

The 11th Annual
Celebration of Excellence
by Students

ACES

Abstract Booklet

March 25, 2015

DR. RAYMOND L. JACKSON
ASSOCIATE DEAN OF GRADUATE STUDIES
CORDIALLY INVITES
ACES PRESENTERS, THEIR FRIENDS AND FACULTY MENTORS
TO
THE ANNUAL CELEBRATION OF EXCELLENCE BY STUDENTS (ACES)
IN THE E.E. HEREFORD UNIVERSITY CENTER
MARCH 25, 2015

WELCOME!

On behalf of President Vistap Karbhari, Provost Ronald Elsenbaumer, and Vice President for Research Carolyn Cason, I am delighted to welcome you to UT Arlington's eleventh Annual Celebration of Excellence by Students (ACES). UT Arlington's strength is built upon innovative thinking and creative work in the arts, humanities and social sciences, as well as in the sciences and technical and professional disciplines. ACES shines a spotlight on intellectual curiosity, rigorous inquiry and the pursuit of excellence students display in their original research and creative projects. During ACES, students present their original work in oral or poster presentations and discuss it with the audience. Alumni, faculty and other members of our community will judge these presentations and provide feedback that helps participants grow as scholars and communicators. You will find the hard work, skill and knowledge displayed by our students both exciting and compelling.

The keynote speaker for ACES 2015 is Mr. Jesus Martinez, an alumnus of UT Arlington who graduated with a bachelor's degree in Music in 2011. Mr. Martinez's record of innovation and creativity as an undergraduate at UT Arlington and later as a graduate student at Southern Methodist University is remarkable. He was the first music student to present a work at ACES and the first student of music to win the ACES President's Prize. While still an undergraduate, he received special recognition by the Texas State Legislature for his composition *Threnody for 9/11* and was commissioned to score two films that were presented and well received at several prestigious film festivals. As a graduate student at Southern Methodist University, he continued to compose, conduct and perform his own musical works, began composing works for dance. Mr. Martinez also took up film making while at SMU. His first film, *Take the Spotlight*, was completed in 2013 and has been shown at four film festivals where it has won awards for best film and best director. He has recently been accepted into the Doctor of Musical Arts program at UT Austin where he plans to begin his doctoral studies in the fall. Mr. Martinez clearly epitomizes the creative spirit, drive and outstanding accomplishment that ACES showcases.

I want to express gratitude to the faculty mentors, both on and off campus, who have enriched the educational experiences of our students and have helped prepare the ACES participants for today's symposium. The time and attention you devote to your students in order to involve them in your research programs and creative endeavors are shaping tomorrow's scholars and professionals.

Finally, I gratefully acknowledge the many efforts of the ACES Steering Committee for the work they have done over the past year to assure that ACES will be prepared to showcase the accomplishments of our students. I am also pleased to recognize the outstanding contribution of the Office of Graduate Studies staff, our faculty and alumni judges, the Graduate Student Senate and our student volunteers. All of them have worked hard and have spent long hours making sure the eleventh Annual Celebration of Excellence by Students is a memorable one.

For more information about this year's ACES event or to read about past ACES events and winners, please visit our website at www.uta.edu/aces.

Dr. Raymond Jackson
Associate Dean of Graduate Studies
ACES Steering Committee Chair

March 25, 2015

Acknowledgements

ACES is sponsored by the Office of the Provost, Office of Research, and the Office of Graduate Studies. Additional financial support was provided by the School of Architecture, College of Business, College of Education and Health Professions, College of Engineering, College of Liberal Arts, College of Science, College of Nursing, and the School of Urban and Public Affairs.

ACES 2015 Steering Committee

Pranesh Aswath, Professor & Associate Dean for Graduate Affairs (College of Engineering)

Amy Austin, Assistant Professor & Graduate Advisor, Modern Languages (College of Liberal Arts)

Lisa Berry, Coordinator, Office of Graduate Studies

Brenda Davis, Graduate Student Services, Office of Graduate Studies

Clifton Evans, Assistant Professor & Graduate Advisor, Music (College of Liberal Arts)

Jennifer Hawthorne, Senior Associate Director, Office of Development

Frank Foss, Associate Professor, Chemistry and Biochemistry (College of Science)

Raymond Jackson (ACES Steering Committee Chair) Associate Dean, Office of Graduate Studies

Jennifer Knight, Executive Assistant, Office of Graduate Studies

Joslyn Krismer, Director, Academic Analytics and Operations

Mark LaVelle, Assistant Vice President, Director, Office of Development

Wasiu Lawal, President, Graduate Student Senate

Daniel Levine, Professor, Psychology (College of Science)

Maria Martinez-Cosio, Associate Professor, School of Urban and Public Affairs, Assistant Vice Provost for Faculty Development (Division of Faculty Affairs)

Patrick Miller, Residence Director, Apartment and Resident Life (Division of Student Affairs)

Ashley Purgason, Assistant Vice President for Strategic Initiatives, Office of the President

Christopher Ray, Associate Professor, Kinesiology, College of Nursing and Health Innovations

Joan Reinhardt, Director, McNair Scholars Program, University College

Les Riding-In, Assistant Dean, College of Liberal Arts

ACES Additional Support

The ACES Steering Committee would like to recognize the following organizations and individuals for their generous support of the 2015 ACES Symposium.

