome to Undergraduate Research Day at the Texas Capitol.

On behalf of the House of Representatives, I want to congratulate you on your impressive work. Undergraduate research is extremely important for the future of this state and this is an excellent opportunity for us to help showcase your efforts.

You are representing your chosen academic discipline by presenting at this event. You are an ambassador for your area of study and for your alma mater. I appreciate this event because it gives both public and private universities a chance to come together and exhibit the work of their brilliant students.

The faculty of both public and private institutions also deserve special recognition. It is a difficult process to balance teaching, advising, and personal research with events like this. We thank them for their commitment to undergraduate research. Their contributions are helping to build stronger universities, stronger graduates, and in turn, a stronger Texas.

The future holds many opportunities for each of you. Today we celebrate your achievements. Your accomplishments are well respected by all of us here at the House of Representatives. The future of Texas looks brighter because of all your hard work.

Best wishes.

Sincerely,

Dan Branch
Event Facts

- **Purpose:** To showcase the experiences of undergraduate students engaged in research for Texas legislators and the public through high-quality poster displays. The program highlights how research conducted by undergraduate students positively impacts Texas -- and Texans -- with the theme: Transforming Texas Through Undergraduate Research

- A total of 68 research projects will be displayed in poster format, reflecting the work of numerous undergraduate students representing 53 general academic institutions across Texas (both public and private/independent universities and health science centers)

- Coordinated by the Council of Public University Presidents and Chancellors (CPUPC), the Independent Colleges and Universities of Texas, Inc. (ICUT) and the Texas Association of Community Colleges (TACC)

- Conducted with the support of the Honorable Kel Seliger, Chairman of the Texas Senate Higher Education Committee, and the Honorable Dan Branch, Chairman of the Texas House Higher Education Committee

- In addition to hearing from a panel of nationally/internationally recognized faculty researchers, student participants and their faculty advisors have the opportunity to tour the Capitol, attend committee hearings, and to attend the daily meeting of the Senate and House of Representatives. Student participants have been encouraged to work with their institution in scheduling meetings with their respective legislators in advance of the event

- For information, contact Rissa Potter, Executive Director, Council of Public University Presidents and Chancellors, (512) 923-8517, rpotter@cpupc.org, Elizabeth Puthoff, Vice President for Research and Policy Analysis, Independent Colleges and Universities of Texas, (512) 472-9522, ext. 103, elizabeth.puthoff@icut.org
Acknowledgments

Members of the Council of Public University Presidents and Chancellors (CPUPC), the Independent Colleges and Universities of Texas, Inc. (ICUT) and the Texas Association of Community Colleges (TACC) thank the following supporters of undergraduate education for their contributions and dedication to making this event a success:

- The Honorable Kel Seliger, Senator and Chair, Senate Higher Education Committee
- The Honorable Dan Branch, Representative and Chair, House Higher Education Committee
- Planning advisors, for without their initial suggestions and enthusiasm, the event would not have materialized:
  - Dr. Henry Flores, Chairman, Association of Texas Graduate Schools, and Dean of the Graduate School, St. Mary’s University
  - Dr. James Hallmark, Vice Chancellor for Academic Affairs, Texas A&M University System
  - Dr. Kevin Lemoine, Assistant Vice Chancellor for Academic Affairs, The University of Texas System
  - Dr. Charlie McCormick, Provost and Vice President for Academic Affairs, Schreiner University
  - Dr. Stacey Silverman, Interim Assistant Commissioner, Texas Higher Education Coordinating Board
  - Dr. Debbie M. Thorne, Associate Vice President for Academic Affairs, Texas State University-San Marcos
- Student presenters, faculty mentors and advisors, and university administrators who enthusiastically responded to the invitation to participate and support this event
- The acclaimed faculty researchers who participated in the panel discussions
- Texas Christian University, with their contribution of souvenir T-shirts for student participants
- Professionals across the state who promoted this event with their students, including governmental relations and public relations divisions and administrators representing offices of the Provost /Chief Academic Officer, Undergraduate Research, McNair Scholars Program, Graduate Schools (including the Association of Texas Graduate Schools), Honors College programs—each dedicated to providing an excellent undergraduate experience to students
Participating Universities

Abilene Christian University
Angelo State University
Concordia University
East Texas Baptist University
Hardin-Simmons University
Jarvis Christian University
Lamar University
Lubbock Christian University
Midwestern State University
Prairie View A&M University
Rice University
Sam Houston State University
Schreiner University
St. Edward's University
Stephen F. Austin State University
Sul Ross State University
Tarleton State University
Texas A&M Health Science Center
Texas A&M International University
Texas A&M University
Texas A&M University-Central Texas
Texas A&M University-Commerce
Texas A&M University-Corpus Christi
Texas A&M University-Galveston
Texas A&M University-Kingsville
Texas A&M University-San Antonio
Texas A&M University-Texarkana

Texas Christian University
Texas Southern University
Texas State University-San Marcos
Texas Tech Univ. Health Science Center
Texas Tech University
Texas Woman's University
The Univ. of Texas of the Permian Basin
The University of Texas at Arlington
The University of Texas at Austin
The University of Texas at Brownsville
The University of Texas at Dallas
The University of Texas at El Paso
The University of Texas at San Antonio
The University of Texas at Tyler
The University of Texas Pan American
The UT Health Science Center-San Antonio
The UT M.D. Anderson Cancer Center
The UT Southwestern Medical Center
University of Houston
University of Houston-Downtown
University of Mary Hardin Baylor
University of North Texas
University of North Texas at Dallas
University of St. Thomas
Wayland Baptist University
West Texas A&M University
Student Researchers/Abstracts

1. Abilene Christian University
William Spenser Lynn
DEVELOPMENT OF A CLEAN GLOVE BOX FOR THE NIFFTE COLLABORATION
Faculty Advisor: Rusty Towell, PhD

The Neutron Induced Fission Fragment Tracking Experiment (NIFFTE) uses a time projection chamber (TPC) to measure the probability that a fission reaction will occur when an actinide target is hit with a neutron beam. One actinide used in the experiment is plutonium (Pu-239), which is highly radioactive. Due to the risks associated with Pu-239, it is necessary to install and remove the target while the TPC is enclosed in a glove box. The TPC electronics are also sensitive to airborne dust so the TPC must only be opened in a cleanroom environment. The existing glove box used by the collaboration did not meet the cleanroom standards needed for the TPC. I conducted a systematic study of cleanroom attributes and contamination variables for the glove box in order to improve the cleanroom condition within the glove box. Variables such as filter type, glove type, and cleaning procedures were all investigated to see which would minimize contamination from airborne dust or maximize cleanliness. After the best materials and methods were identified, a method for creating a suitable cleanroom environment was developed.

2. Abilene Christian University
David Gasvoda
CORMAC MCCARTHY’S PROJECTION OF NATURE IN BLOOD MERIDIAN
Faculty Advisor: Jeremy Elliot, PhD

This essay analyzes Cormac McCarthy’s projection of nature in his novel Blood Meridian. I begin with a presentation of the changing role of nature as the novel progresses and include a brief discussion of the novel’s place in the world of wilderness preservation. The specific places mentioned in the novel including New Orleans, Chihuahua, the Yuma, and Ft. Griffin play an important role in McCarthy’s overall vision of nature and therefore in his placement within the wilderness preservation spectrum. After this discussion, I go into an in-depth analysis of the character of the judge and the importance of his character to McCarthy’s broad vision. I examine the interesting tension between the judge’s role as the ultimate abuser of the land and his role as a wild creature himself. In my analysis, I cite Harold Bloom, George Guillemin, and Sara Spurgeon among others.
3. Angelo State University
Joshua T. McGuire
HOFMEISTER EFFECTS ON THE STRUCTURE AND FLUORESCENCE OF GREEN FLUORESCENT PROTEIN
Faculty Advisors: Edith M. Osborne, PhD; John J. Osterhout, PhD

The Hofmeister series describes a set of cations and anions that have been arranged in order of their ability to affect the physical properties of solutions and proteins. Salts in the Hofmeister series will be used to investigate the structural properties of Green Fluorescent Protein, GFP. The goal is to detect structural intermediates induced by the Hofmeister salts prior to the major unfolding transition. Structural changes will be detected with circular dichroism spectropolarimetry and compared to changes in fluorescence and fluorescence quenching induced by Hofmeister salts. These experiments will contribute to the understanding of Hofmeister effects and help characterize how subtle structural changes affect the fluorescence of GFP.

4. Concordia University Texas
Peter Hendzlik
THE EFFECT OF GLYCEROL MONOLAURATE AND ALPHA-AMYLASE ON THE ABILITY OF ANTIBIOTICS TO ERADICATE STAPHYLOCCUS AUREUS BIOFILMS
Additional Contributors: Alexandra Brennan, Courtney Glenn, Carly Jennings
Faculty Advisor: Donna Janes, PhD

Biofilms are formed when free floating microorganisms attach to a surface and colonize, secreting a protective exopolysaccharide matrix in the process. *Staphylococcus aureus* is a prominent organism behind nosocomial and equipment infections, and is often found as a biofilm, making it particularly difficult to treat. Glycerol monolaurate (GML) is a potent antimicrobial agent shown to have an inhibitory effect on biofilm formation and growth in *S. aureus*. Amylase is a commonly available enzyme that cleaves molecules in the EPS matrix and results in high inhibition of biofilm formation in some bacteria. This study examines whether GML and α-amylase used in tandem would have a synergistic effect (with or without the addition of antibiotics) on biofilm inhibition. It was found that α-amylase alone, or in conjunction with GML, did not enhance eradication of biofilms. However, addition of GML to biofilms showed an increased ability for both penicillin and erythromycin to eradicate *S. aureus* biofilms in culture.

5. Concordia University Texas
Elizabeth Chesna
EFFECTS OF LOW LEVEL HAND SANITIZER EXPOSURE ON BACTERIAL BIOFILM RESISTANCE
Additional Contributors: Bao Tran Nguyen, Whitney Holdbrook
Faculty Advisor: Donna Janes, PhD

Biofilms are collections of sessile microorganisms that have attached to surfaces by secreting an exopolysaccharide (EPS) slime layer. Increased attention has been given to the production of bacterial biofilms in hospital settings because these biofilms become resistant to physical and chemical removal and to treatment with antibiotics. To prevent bacterial contamination, many are turning to the use of hand sanitizers. There is a risk that with increased amounts of hand sanitizer in the environment, these bacterial biofilms will adapt and become increasingly resistant. This study found that over time, low levels of some brands of hand sanitizer in the environment increased resistance of biofilms to clinical concentrations (effective dosages) of hand sanitizer.
Overall, male athletes had significant differences in their preference toward male athletic trainers in only general medical conditions and gender specific injuries. Female athletes however, indicated significant differences in the gender preference of athletic trainers in comfort level (e.g. general medical conditions, psychology, upper body, middle body, gender specific situations, and within the overall score). This indicated a strong preference toward female athletic trainers for most conditions. Interestingly, a significant difference was found when comparing sexism by gender. Male athletes were found to have significantly higher sexism scores than female athletes when taking the “General Sexism” questionnaire. This proves interesting because while looking at males and females separately it was found that no bias existed. However, when compared together a significant difference was found. Although no clear answer is defined, it can be assumed that males have improved their views of sexism for women involved in healthcare, whereas there still may be some significant steps needing to be made within general bias.

The proper immediate management of joint dislocations (JD) is a controversial subject in athletic training literature. The purpose of this online survey was to determine the immediate JD management by certified athletic trainers (ATs) in the college/university and high school settings. Approximately 1,500 ATs received an e-mail regarding participation in the online survey; 355 ATs responded. Over 84% of respondents would attempt to reduce JD of the finger, patella, and shoulder. Over 91% would not reduce hip, ankle, and wrist JDs. Factors that encouraged immediate reduction include increased time/distance to emergency care and pain. Physicians have taught JD reduction education to 78.6% of respondents, but only 20.4% have written standing orders to attempt JD reduction; 43.1% have no standing orders. Surprisingly, 54.1% of respondents were unaware if their state’s practice act addresses JD care; however, 27.7% of ATs reported that their state’s athletic training practice act permits attempting to reduce JD. Approximately 90% reported no complications after JD reduction. The results of this study demonstrate disconnection between actual AT practice and the literature concerning JD care. In addition, results show education on state practice acts is essential. Further research should be conducted to determine appropriate JD management by ATs.

Fishes were sampled along a stream segment that crosses a major salt dome in East Texas. Significant differences in the fish community above and below the feature were observed. Different hypotheses explaining the effect of point-source groundwater on the fish populations are explored.

Snakes were surveyed with static traps in various locations with sandy habitat suitable for the Louisiana Pine Snake (Pituophis ruthveni). Resulting differences in the snake species community are interpreted in light of their locations in lever III ecoregions.
10. Lamar University
Sara-Jeanne Vogler
ANALYSIS OF ATOMIC EMISSION SPECTRA WITH APPLICATIONS IN THE STUDY OF OUR UNIVERSE
Faculty Advisor: Cristian Bahrim, PhD

Spectroscopic analysis of atoms and simple molecules reveals their atomic structure. The analysis of emission lines is possible with PASCO® equipment by allowing the pressure broadening effect to enlarge these lines to a few nm in width. The photon emission obeys the selection rules for orbital angular momentum, spin, and parity. One can identify the constituents of matter by finding the characteristic photons emitted by gaseous discharges. From the relative intensity of the emission lines, de-convoluted from the Maxwell-Boltzmann distribution in discharges at thermal equilibrium, the effective temperature of atoms and their average speed is found. From the Lorentzian profile of each photon the lifetime of the atomic states can be estimated. From the FWHM the uncertainty in the energy value of the atomic excited states is found. This theoretical knowledge can be applied to absorption spectra as well as precisely identifying wavelength with the goal to determine the life cycle of bright stars, for studying the influence of the atmospheric constituents on the stellar and solar spectra, and also for testing the effects of optical instruments on astronomic measurements.

11. Lubbock Christian University
Nolan C. Rutherford
ANTIBIOTIC RESISTANCE OF ESCHERICHIA COLI ISOLATED FROM CANADA GEESE FECES AND URBAN PLAYA LAKE WATER
Faculty Advisors: Lucy Porter, MS; Bart Durham, PhD

This investigation was conducted in West Texas urban wetland areas known as playa lakes during the time when Canada geese were in great abundance, and findings suggest a high incidence of antibiotic resistant Escherichia coli in the feces and water. The Kirby-Bauer Antibiotic Disk Diffusion Susceptibility Test was used to determine the antibiotic resistance or susceptibility of 100 E. coli isolates from Canada geese feces and playa lake water using 10 antibiotics known to be effective in the treatment of gram-negative bacterial infections. Antibiotic resistance was found in 84% of E. coli isolated from feces and water. Isolates were completely susceptible to 5 antibiotics and susceptible, intermediate, or resistant to the other 5 antibiotics. Complete resistance to tetracycline, streptomycin, ampicillin, and amoxicillin with clavulanic acid was found in some isolates. This research is important because antibiotic resistance is a growing concern in the treatment of infections. With the high incidence of antibiotic resistant E. coli in the feces and water, pathogenic and opportunistic microorganisms might possibly be present. Therefore, finding antibiotic resistant E. coli in Canada geese feces and playa lake water poses potential health issues because these lakes are used recreationally where there is possible contact with both sources.

12. Midwestern State University
Chanez Symister
THE SYNTHESIS AND CHARACTERIZATION OF TETRA-3,3′5,5′-ARYLAZADIPYROMETHENES
Additional Contributor: Mary Iseguede
Faculty Advisors: Jianguo Shao, PhD; Chris Hansen, PhD

Two symmetrical tetra-arylaZadipyrromethenes with electron withdrawing (-F) and electron donating (-OMe) were synthesized and characterized using UV-visible spectroscopy, IR and cyclic voltammetry and NMR. The compound with the electron withdrawing (-F) group was a deep purple color, while the electron donating (-OMe) compound was dark green. Cyclic voltammograms illustrated two reversible reductions and one irreversible oxidation. From the UV-visible spectra, the B-band was located in the UV region and the Q-band is located in the visible region. A red shift of B and Q-bands in UV-visible spectra was also seen in the presence of electron-donating groups. The substituent effect was observed for the complexes in electrochemistry and UV-visible spectroscopy. These compounds might be used (a) as photosensitizers in photodynamic therapy (PDT) of cancer and (b) as catalysts for many organic reactions such as DDT dechlorination - a new way for waste treatment.
13. Prairie View A&M University
Sonya Wolf
EXAMINING THE INNATE IMMUNE RESPONSE OF STREPTOCOCCUS PNEUMONIAE EXPOSED HUMAN EPITHELIAL CELLS
Additional Contributor: Olivia Solomon
Faculty Advisor: Quincy C. Moore, III, PhD

The study examined host immune factors involved in pneumococcal keratitis through the use of Pneumolysin, a cytoplasmic pneumococcal protein. Utilizing human corneal epithelial cells (HCE), the effects of different concentrations of pneumolysin were examined at various time-points on the induction of pro- and anti-inflammatory cytokines. Human Corneal epithelial cells (HCE) were used to study the effects of pneumolysin in vitro. HCE cells were grown up in a T25 flask reaching a confluency of 85% and then split into 6-well plates for experimentation. HCE were exposed to pneumolysin at various concentrations: 200, 400, 600, 800 and 1000 ng/ml. The various concentrations were allowed to incubate on the cells for a time period of 2hr, 4hr, and 24hr. After which the supernatant was removed from each well and an ELISA was performed on the supernatant. The supernatants were assayed with ELISA to determine which immune factors were elicited from the different concentrations of pneumolysin which resulted in the presence of IL-6, IL-8, and TNF-alpha. Summary: Our studies provide insight into the induction of certain cytokines during pneumococcal ocular infection. The findings from our study will provide insight into the pathogen-host response that is triggered following infection with pneumolysin.

14. Rice University
Virginia White
FAITHFULLY SUPPORTING SCIENCE: AFRICAN AMERICANS PROTESTANTS' INTEGRATIVE NARRATIVES OF SCIENCE EDUCATION AND FAITH
Faculty Advisor: Elaine Howard Ecklund, PhD

African Americans are commonly affiliated with conservative Protestant congregations (Kosmin, Keysar and Lerer 1992) and are subject to a racial achievement gap in science education (Abdul-Alim 2011). These findings are used to explain the underrepresentation of African Americans among the highly educated in science (Granger and Price 2007). Using interview and ethnographic data collected as part of the Religious Understandings of Science study, narrative analysis was used to illuminate a disconnection between the overwhelming support for science education found among African American Protestant respondents and the racial achievement gap. Subsequently, integrative narratives created by respondents around religion and science education were examined, with how these narratives may restructure the currently separatist boundaries between these institutions. Respondents contextualize science education; suggest religion may equalize science education; and interconnect science education and faith. Findings indicate African American Christians’ under-representation in science fields may not be explained by religious commitments. Instead, future analysis should consider the permeable boundaries between faith, science education and modern life and examine emerging strategies to integrating these sectors. Educational policy, particularly science standards, should be reconsidered to open science classrooms to this integrative worldview, in order to avoid excluding students from this background.

15. Rice University
Hasitha Dharmasiri
MOBILESPIRO: A PORTABLE SYSTEM FOR ACCURATE, USER-FRIENDLY SPIROMETRY
Additional Contributor: Peter Chang
Faculty Advisors: Ashutosh Sabharwal, PhD; Gaurav Patel, MS

Lung diseases are among the world’s most critical health issues. Specifically, chronic lung diseases like asthma and chronic obstructive pulmonary disease (COPD) have become major concerns in modern healthcare, and the need for detection and management of these diseases will only continue to grow. We have developed mobileSpiro, a portable, low-cost spirometer intended for patient self-monitoring. mobileSpiro innovates on previous spirometer designs by utilizing the processing capabilities and Internet connectivity of smartphones. This enables mobileSpiro to provide instant feedback to patients and to allow doctors to access and analyze medical data remotely. mobileSpiro is intended to be released as an end user device and therefore will perform spirometry measurements with sufficient accuracy to receive ISO and ATS certification.
16. Sam Houston State University
Anna Duke
STABILITY STUDIES FOR A FORMULATED SULFUR DONOR AS A POTENTIAL THERAPEUTIC AGENT TO TREAT CYANIDE INTOXICATION
Additional Contributor: Assumpta Nwaneri
Faculty Advisors: Ilona Petrikovics, PhD; David Thompson, PhD

The major pathway for cyanide metabolism is its conversion, in the presence of a sulfur donor, to the urinary metabolite thiocyanate. Previous studies focused on enhancing the solubility of a sulfur donor, SDA, to develop an intramuscular formulation for treating cyanide intoxication. After preparation of a formulation, a stability study was carried out. During this study, it was seen that the drug content in the formulation decreased over time. 5 hypotheses were proposed to explain this loss: the drug could be temperature dependent, must be stored under airtight conditions, is pH dependent, there is a change in the micelle structure, and/or the SDA is light sensitive. In this experiment, the following three hypotheses were explored: temperature storage, storage under airtight conditions, and preparation at different pH's. After storage at various temperatures, it was seen that storing the formulated SDA at 0 °C and 4 °C resulted in the least percentage of SDA lost. It was also seen that storage in airtight, evaporation-proof, containers prevented the SDA content from decreasing. Lastly, after preparation and storage of SDA at multiple pH's, the difference in the decline of SDA over time was not greatly different for the different pH's.

17. Schreiner University
Hannah Fei de Jong
JOURNEY TO TIANJIN AS SCHOLARSHIP OF ENGAGEMENT
Faculty Advisor: Scott Short, MFA

In the year 2000, I was adopted. I had grown up in an orphanage in Beijing, China, and at the age of eight, suddenly found myself in another country with a strange culture and new language. I felt compelled to return to the country of my birth and find a way to give back to the less fortunate, specifically orphans like I once was. So, in 2009, when I was 16, I spent the entire summer in China, returning to the orphanage where I grew up and playing games with the young children. It was such a remarkable way of coming full circle. Last summer, I returned to China once more and spent 3 weeks at the Prince of Peace orphanage in Tianjin, a modern, privately run orphanage accommodating over 100 children with disabilities. Some of the children were able to learn basic computer skills. We set up a make-shift computer lab and taught eight children how to use a computer and basic functions of word processing. Because of the success of this initiative, a new computer lab is now being set up that will provide a computer curriculum that will be taught year round with the help of Teach for China, a non-profit organization that facilitates teaching for the less fortunate in Chinese society.

18. Schreiner University
Colby M. Adolph
NEW METHODOLOGY TOWARDS AN EFFICIENT ROUTE TO FUMAGILLIN
Faculty Advisor: Danette Vines, PhD

Fumagillin, an anti-angiogenesis drug, inhibits the growth of cancerous tumors. The natural product is extracted from the fungus Aspergillus fumigatus in limited quantities, thus a synthesis is desired. Our group previously attempted the synthesis of a Fumagillin subunit starting with commercially available 4-methoxybenzylmagnesium chloride. We decided to modify the Grignard by replacing the para-substituted methoxy ether moiety with a nitro group in hopes that the rearrangement would occur more readily through the corresponding Meisenheimer salt complex. Six experiments to prepare the Grignard from 4-nitrobenzyl bromide were run using varying parameters. We believed the corresponding Grignard, upon reaction with benzaldehyde, would lead to a direct route of a functional Fumagillin subunit. The Grignard reactions were executed under anhydrous conditions using magnesium activation techniques including: magnesium turning crushing, 1,2-dibromoethane, and iodine. Magnesium-halide exchange (transmetallation) was also attempted between 4-nitrobenzyl bromide and 4-methoxybenzylmagnesium chloride.
Jaeggi and colleagues (2008, 2010) showed that a 4-week training program, involving a task called “n-back” lead to improvements in reasoning performance in young healthy adults. A similar study involving typically developing children also indicated that there may be some improvement in working memory (WM) and other transfer tasks. Cognitive impairments associated with ADHD are thought to affect executive functions involving response inhibition, vigilance, working memory, and planning (Willcutt et al., 2005; meta-analysis). Executive functions are also thought to underlie academic success for children with ADHD (Biederman et al., 2004). Data from this research indicated mixed results about the effects of brain training in children with ADHD but found that in general, working memory training may be useful for children. Data also indicates that n-back training may make children more cautious as they were less likely to respond to lures and slower to react to stimuli. Transfer tasks showed mixed results. Degrees of transfer results may also have been influenced by individual differences in children.

Fire modeling is used to gain insight into the fire dynamics of flora and how it impacts the environment. Recent data confirms that current models are not updated with certain vegetation. Privet, Tallow, and Yaupon are ornamental plants common to households but are invasive; thus, the expansion of these plants into the wilderness has been inevitable. Current fire models of the US do not contain specific information about this vegetation. This data must be included in the current fire model to predict how they will impact the environment during a wildfire. The Departments of Chemistry & Biochemistry and Forestry are engaged in an interdisciplinary study researching the impact of these species in East Texas. Bomb calorimetry is used to determine the energy content of the invasive species during combustion. Three kinds of samples are included. The first sample is raw, taken from the plant directly. The second and third samples are ether and benzene/ethanol extracted, respectively. This allows the identification of which component(s) of the plants contribute most to the fire hazard. Simultaneous Thermal Analysis is used to measure the moisture content and mass loss on heating for each sample. Once the fire models are updated, the contribution of these plants to wildfires will be known and preventive steps can be incorporated in the new model.

Understanding the water requirements for any wildlife species is prerequisite to considering a restoration or reintroduction effort. In February 2011, 200 pronghorn (Antilocarpa americana) were translocated from the Texas Panhandle to the Trans-Pecos region of Texas to supplement declining populations. We utilized 15 GPS radio-collared pronghorn (8 M, 7 F) to assess water utilization with GPS radio-collars equipped to record 1 location/hour. Locations were separated by weeks post translocation, temperature regimes, diurnal/nocturnal, male/female, and breeding/fawning to quantify their water utilization on artificial water sources. We attained 40,232 hourly locations averaging 2,682 per individual. We found that 89.1% of the total hourly locations were ≤2,500 m from artificial water sources. Within the first 24 hours, pronghorn maintained a close distance to water with 99.4% of the locations ≤2,500 m and their utilization during the first 5 weeks averaged 97.5% of locations ≤2,500 m. Water utilization did not differ between diurnal and nocturnal hours. We found 94.5% of locations ≤2,500 m for adult does during the fawning season. Further, we measured adult bucks during breeding season having an average of 67.9% of locations ≤2,500 m. This information will help wildlife managers as they try to restore pronghorn populations to the Trans-Pecos.
22. Tarleton State University
Ryan Eaton
GENDER & SPORT RELATED DIFFERENCES IN ELECTROCARDIOGRAM & PRE-PARTICIPATION EXAMS (PPE) IN COLLEGE AGE ATHLETES
Additional Contributors: Jonathan R Thompson, Marco Messina, Brenda DeLeon, Josh Wondra
Faculty Advisors: Jennifer Blevins-McNaughton, PhD; Steve Simpson, EdD

The purpose of this study is to assess pre-participation exams using 12-Lead ECGs of college level athletes for specific markers that could determine risk factors for cardiac event or disease. Ninety College level athlete’s ages 18 to 25 participated in this study. Age, gender, height, weight, BMI, blood pressure and heart rate were measured during the pre-participation exam. Twelve-lead ECG was categorized by sport and one-way Anova was used to analyze differences between genders and sports. Independent t-test and linear regression were used to analyze differences between male and female responses. Significant differences were found in systolic blood pressure, P Wave duration, and the QTC interval. Systolic Blood Pressure was higher in football and basketball athletes compared to track and cheerleading. No significant differences were seen in genders. Conclusion: Overall significant differences in 12-lead ECG markers revealed that there were variances between four of the major sports. Additionally, several athletes with 12-lead ECG abnormalities included in this study were cleared for physical activity by a physician. Further investigations should focus on sport specific chronic abnormalities as well as differences in gender.

23. Texas A&M International University
George-Thomas Pugh
CLONING AND SEQUENCING THE VITELLOGENIN GENE IN TILAPIINE FISHES
Faculty Advisor: Michael Kidd, PhD

Inefficient broodstock production continues to be a major challenge for the tilapia aquaculture industry. Identifying selectable genes or molecular markers associated with increased fecundity and developmental competency will require a better understanding of oocyte development and maturation at the molecular level. Vitellogenin is a vital protein that is a precursor to various lipoproteins and phosphoproteins that are the principle components for the yolk fish eggs. The developing embryos survive solely on the proteins provided by the yolk making vitellogenin gene expression essential for larval survival. In this study, degenerate primers were designed using nucleotide sequences from various teleost species to isolate and amplify genes for the vitellogenin precursor protein and the vitellogenin receptor from cDNA derived from the brains, liver and ovaries of several Tilapiine species. Using the polymerase chain reaction and a degenerate primer for a 1600 base pair sequence of the vitellogenin receptor protein, I was able to amplify sequences from 5 species from the family Cichlidae, suggesting that these primers will useful for a large number of cichlid species, including tilapiines. The sequencing of these PCR products is a necessary first step in order to design species-specific primers for rtPCR and probes for in situ hybridization.

24. Texas A&M University/Texas A&M Health Science Center
Zeni Crisp
REGULATION OF ANTIMICROBIAL ACTIVITY BY A SINGLE MICROBIOTA METABOLITE
Faculty Advisor: Robert Alaniz, PhD

The microbiota, commensal symbiotic microbes that naturally inhabit the gastrointestinal (GI) tract, contribute to immune & physiologic homeostasis in the host GI tract. The microbiota provide resistance to enteric pathogen invasion and colonization; an important function termed “colonization resistance” (CR). Despite this observation, the mechanisms mediating CR are poorly understood. We hypothesized the microbiota produce compounds that either directly or indirectly contribute to CR. Indole is an abundant GI tract metabolite produced from tryptophan strictly by the microbiota. In the GI tract, dendritic cells (DCs), professional phagocytes that sense the microbiota and provide a link to host immunity, are continuously exposed to indole. Our previous work demonstrated that indole reduces pathogenic bacteria chemotaxis, motility, and epithelial cell attachment. Here, we tested whether indole directly promotes DC antimicrobial properties. Our results demonstrate that DCs conditioned with indole restrict Salmonella typhimurium invasion and intracellular replication, revealing a potential novel mechanism regulating CR.
ASSOCIATION BETWEEN BROWN SHRIMP CATCH PER UNIT EFFORT AND ENVIRONMENTAL VARIABLES
Faculty Advisor: Masami Fujiwara, PhD

The commercial shrimp harvest is one of the most important fisheries in the United States. Eighty percent of this harvest, by weight, is caught in the Gulf of Mexico (GOM). Survival rate of post larval shrimp is hypothesized as the most important factor in determining abundance. Previous research shows that salinity and temperature changes affect shrimp growth, which can affect their survival. If tidal fluctuations and/or water discharge affect these conditions, these environmental factors could be used to estimate shrimp populations. From the GOM, six stations supplied tide data and ten statistical zones provided shrimp catch per unit effort (CPUE). Seven major tributary rivers were used for stream discharge data. This analysis utilized two statistical methods to determine whether shrimp abundance is significantly affected by tidal fluctuations and/or river discharge in estimating shrimp populations. Findings showed a positive correlation between shrimp CPUE data and tide data and a negative association between shrimp CPUE data and discharge data, all consistent with previous research. These results support the conclusion that tide and discharge data can be used as effective tools to estimate shrimp populations.

OUR TABLES HAVE SUFFERED: QUANTIFYING THE DECLINE OF COMMERCIALLY VALUABLE LIVING RESOURCES USING HISTORICAL DATA SOURCES
Additional Contributor: Joshua Carter
Faculty Advisor: Glenn Jones, PhD

The objective of this study was to quantify the demand and supply of historically important commercial seafood species utilizing data sources including historical newspapers, price lists, and menus to capture market trends. Increases in market values for all Chesapeake Bay species were observed between 1850 and 1950 with some escalating dramatically during the early 1900s as they grew in restaurant popularity. Terrapin and duck all but disappeared from markets and menus with the passing of the Migratory Bird Treaty Act of 1918 and Volstead Act of 1920, whereas shad climaxed between 1910–1920 before stock declines, dam engineering, and pollution reduced these fish from markets in the region. Bluefish, striped bass, and blue crab fisheries remain relatively healthy but have all shown cyclical declines over this period. Oyster prices have remained steady with the national inflation rate although menu prices have steadily increased since the 1950s. This study, the first of its kind, demonstrates the utility of historical menu and market prices for reconstructing consumer-driven market behaviors of commercially valuable species for periods prior to NOAA databases. This important tool in determining pre-disturbed natural baselines may have application to tracking historical changes in abundance of Texas species.

SUBWAY AND THE RISE OF A NEW WORD IN THE AMERICAN SOUTH
Faculty Advisors: Garry Ross, PhD; Katherine Miles, PhD

The basic premise of my research was to compare the regional terms used for the “Subway Sandwich” before and after the rise of the Subway food chain. I used a study conducted in 1967, one year before the incorporation of the food chain, by Edwin Eames and Howard Robboy. The study discussed the regional terms for the sandwich, “hoagie,” “hero” and “grinder” for example. The two found there to be no term available in the Central-Texas region for the particular type of sandwich. However, after I conducted my own research I found that a large percentage of the individuals who partook in the experiment called the sandwich a “sub”. I surmise that since no such word for the item existed prior to the rise of Subway Restaurants that there was not such an item present in the region before 1968. Therefore, Subway created the term that is currently used in Central-Texas and furthermore, according to my findings, has nearly eliminated regional terms altogether in favor of the simple “sub.”
INTERFERON INDUCED GENES CORRELATED WITH POOR-PROGNOSIS IN BREAST CANCER
Faculty Advisor: Venu Cheriyath, PhD

While inflammation is associated with poor prognosis in breast cancer (BC), role of inflammatory responsive genes remain unexplored. Recently, we reported a significant correlation between poor prognosis of BC with elevated expression of G1P3, and interferon-induced antiapoptotic protein. Compared to normal breast biopsies, 93 interferon stimulated genes (ISGs) were upregulated (>2x) in breast cancer biopsies. Therefore, we hypothesized that some of these aberrantly expressed ISGs may promote BC. To identify such procancer ISGs, clinical data from 3 studies (n=487) were metaanalyzed for the correlation between the expression of ISGs and the outcomes. Patients were classified into 2 cohorts (High and Low) based on the expression of each ISG using two approaches: scaled recursive partitioning (scaled RP) approach and median approach. In univariate analysis, 13 ISGs were significantly associated with poor outcomes in BC patients (p<0.02). In multivariate analysis, 3/13 ISGs were significantly associated with poor outcomes (p<0.008) with a hazard ratio of ~2.0. Overall, our results suggest that inhibiting the activity of pro-cancer ISGs may enhance the tumor-surveillance activities of immune system to provide new interventions in BC.

THERMODYNAMIC CONTRIBUTIONS TO THE GIBB'S FREE ENERGY OF TEMPLATE-DIRECTED MICELLIZATION
Faculty Advisor: Mark A. Olson, PhD

A smart detergent has been developed in which the surface activity and detergency of a bipyridinium-based Gemini surfactant can be switched 'on' and/or augmented by employing the principles of preorganization and template-directed self assembly in aqueous solutions. Efforts to develop quantitative structure property-activity relationships for these types of tunable micellar systems require quantification of the thermodynamic parameters to the free energy of the template directed micellization. Variable temperature conductivity, NMR spectrometry, surface tension, dynamic light scattering, and zeta-potential measurements confirmed the presence of two aggregates which only one responds to template-directed coercion. By employing a phase separation model which takes into account the degree of counter ion binding to the micellar aggregates, the free energy of micellization was calculated for both the first critical micelle concentration (CMC) and the subsequent CMC with and without molecular template at temperatures ranging from 25 °C to 65 °C. The addition of the template results in the triggering of micelle formation at substantially lower detergent concentrations. The surfactant was designed so that it can benefit by the addition of up to two molar equivalents of template with one equivalent residing within the bipyridinium pocket and the other equivalent equally engaged in along-side binding interactions.

THE IMPACT OF FLAVONOIDS ON THE DIABETIC RETINA
Faculty Advisor: Carlos Garcia, PhD

Vision loss due to diabetic retinopathy is a major health concern. Retinal inflammation has been suggested as contributing to vision loss. The purpose of this study was to test the hypothesis that flavonoids ameliorate inflammation in the hyperglycemic mammalian retina. Age-matched rats were injected with a single dose of streptozotocin. Three months after the onset of diabetes, hyperglycemic, age-matched controls, and diabetic flavonoid-treated rats were sacrificed and neural retinas were collected for biochemical analysis. The content of Interleukin 6 (IL-6), Interleukin 10 (IL-10), and Tumor necrosis factor-alpha (TNF-α) were measured by enzyme-linked immunosorbent assays. The IL-6 content and TNF- α increased in the diabetic retina and flavonoid (0.02%) treatment resulted in a decrease in IL-6 and TNF- α concentration to the control value. The IL-10 content decreased in the diabetic retina and flavonoid (0.02%) treatment resulted in an increase of IL-10 concentration to the control value. The results of this study suggest that hyperglycemia induced inflammation in the retina indicated by increases in the pro-inflammatory cytokines TNF– a, and IL-6 with a concomitant decrease in the levels of the anti-inflammatory IL-10. This clinically relevant work identifies a drug target in the treatment of diabetic retinopathy.
31. Texas A&M University–San Antonio
John T. Carrola
INCLUSION OF UNCERTAINTY EFFECTS IN PAST LIFETIME PHENOMENA TO SIMULATE THE COMPLEX RHEOLOGY OF SHEAR-INDUCED EROSION ON DEFORMABLE NANOPARTICLES WITH THIN SHELLS
Faculty Advisor: John G. Romo, PhD

This research focuses on innovatively applying a mathematical technique to simulate the complex rheology of shear-induced erosion on deformable nanoparticles with thin shells. In biomedical application, submicron therapeutics encased within “carriers” of biodegradable deformable shells and fluidic interiors are used for targeted drug delivery. The resultant carrier erosion provides a means to regulate the release of the enclosed nanotherapeutics into the targeted system. Research shows the mass erosion rate for complex molecular structures can be affected by uncertainties on the deformable shell surface such as, in-situ shear stress, molecular or atomic rearrangement on the surface, and reactions with the nanotherapeutic molecules. To account for nanoparticle structural changes from past shear stresses, we introduce a notion of uncertainty correlating to surface phenomena in time past. To investigate the impact of past entropy when applied to the shear-induced erosion model for deformable nanoparticle surfaces, a new numerical model was developed.

32. Texas A&M University-Texarkana
Glen Wallace
INTELLIGENT AND RANK-ORDER METHODS FOR IMPULSE NOISE DETECTION
Faculty Advisor: Igor Aizenberg, PhD

Our Intelligent System works phenomenally in detecting and filtering Salt and Pepper Impulsive noise in images while a modified rank-order criterion has shown promise for detecting and filtering Random Impulsive noise. A Multi-Layered Neural Network with Multi-Valued Neurons when trained has demonstrated a remarkably robust ability to learn from a single image what constitutes noisy pixels and clean pixels and to apply its weights learned from that single image to detect and successively remove noisy pixels in images that did not participate in the learning process. Pixels detected as noisy are filtered with a simple median filter while clean pixels are ignored. Results with this system for Salt and Pepper noise in which the noisy pixel is either of an intensity of 0 or 255, have produced pleasing Peak Signal to Noise Ratios in the range of 30 to 40. Random noise is a much more difficult problem, as the intensities of the noisy pixels aren’t guaranteed to be one or two values, but any value in the range 0 to 255. To combat this difficulty we came up with a new method to create our datasets, and in the process a new Non-Intelligent filter.

33. Texas Christian University
Katelyn M. Lehman
FROM TEXAS TO THE NEARSIDE OF THE MOON: DETERMINATION AND EXPLANATION OF COMPOSITIONAL DIFFERENCES IN THE MARIUS HILLS VOLCANIC COMPLEX
Faculty Advisors: Rhiannon G. Mayne, PhD; Walter Kiefer, PhD

On the nearside of the Moon, the Marius Hills Volcanic Complex stands in great contrast to the smooth basaltic mare terrain of the central Oceanus Procellerum. The 50,000 km² Complex includes volcanic cones, collapsed lava tubes, pyroclastic deposits, and over 250 volcanic domes cover, indicating a dynamic volcanic past. Previous studies have investigated the area by utilizing spectral datasets to uncover compositional differences. However, the visible to near-infrared range datasets have only shown the area to be filled with high TiO₂ basalt, leaving much of the history still hidden. In an effort to clarify this history, we have integrated existing calibration datasets with the new mid-infrared (MIR) spectral dataset of the Diviner Lunar Radiometer Experiment. The MIR dataset of has enabled us to see features that are much more felsic in composition. The identification of felsic regions in the primarily basalt complex is especially telling in relation to the discovery of a large magma chamber, possibly indicating large scale magma evolution in the Marius Hills Complex.
We have evidence that the colorless gas, hydrogen sulfide (H2S), can produce pharmacological actions in the eye. In the present study, we tested the hypothesis that the intraocular pressure lowering effect of H2S (using H2S-releasing compounds as donors) is mediated by an increase in aqueous humor (AH) outflow in porcine trabecular meshwork (TM) tissues. Methods: Porcine ocular anterior segments explants were perfused with Dulbecco's Modified Eagle's Medium maintained at 37°C, 5% CO2 and constant pressure of 7.35 mmHg. Once outflow was stable, explants were administered with H2S-releasing compounds: sodium hydrosulfide (NaHS, 100 nM, 1µM, 10 µM), L-cysteine (1 nM, 100 nM, 1µM), and outflow was monitored for 4 hours. Vehicle (0.1% saline) was run in parallel. Results: NaHS (10 µM), a fast-releasing H2S compound significantly increased AH outflow by 52 % for only 2 hours when compared to vehicle. Furthermore, there was a concentration-dependent increase in AH outflow with administration of 1 and 10 µM of NaHS. L-cysteine, a slow-releasing H2S compound caused a significant (p<0.01) concentration-dependent increase in outflow facility. Interestingly, the duration of the effects of L-cysteine on outflow lasted longer than that of NaHS. Conclusion: H2S-releasing compounds can increase AH outflow in porcine TM indicating a pharmacological role for H2S in the regulation of IOP.

Young Latinas have the highest teen pregnancy rates in the country (National Vital Reports, 2011). The study proposed to better understand the reasons for these alarming rates. Latinas' beliefs about whether contraceptive use harmed their health, was wrong or made them look promiscuous were measured along with their opinions about having unprotected sex with someone they loved, and whether the discussion of sex with parents was taboo, among other beliefs. Participants were 73 unmarried Latina women between the ages of 15-30 from the border region. Results showed that beliefs about contraceptive use harming health, r(71) = .32, p < .01, and accepting unprotected sex with someone they loved, r(71) = .39, p < .01, were each correlated with a stronger perceived likelihood of having an unplanned pregnancy. Not supporting contraceptive use because it prevented a child's birth correlated with intentions to have a baby sooner r(71) = .35, p < .01. Cultural beliefs were linked with perceived chances and behavioral intentions of getting pregnant. It is my hope that this research and its findings will help policy makers and providers better understand and address these concerns.
37. Texas Tech University
Cara Wessels
A POTENTIAL IMPROVED TECHNIQUE FOR SELECTION OF EMBRYOS TO BE USED FOR CRYOPRESERVATION AND GENETIC STORAGE
Faculty Advisors: Samuel Prien, PhD; Lindsay Penrose, PhD

After an initial training period with glass beads, no beads or embryos were lost during their exposure to the redesigned specific gravity chamber suggesting this is a tool which can be used with human embryos without fear of embryo loss. The curve established (R²= 0.9998) should allow a highly consistent estimation of embryo weight. Due to the survival and development rate of the embryos used in the redesigned specific gravity chamber, it can be concluded that the embryos are not harmed when used in the device. With the redesigned specific gravity chamber, live embryos were able to be differentiated from dead embryos due to differences in specific gravity. This proves the device can be effective in detecting differences in embryo weight. Given the new design and the earlier experiments which demonstrated differences in embryo weight based upon chemical composition, studies can now proceed to determine if the changes in embryo chemistry affect their survival and if this detection method can be used as a noninvasive means of assessing embryo quality.

38. Texas Tech University Health Sciences Center
Adam Zigler
GLENNA ROBERTS CAREER LADDER FOR CERTIFIED NURSING ASSISTANTS
Faculty Advisor: Alyce Ashcraft, PhD

The study results are part of an ongoing study that examines certified nurse aide experiences pre and post implementation of a career ladder. The ladder consists of three levels (1) Personal Growth and Development and Normal Changes of Aging, (2) Health Care issues of the Older Adult, (3) the CNA role in Dementia, Palliative Care, and the Survey Process. Survey results reveal the importance of including this subset of caregivers when considering changes in the workplace. Only partial results are presented. Laschinger's Conditions for Work Effectiveness Questionnaire revealed improvement in perception of opportunity and access to support, as well as innovation, flexibility, and visibility of work-related activities. A paired t test found significance (p = .01) for the chance to gain new skills and knowledge on the job post Level 3 of the clinical ladder. Roller's Perception of Empowerment Instrument revealed participants were neutral about their freedom to make decisions and involvement with changes concerning their job. Participants did not feel they played a part in determining organizational goals and changes. Yeatts and Cready Dimension of Empowerment Measure revealed participants felt they had the skills and knowledge to do a good job. CNAs did not feel management was open to their ideas and solutions and did not listen to their suggestions. A paired t test found significance (p = .03) for CNAs being allowed to make their own decisions post Level 3 of the clinical ladder.

39. Texas Woman's University
Jehan Kohistani
PHOTOPHYSICAL PROPERTIES OF NEW COPPER (I) AND SILVER (I) COMPLEXES TOWARD POTENTIAL USE AS LUMINESCENT SENSORS FOR VOLATILE ORGANIC COMPOUNDS (VOCs) AND OTHER ENVIRONMENTAL POLLUTANTS
Faculty Advisor: Manal Omary, PhD

Ring complexes of the coinage metals (gold, silver, and copper) exhibit luster beyond that of jewelry! In particular, combination of these metals with certain organic molecules leads to a fascinating glow that can be customized for a variety of energy, health, technological, and environmental applications. Our recent efforts, for example, attained: (a) gold and copper ring complexes that are potentially useful for electronic devices such as cell phones, high-definition TV sets, and other full-color video display products; and (b) analogous silver complexes that can sense cancerous benzene vapor with remarkable reversibility, selectivity, and sensitivity. We will show how the different chemical variations in this class of ring complexes affect the light-emission and sensing properties. Thus, we shall elucidate the factors that alter the emission color or brightness, and which specific set of hazardous vapors can be monitored the best by which coinage metal/organic molecule combination.
40. The University of Texas at Arlington
Sarah M. Hussein
THE MUTUAL INTERACTION OF HOMOGENEOUS, ISOTROPIC TURBULENCE AND A DETONATION WAVE
Additional Contributors: Elizabeth Blaiszik, Ezgihan Baydar
Faculty Advisor: Frank Lu, PhD

Following shock-turbulence interaction (STI), continuation studies of detonation-turbulence interaction (DTI) are conducted. Both STI and DTI are of fundamental interest as they embody complex gasdynamics phenomena without further complications of geometry. DTI has the added complexity of chemical reactions. Direct Numerical Simulation of a large computational database is conducted to obtain data for the analysis of velocity fluctuations in a strong DTI. The research project is to process and visualize the acquired database. Longitudinal fluctuations of five hundred datasets are analyzed statistically. Under the condition of high heat release, a combustion front is produced behind the shock after the interaction. The shock wave and the combustion front form the inherently unstable detonation wave. It is found that the detonation-turbulence interaction is mutual. While the turbulent flow is longitudinally strained in the axial direction, the detonation wave is wrinkled. DTI analysis leads to the understanding of turbulence in fluid mechanics and gasdynamics applications. This understanding is essential for DTI applications in safety, such as coal mine explosions, and new engine development, such as rotating detonation engines.

41. The University of Texas at Arlington
Dianna H. Nguyen
TARGETED SEGREGATION FOR AXONAL SUBTYPE NEURAL INTERFACING
Additional Contributors: Sanjay Anand, Srikanth Vasudevan
Faculty Advisor: Mario Romero-Ortega, PhD

About 1 in 200 people living in the U.S have undergone limb amputation and can receive bionic prosthesis. The control and natural feel for bionic devices requires a neural interface to connect the nervous systems of the user with the robotic prosthesis. We developed a regenerative multielectrode interface (REMI) that can record neural activity. However, regenerating nerves consists of mixed modalities and identifying the nature of the interfaced axons remains a challenge. Compartmentalizing the regenerating nerve serves as a method for modality-specific interfacing. In order to investigate signals that can be used to segregate the regenerating axons into type-specific REMI, we used surrogate targets of muscle and skin to segregate mixed nerves. Constructed “Y”-shaped polyurethane tubes used were 6mm in length with an internal diameter of 1.7mm. The conduits were implanted into the sciatic nerve of adult rats, and regeneration was evaluated after 30 days by tract-tracing and histology. We observed regenerated axons innervating the surrogate targets and tracing back to the dorsal root ganglion and spinal cord. This result demonstrates the use of natural targets to induce the segregated interfacing of sensory and motor axons, which will support a more natural control and feel of the robotic prosthetic devices.

42. The University of Texas at Austin
Jeffery Watson
DOCUMENTATION OF PLEASANT VALLEY SPRING DISCHARGE AND REGIONAL WATER SUSTAINABILITY IMPLICATIONS
Faculty Advisor: Marcus Gary, PhD

The recently documented Pleasant Valley Spring (PVS) discharges into the Blanco River upstream of Wimberley, TX. It is currently the largest known spring discharging from the Middle Trinity Aquifer. A discharge record taken from December 2012-April 2013 indicates that PVS accounted for the majority of Blanco River flow over the study period, during a time of drought and relatively low flow. These findings have water sustainability implications for western Hays County, which has dramatically increased pumping of the Trinity Aquifer in recent decades. Blanco River recharge of the Edwards Aquifer downstream of Wimberley may also be threatened if PVS spring discharge is reduced by regional pumping.
A GENERIC MODE CHOICE MODEL APPLICABLE FOR SMALL AND MEDIUM-SIZED MPOS
Additional Contributors: Marisol Castro, Subodh Dubey, Jun Deng
Faculty Advisor: Chandra Bhat, PhD

The private automobile’s dominance among travel modes used in Texas urban areas highlights the importance of developing the technical ability to evaluate multimodal projects that attempt to increase the shares of non-drive-alone modes of travel, such as public transportation and walking. Doing so will lead to a more efficient use of the roadway infrastructure, less traffic congestion, lower mobile-source emissions, less energy dependence, and improved mobility and quality of life. Therefore developing a framework to enhance current travel demand modeling systems to analyze alternative transportation modes (carpooling, public transportation, bicycling/walking modes) and evaluate (and prioritize) multimodal projects at the regional level is key.

DETECTION OF ALARMING CONDITIONS IN REMOTE FACILITIES THROUGH IMAGE PROCESSING
Faculty Advisor: Fitra Khan, PhD

“Through experimentation, several techniques for segmentation and tracking were found. Methods for recognizing certain objects through their surface area, shape, properties, and color were also found and by specifying certain properties to be recognized, objects could be identified most of the time. Different methods for segmenting persons from an image through the color spaces of these images and tracking algorithms were used to find how to track movements from separate parts of a body and not only record but to test these movements for certain actions that can be recognized by a computer. Algorithms like the Lucas-Kanade Optical Flow and K-Means clustering techniques were used and extended to achieve the results of tracking and recognizing what a person was doing; being able to recognize specified movements, along with the direction of the movement, correctly.”

A META-ANALYSIS OF EXPRESSIVE LANGUAGE IN CHILDREN WITH COCHLEAR IMPLANTS
Faculty Advisors: Emily Tobey, PhD; Andrea Warner-Czyz, PhD

Children with hearing loss who receive cochlear implants (CI) display vast differences in early language skills. One primary factor thought to underlie this variability is the age at which they receive intervention with CI. Few studies to date systematically review early language development in young CI recipients to measure this factor’s influence. This meta-analysis compares expressive language acquisition in children with CI and children with normal hearing (NH). Standardized mean differences were calculated from 13 peer-reviewed studies reporting standard or raw scores from 3 commonly used clinical measures. Results reveal children implanted by 24 months do not differ significantly from NH peers, supporting benefits of earlier implantation. However, expressive language measures including more advanced expressive language skills reveal considerable differences, on average, between children in the CI and NH groups. Age at CI may serve as an important predictive factor for pediatric CI recipients to attain expressive language outcomes similar to NH peers.
46. The University of Texas at Dallas
Katherine Borner
SYNTHESIS OF COPPER NANOWIRES VIA ELECTROLESS NANOWIRE DEPOSITION ON MICROPATTERNED SUBSTRATES
Faculty Advisor: Amy V. Walker, PhD

Nanowires have many applications from nanoelectronics to sensors. One challenge in the practical use of metallic nanowires is their effective integration into devices via assembly, patterning, and alignment. We have developed a method, electroless nanowire deposition on micropatterned substrates (ENDOM), to synthesize and precisely place copper nanowires on organic thin films. Electroless deposition (ELD) is a chemical reaction, and is widely used to deposit metals on bulk surfaces. In ENDOM a nanowire forms at the interface of two dissimilar materials if the following conditions are met. First, ELD is kinetically favored on one surface due to preferential adsorption of the reducing agent (reactant). Second, the transport of the reactants must be slower to the surface with the faster ELD rate. We use two dissimilar self-assembled monolayers (SAMs) in this study, 16-hydroxy-1-hexadecanethiol (MHL) and hexadecanethiol (HDT). We have studied and optimized the reaction conditions for copper ELD on MHL and HDT SAMs. By controlling the deposition times, the widths of the wires can be varied from nanometers to microns. Further, the deposited nanowires are ultralong (centimeters) and can be patterned in arbitrary shapes, such as going around a right angle.

47. The University of Texas at El Paso
Jennifer A. Lopez
STRESS-CORROSION CRACKING OF NATURAL GAS PIPELINES
Additional Contributor: Monica A. Torres
Faculty Advisor: Steve W. Stafford, PhD

One of the biggest problems in the natural gas pipeline industry is stress-corrosion cracking (SCC), which accounts for 15-20% of gas pipeline failures and a persistent concern for structural integrity and public safety. The susceptibility of a pipe to SCC is dependent on the material and the environment. SCC is not clearly understood and practical methods to predict a pipeline’s susceptibility are lacking. We want to study which factors contribute the most to SCC since it is time-dependent. This way we can understand which steel products are most susceptible and thus prioritize their remediation and/or removal. We were provided with 12 samples of pipe removed due to SCC damage. Our research uses nondestructive evaluation (NDE), macroscopic examination, chemical analysis, metallographic analysis, electron microscopy and fracture mechanics to foster an understanding of the susceptibility parameters on the metal side of the pipeline interface. As expected, we found that the cracks propagate intergranularly because of carbide enrichment in the grain boundaries. Also, cracks may occur near a weld because of residual stresses.

48. The University of Texas at El Paso
Marc A. Lucero
DETERMINING THE STRUCTURE OF THE WESTERN BOUNDARY OF THE HUECO BOLSON USING GRAVITY MEASUREMENTS
Additional Contributor: Pawan Budhathoki
Faculty Advisor: Diane I. Doser, PhD

For better localization of possible fresh water drill sites, it is important to determine the structure of bolsons where the water is stored. To understand this, we have collected over 100 gravity data points along 4 lines that cross the western boundary of the Hueco Bolson north of Transmountain Drive. These data will be used to examine the character of the East Franklins fault zone that forms the western boundary of the Hueco Bolson. Understanding the structure and width of this fault zone will aid in determining how surface water flowing off the Franklin Mountains infiltrates into the Hueco Bolson. For example, a wide fault zone may provide a very permeable recharge zone with quick infiltration into the Bolson. On the other hand, smaller faults that parallel the main fault may act as barriers to water flow into the Bolson. Fault zone geometry also influences deposition of sediment within the basin. Our preliminary structural analysis involved constructing gravity maps and profiles along the fault. In addition, we have developed a 2-D density model along two profiles. We have also converted the results of this project into a teaching module for introductory geology courses at UTEP.
Myocarditis, an autoimmune inflammatory disease of the myocardium, is a major cause of sudden death and dilated cardiomyopathy (DCM). Acute inflammation can be suppressed by glucocorticoids (GCs) in some patients; however, treatment cannot stop progression to DCM. Macrophage migration inhibitory factor (MIF) is a unique regulatory mediator induced by GCs, which also counter-regulates their immunosuppressive effects. MIF also triggers chemotaxis of T cells through CXCR4. Dexamethasone (Dex) treatment was investigated in early and late stage experimental autoimmune myocarditis (EAM) in MIF⁻/⁻ Balb/c and wild-type (Wt) mice. EAM and DCM severity were determined histopathologically using Hematoxylin and Eosin and Massons Trichrome staining. Cardiac infiltration and CXCR4 expression were analyzed using immunofluorescence (IF) staining. We found that Wt Dex-treated mice recover from EAM after peak of disease but progress to DCM, whereas MIF⁻/⁻ Dex-treated mice are highly resistant to both EAM and DCM. IF staining demonstrated the absence of inflammatory lesions and CXCR4 expression in MIF⁻/⁻ Dex mice, showing that CXCR4-mediated T cell recruitment is inhibited. Our results indicate that MIF antagonizes the efficacy of GCs in EAM and DCM and implicates MIF inhibition in combination with GC treatment as a potential therapeutic strategy for myocarditis and prevention of progression to DCM.

Haiti suffered extreme destruction from the earthquake that rattled the country in January 2010. The international community funneled billions of dollars into Haiti, and thousands of non-governmental organizations (NGOs) concentrated on assisting and relieving the initial damage of the earthquake and providing long-term reconstruction of the country. Three years later, however, there has been a withdrawal of aid, the government has not been strengthened, and economic growth and public services have not significantly improved. The purpose of this research project was to explain why there has been lack of positive change in Haiti despite international large-scale focus of aid and attention. In the paper, I argue that this negative development results from a persisting situation of state capture, characterized as a condition that persists when a group of firms and elites exert their economic power over political officials, shaping politics to the advantage of said economic elites. The paper, through process tracing, further demonstrates that the country has been under state capture for many years, and that reconstruction efforts from the earthquake exacerbated the cycle. I use qualitative analysis and a quantitative regression test analysis to verify the relationship between state capture and withdrawal of aid from Haiti. The results of this paper point to the need for both international institutions and NGOs to focus reconstruction efforts upon comprehensive government reform, which, with time, will remove Haiti from capture.

Infrared and Raman spectroscopy have been used to identify ionic associations in systems of low energy lattice salts dissolved in polymers/oligomers, especially in ether-oxygen containing solvents and, to a lesser extent, in imine based systems. While species to frequency assignments have been thoroughly investigated for the symmetric CF₃ deformation, symmetric SO₃ stretch and symmetric SO₃ deformation, the antisymmetric CF₃ stretch is less well characterized. Here, N,N'-dimethylethylenediamine (N,N'-DMEDA) and diglyme are used to make frequency/species assignments for the antisymmetric CF₃ stretching band. Since the bulky “arms” of tetrabutylammonium triflate (TBATf) prevent reassociation once dissolved, TBATf was used to benchmark the unassociated species in both the ether oxygen and imine systems. The contact ion pair and triple ion frequencies were assigned using the known species-frequency correlations of the symmetric CF₃ deformation, the symmetric SO₃ stretching and the symmetric SO₃ deformation bands to identify the species present in the sample. These species were then correlated to frequencies observed in the antisymmetric CF₃ stretching band.
52. The University of Texas Health Science Center at San Antonio
Leslie Gonzalez, CRT
TREND SETTERS: OPTIMIZING NONINVASIVE VENTILATION IN PATIENTS WITH ALS
Additional Contributors: Rocio Carrizalez, CRT, Isaac Maldonado, CRT, Emma Silva, CRT
Faculty Advisors: Leo Wittnebel, MSIS, RRT; Donna D. Gardner, MSHP, RRT

Patients with Amyotrophic Lateral Sclerosis (ALS) suffer from a deteriorating neuromuscular disease that results in mortality within 3 years of diagnosis from respiratory failure. The diaphragm weakness leads to respiratory insufficiency, nocturnal hypoventilation and eventually respiratory failure if not treated early. These patients are evaluated for the need of noninvasive ventilation (NIV). Factors such as poor reimbursement, inequitable access to resources, and patient geographic location make follow-up and assessment of the efficacy of NIV difficult. Nocturnal trending pulse oximetry (NPO) is an easy, efficient, and reliable tool that identifies signs of respiratory insufficiency earlier than other tools. In total we provided NPO to 13 patients, 3 who were not on NIV and 10 who were already on NIV. All patients who were not using NIV the NPO demonstrated a need for NIV and 92% (12/13) demonstrated abnormal results and were considered for NIV or NIV settings changes. 90% of those who were already on NIV the NOP determined the current settings were inadequate. There were 1-54 episodes of desaturation less than 90% for more than 10 seconds and 213 total desaturation events for all 13 patients throughout 1 night.

53. The University of Texas MD Anderson Cancer Center
Sadeem Qdaisat
BONE MARROW CULTURE WITH CpG OLIGONUCLEOTIDE/IL-2 BENEFITS FOR CHROMOSOMAL ABERRATIONS DETECTION OF CLL PATIENTS IN COMPARISON WITH STANDARD CULTURE
Faculty Advisors: Ming Zhao, MD; Vicki Hopwood, MS; Jun Gu, MD, PhD

Background: Chronic lymphocytic leukemia (CLL) is the most common leukemia in the United States. Metaphase cytogenetic tests, such as G-Band karyotyping and FISH are among the most effective tests to detect CLL and provide significant prognostic information. The use of metaphase cytogenetics is currently problematic due to the low mitotic index and quality. Purpose: In our study, we hypothesize that immune-stimulatory CpG Oligonucleotide plus interleukin-2(IL-2) (CpG/IL-2) can work as a novel B-cell mitogen to stimulate bone marrow culture and result in higher mitotic index and improved quality. We also hypothesized that CpG/IL-2 would increase clonal chromosomal aberration detection rate in CLL patients. Methods: Bone marrow from 9 CLL patients were obtained and set up under two culture conditions, one with LPS and other with CpG/IL-2 as mitogen respectively. Mitotic index was read under the microscope blindly by three different readers (SQ,LV,RM). G-banding and Spectral Karyotyping (SKY) were also performed to confirm clonal abnormalities. Results: The readings showed that mitotic index in CpG Oligonucleotide/ IL-2 stimulated bone marrow culture was seven times higher than that in standard LPS bone marrow culture with an average standard deviation of “0.92” and CI of 95%, p<0.05. G-Banding and SKY showed the same abnormalities in both CpG/IL-2 and LPS Bone marrow cultures. CpG/IL-2 did not reveal additional clonal chromosomal aberration than LPS cultures. Conclusion: According to the results CpG/IL-2 culture should be used in the cytogenetic lab for chromosomal analysis instead of LPS due to the higher mitotic index that helps in reducing false negative results. Further cases and different methods should be studied in order to support these findings and reduce false negative CLL detection rates.

54. The University of Texas of the Permian Basin
Kari Andrews
FOLK ETYMOLOGY: BACRONYMS AND CULTURAL TABOOS
Faculty Advisor: Rebecca D. Babcock, PhD

Many words in the English language develop a folk etymology as a speculation of the actual definition is passed from one person to another. The word then loses its tentative nature and produces a pseudo-history. This research focuses on one aspect of folk etymology: Bacronyms. As people try to explain the actual origins and definitions of various taboo words, the word first falls into a pattern of being a real term, then transforms into a bacronym, then continues to carry both real and folk etymologies. The results from this study find that because these words deal with socially taboo ideas, the bacronyms and folk etymology help to make the term appear less taboo, or dilute the effect of the word. The terms also possess superficially plausible definitions that are ultimately wrong in etymology.
55. The University of Texas Southwestern Medical Center
Eric K. Graham
REGULATION OF THROMBIN-INDUCED CORNEAL FIBROBLAST CLUSTERING BY MATRIX RIGIDITY AND CELL CONTRACTILITY
Faculty Advisor: W. Matthew Petroll, PhD

In most tissues, cells are surrounded by a network of fibrous proteins called the extracellular matrix (ECM). The ECM supplies both physical and chemical signals to cells, and provides a substrate through which fibroblasts migrate during wound repair. In this study, the effects of thrombin on cell behavior in both rigid and compliant collagen ECMs were investigated. Corneal fibroblasts were incubated overnight in serum-free media containing platelet-derived growth factor (PDGF), with or without the addition of thrombin. Cell nuclei and f-actin were then fluorescently labeled and imaged. Cell clustering was assessed using nearest-neighbor and cell connectivity algorithms. Fibroblasts plated on rigid collagen-coated dishes or compliant 3-D collagen matrices normally had a dendritic morphology and did not form clusters. On collagen matrices, addition of thrombin induced cellular contraction, stress fibers and cluster formation. On collagen-coated dishes, thrombin did not induce clustering, but cells still exhibited stress fibers and assumed a contracted morphology. Blocking cellular force generation using Y-27632, a Rho kinase inhibitor, inhibited thrombin-induced clustering. Overall, these findings provide new insights about the interrelationships between thrombin signaling, cell contractility and ECM compliance - factors which can have a profound impact on corneal transparency and visual acuity following injury or refractive surgery.

56. The University of Texas-Pan American
Kaysey Aguilar
HEALTH HABITS AND PERCEPTIONS OF COLLEGE STUDENTS
Faculty Advisor: Suad Ghaddar, PhD

Studies show that, although peers generally have significant influence over the health habits of their friends, parents’ influence is not completely absent. However, these studies have either focused on youths’ perceptions of people their age in general or have been conducted in another country. To date, no studies have investigated the influence of close peers’ and parents’ effects on the health habits of college students in a primarily Latino region. Given the Latino culture’s strong family-orientation, it is hypothesized that these college students’ health habits are influenced more by parents than by peers. To assess the influence of each group, an online survey was developed to assess student’s (1) health habits in regard to exercise, nutrition, smoking, and alcohol consumption and (2) their perceptions of the level of priority given by their parents and close peers to those same health behaviors. Results were reported through univariate analysis. Data was collected from 246 college students; the majority was Hispanic (76.4%). Results revealed a stronger influence of peers relative to parents concerning alcohol consumption and physical activity habits. Parents had stronger influence relative to peers concerning nutritional habits. Influence from either group concerning smoking habits was found to be statistically insignificant.

57. University of Houston
Nicholas Heisig
BETWEEN BERLIN AND A BOYCOTT: AFRICAN-AMERICANS, JEWISH- AMERICANS AND THE DEBATE OVER THE 1936 OLYMPICS
Faculty Advisor: Irene Guenther, PhD

Adolf Hitler’s ascent to power in 1933, two years after the 1936 Olympic Games were awarded to Germany, provoked immediate debate over whether the Games should remain there, be relocated elsewhere, or cancelled outright. As the largest delegation, debate was most contentious in the U.S., where African-Americans and Jewish-Americans were athletically successful, felt threatened by Nazi policies, and deeply engaged in this discussion as prominent American communities. Exploring the positions taken by athletes, luminaries, newspapers, and organizations helps to illuminate the similarities and differences between the two groups. Many striking patterns emerged from such comparisons, along with jarring ruptures, such as the partnering of anti-Semite Father Charles Coughlin with Jewish groups to oppose the Games and the strong advocacy of African-American athletes to participate in the Games while praising Hitler’s Nazi State as being more racially tolerant than the United States. In general though, the majority of both African-American and Jewish-American athletes sought to participate (with a few notable Jewish exceptions), while most organizations for both groups, charged with protecting their constituents’ interests, pursued a boycott. The most prominent disagreement between the communities arose in newspapers, where most African-American journals urged participation, against the pro-boycott desires of most Jewish-American periodicals.
Rho-Associated Kinase-I ("ROCK1") is a protein from the serine/threonine kinase family. ROCK1 has been shown to be involved in pathways that cause heart disease through ventricular and vascular remodeling. ATP competitive inhibitors can down-regulate ROCK1's kinase activity, but due to the conserved active site of kinases, off-target effects are a common problem. I have taken a peptide inhibitor of ROCK1 developed in Dr. Schwartz's lab and implemented a bivalent linking strategy to a known inhibitor of ROCK1, Y-27632. We hypothesize that a bivalent compound will increase inhibitor binding affinity and target specificity. These bivalently linked compounds were computationally modeled, docked against ROCK1's catalytic domain, and energetically scored. Results indicate inhibitors cluster into two populations: 1) Y-27632 inside the ATP binding pocket; 2) A tyrosine residue from the peptide inside the binding pocket. Capping the N-terminus, removing its large electrostatic character, results in a larger cluster of poses with the tyrosine residue occupying the pocket. These results provide us with a better understanding of the interactions of the bivalent inhibitor with the ATP binding pocket and with the groove between the two lobes of the catalytic domain and information to refine our drug lead compound into a peptidomimetic.

Diatoms can be used to measure succession in a mitigation wetland community. Previous research compared Greens Bayou Wetlands Mitigation Bank (GBWMB), a man-made wetland, and Anahuac National Wildlife Refuge (ANWR), a natural wetland, using the total Diatom count and the number of genera present as indicators. Shannon’s Index was one measure of comparison used, but the value of the Shannon Index was reduced by the lack of counts from multiple samples for each site in the comparisons. In this study, we investigated the impact of multiple samples on the value of the Shannon Index as a measure of progress of how GBWMB has become similar to ANWR. Shannon index is an index that can be used to identify genera diversity in a community. Shannon's index accounts for both abundance and evenness of the genera present in both locations. In this study, 0.1g samples were used to generate data for Shannon's Index calculations. The expectation is that these values will give a truer signal for the comparison of the GBWMB to the ANWR.

There are various physical fitness programs that incorporate strength, power, and endurance components to promote physiological muscle adaptations. The acute physiological and hormonal changes associated with these programs have not been defined by research to see if they result in adaptations. The purpose of this study was to evaluate the acute physiological response of a body weight resistance exercise protocol as compared to a traditional bout of resistance exercise. Eleven resistance trained males (21.18 +/- 1.22 yrs, 85.23 +/- 13.2 kg, 174.3 +/- 14.5 cm) participated in this acute study using a randomized cross-over design. The key findings of this study are that a resistance exercise workout utilizing body weight exercises can elicit a similar physiological response in serum growth hormone and cortisol levels in addition to heart rate as compared to a traditional bout of resistance exercise performed at an intensity of 75% of maximum. The body weight exercise protocol elicited the highest mean growth hormone responses despite no significant differences between the workout groups. A trend for significance (p = 0.060) for the cortisol response suggests that the traditional resistance exercise protocol elicited a slightly higher physiological stress response.
Numerous studies have concluded that combat veterans with PTSD have difficulties maintaining intimate relationships with other individuals (Monson, 2009). Many veterans suffering PTSD find this to be one of the most detrimental symptoms of the disorder. A new therapy called Profile Self Confrontation (PSC) has just been implemented for treatment of PTSD in combat veterans spearheaded by Dr. Bob Rynearson. Dr. Rynearson’s new perspective on treatment for the disorder poses the question: Does the therapy Profile Self Confrontation improve the sustainability of the combat veteran’s intimate relationships? Early results indicate that there is a positive correlation between participation in the therapy and improved personal relationships.

Reactive astrogliosis is a reaction to brain injury characterized by changes in astrocytes, such as altered gene expression and rapid proliferation, and can cause permanent brain damage and inhibition of axonal regrowth. Primary cilia are ubiquitous organelles that extend from most vertebrate cells and are essential for signal reception. Though primary cilia on astrocytes have been noted before, this study is the first to quantify and find that the majority of astrocytes possess cilia. Because astrocytes have been shown to respond to proliferative signals such as sonic hedgehog (Shh), mediated through the cilium, we speculate that primary cilia are involved in astrogliosis. In this experiment, we also study somatostatin and one of its receptors, SstR3, localized to the neuronal primary cilium. We examined wild-type and SST3KO mice injured in the cortex and found a lower astrocyte ciliation near the site of brain lesion. Also, we found higher astrocyte density and ciliation incidence in the SST3KO injured mice than in the wild-type injured mice, suggesting a greater need for proliferation and a larger loss of neurons due to the injury in SST3KO mice. These results suggest a neuroprotective role of somatostatin-SstR3 interactions and a crucial function of primary cilia in astrocytes.

Metagenomic sequencing and analysis was used to characterize various human and animal microbiomes. A study of the human subgingival microbiome identified microbial patterns associated with periodontitis and diabetes mellitus. In another study, the bacterial communities of fleas and ticks were found to correlate with the species of arthropod, but not the species of the vertebrate host or the environmental conditions. A third study found distinct differences between the milk microbiomes from infected and healthy tissue of dairy cows in cases where the cause of the infection was unknown. There were procedures common to each of these studies, but each one also required consideration of the biological nature of the investigation. In addition to making discoveries of their own, it is important that bioinformaticians develop software that can be used by biologists with less computational experience to analyze their own data. Online tools are especially useful in the present day because researchers must be able to share their data with collaborators, the scientific community, and the public. One such tool, the multi-Genome Synteny Viewer (mGSV), has been developed to help researchers visualize and study conserved regions across two or more genomes or chromosomes.
64. University of North Texas at Dallas
Jennifer Lazarus
TANGLE SOLUTIONS FOR SITE-SPECIFIC HIN RECOMBINASE ON DNA
Faculty Advisor: Noureen Khan, PhD

The tangle model was developed by Ernst and Sumners, to analyze enzymatic reactions on DNA. Recombinases act on DNA by changing crossover sites by inverted repeats or direct repeats. Previously, the tangle model was created to describe the processive recombination of enzymes with DNA; which produced four-plats as products. Results from biological observations and topological analysis aid in adjusting the tangle model to handle the tangle equations of distributive recombination; which produces composite knots as some products. Hin recombinase acts on DNA by both processive and distributive recombination. We explore the adjustment of the tangle model to distributive recombination using Hin recombinase.

65. University of St. Thomas
Gina Duong
DETERMINING THE LETHAL CONCENTRATION (LC₅₀) OF TOLUENE ON DROSOPHILA MELANOGASTER AND THE RESULTING MORPHOLOGICAL EFFECTS OF TOLUENE EXPOSURE ON FLY OFFSPRING
Additional Contributors: Ryan Reynolds, Zoe Knippa, Peter Karagozian, Heather Skeen-Esterheld, Cecilia Dao, Debra Bramblett
Faculty Advisors: Rosmarie C. Rosell, PhD; Elmer Ledesma, PhD

Toluene is a volatile organic compound found in the atmosphere surrounding factories, refineries and combustion engines. According to the Environmental Protection Agency and Office of Environmental Health Hazard Assessment, toluene negatively affects organ systems and fetal development in humans. We developed a flow meter system with an impinger that delivers known concentrations of toluene gas to test populations of Drosophila melanogaster. We determined the lethal concentration that kills 50% of the trial group (LC₅₀) to be between 148 and 310 ppm. To determine the effects of toluene on offspring, surviving adult females were collected and mated with unexposed males, and larval offspring were collected at day 5. Future studies will use scanning electron microscopy to examine morphological defects in larvae of exposed females in comparison to offspring of unexposed females. Developmental changes will be catalogued and compared to known genetic or mutagenic effects on the fly’s embryonic and physiological development.

66. Wayland Baptist University
Hunter Green
A TAXONOMIC AND TAPHONOMIC DESCRIPTION OF AN UNGULATE FOSSIL FROM THE CHADRON FORMATION OF THE BUFFALO GAP NATIONAL GRASSLANDS, SOUTH DAKOTA
Faculty Advisor: David Schmidt, PhD

In a recent field expedition to the Indian Creek area within the Buffalo Gap National Grassland, South Dakota, a field team collected fossil specimens from the White River Group. This area is recognized as one of the most fossiliferous localities spanning late Cretaceous to early Miocene strata. A partial mandible of a large fossil ungulate was recovered from the upper Chadron Formation and is being investigated for its taxonomic relationship and condition of preservation. A preliminary description and morphometric analysis has been conducted on recovered skeletal elements. The left dentary is highly fractured and measures 30.7 cm in length and 9.2 cm diagonally from the angular process to the curved antero-dorsal margin of the ramus, approximately 3 cm behind molar 2. Additionally, the left dentary contains an incomplete tooth row that measures 13.7 cm in length consisting of molars and premolars. The right dentary is represented by several bone and tooth fragments with an incomplete dentition while possessing enough material for a partial description. Based on dental and skeletal morphological comparisons to other large ungulates from the Chadron formation, Brontotheriidae and Hyracodontidae families are currently considered for taxonomic assignment. Most of the observed fractures in the left dentary appear to have occurred after fossilization. However, bone weathering and fracturing prior to fossilization is indicated by fracture-filling clay and flakes of bone within the matrix.
Breast cancer is the second leading cause of cancer related deaths among females in the United States. For many years, traditional methods of treatment, such as surgery and various forms of therapy, have been viewed as the only form of cancer treatment available. However, in recent years, an increasing number of people have been turning to medicinal plants as a possible option for cancer treatment. In previous studies, we have demonstrated that ethanolic extracts of several medicinal plants were found to be cytotoxic on the 4T1 murine breast cancer cell line. This study sought to further investigate whether two of these plant extracts, Zingiber officinale (Ginger Root), and Sanguinaria canadensis (Blood Root) were effective in causing apoptosis and/or cell cycle arrest. Breast cancer cell cultures were assayed for these effects using caspase activity assays and western blots following treatment with blood root and ginger root extracts.

Cooperative intelligence is the use of many individually insignificant beings to solve complex problems through a series of simple operations. Over the summer of 2012 our research focused on the question “How can we get limited-resource, autonomous machines to exhibit these cooperative intelligence behaviors?” Our search led us to the learning algorithms Naive Bayes and neural networking. Machine learning algorithms are a means of teaching a computer how to make decisions based on input from an outside source. When paired with cooperative intelligence, we expected these machines to be able to act as a swarm to pursue a common goal. As our experiment, we tried to build a series of small robots to scan an area and create a virtual map of the space. Throughout the process, each robot would report to the others its finding. This not only sped up the scanning process, but also created a redundancy in case a robot malfunctioned. One summer is not enough time to fully cover this topic. There is still much room for discovery and development in this area. As a result, we plan to continue working on developing this idea in the future.