Tina Gill, Aramark Catering

Stephen "Bear" Lunce II, Assistant Director, E.H. Hereford University Center

Kevin Schug, Associate Professor & Shimadzu Distinguished Professor of Analytical Chemistry, College of Science

UT Arlington Facilities Management and Central Receiving

UT Arlington Staff Volunteers

UT Arlington Student Volunteers

Divisions of Student Affairs

Faculty, alumni, and graduate student judges

Graduate Student Senate

Office of Development

President's Sustainability Committee

Women and Gender Studies

ACES Symposium Schedule

At-a –Glance

7:15am	Registration opens. Poster presenters in the Bluebonnet Ballroom. Oral presenters on the 2nd Floor of the University Center, Sierra Lounge
7:45am until 11:00am	Poster Installation in the Bluebonnet Ballroom. No posters will be installed after 11:00am
8:00am until 12:00pm	Oral Presentations - Undergraduate and Graduate Students, 2nd Floor, University Center meeting rooms (see schedule)
11:00am until 3:30pm	Poster Session open for viewing by general public
12:00pm until 1:30pm	Judging of Undergraduate Students' Posters. Student presenters must be present during the entire judging session.
1:00pm until 5:00pm	Oral Presentations - Undergraduate and Graduate Students - 2 nd Floor, University Center meeting rooms
2:00pm until 3:30pm	Judging of Graduate Students' Posters. Student presenters must be present during the entire judging session.
5:30pm	Judging rubrics available to all student presenters, 2nd Floor University Center
5:30pm	Reception, Rio Grande Ballroom, 2nd Floor University Center
6:00pm	Keynote Address and Presentation of Awards, Rio Grande Ballroom, 2nd Floor University Center

ACES Symposium Keynote Address

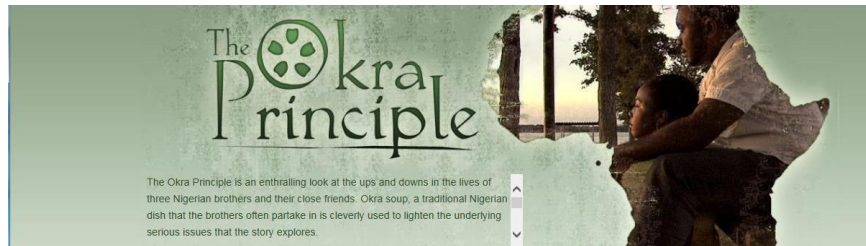
Jesús J. Martínez graduated in 2011 from the University of Texas at Arlington with a bachelor's degree in Music Education specializing in percussion. He went on to complete his Masters in Music Composition at Southern Methodist University (SMU) in May, 2014 where he studied primarily with composer Dr. Robert Frank. While at SMU, Jesús was the recipient of the School of Meadows Artist Scholarship, and was selected in 2013 as the SMU Student Composer-in-Residence for the Irving Symphony Orchestra which performed his composition "*Harmonic Tremor*" in 2014. He is a member of TMEA, PAS, and ASCAP and is currently published by C. Alan Publications. Jesús is also on the Vic Firth educational staff and is strongly supported by Marimba One. Jesús is currently the percussion specialist for Sam Houston High School in Arlington, TX, but he will be leaving the Metroplex this Fall to begin work on a Doctor of Musical Arts degree at UT Austin.



Jesús' relationship with ACES is a special one as he was the first student in UT Arlington history to give a presentation at ACES based on a musical composition. In 2009, he presented his work for Marimba Quartet titled "*Temperance*," winning an honorable mention award. He continued to participate in ACES in 2010, presenting an abstract of a work based on Jack the Ripper titled, "*The Ripper: From Hell*," a 32-member production and in 2011 winning the ACES President's Award for his original composition, "*Threnody for 9/11 for Mixed Chamber Ensemble*." He was the first music major at UT Arlington to win that award.

His abilities as a composer have been widely recognized. Jesús premiered "*Threnody for 9/11 for Mixed Chamber Ensemble*" and received much praise and attention from Texas-based media. In admiration, the Texas State Legislature granted a resolution in his name for the composition. Not surprisingly, In April 2011, Jesús was awarded "Student of the Year" in the winds and percussion area, and the "Undergraduate Student of the Year" at the UT Arlington Music Awards Ceremony.

ACES gave Jesús a place to share his creative work with UT Arlington students, faculty and alumni. However, he found numerous other ways to develop and bring new creative works to light. In 2009, while still an undergraduate, Jesús began receiving commissions to write musical scores for films. The first was written in 2009 for the film, *“The Okra Principle,”* which premiered in Dallas, TX, and was later shown at both the Los Angeles Film and the San Francisco Film Festivals. Jesús subsequently composed the score of the film, *“Mystery of Birds,”* which premiered 2011 in Houston, TX, and was screened in 2011 at the Los Angeles Black Film Festival.



At SMU, Jesús found new creative outlets adding interests in dance and film-making to his work in composition. In 2013 he collaborated on and premiered a work with the SMU Dance Studio called *“American Dances.”* His first film, *“Take the Spotlight”* (2013), has been shown at four film festivals in Texas, Arkansas and Georgia, and has won awards for best film and best director. He has recently completed his second film *“All the Wrong Friends”* in collaboration with Film Professor Mark Kerins.

2015 ACES Morning Oral Presentations

	CONCHO	RED RIVER	PALO PINTO	PEDARNALES	NECHES	SAN SABA	GUADALUPE - Undergraduate	SAN JACINTO - Undergraduate
8:00 AM	Ezgihan Baydar (MAE)	Shabnam Aboughadareh (CSE)	Mohammad Abdallah (EE)	Daren Card (BIOL)	Cheng Sheng (PHYS)	Vicki Cana (LING)	Courtney Broderick (HIST)	Adeel Sajid (SCIE)
8:20 AM	Manasa Sahini (MAE)	Md Mehrab Shahriar (CSE)	Md Bellah (EE)	Lauren Fuess (BIOL)	Sat Byul Seo (MATH)	Kent Rasmussen (LING)	Heriberto Rodriguez (CRIM)	James Hobbs (EES)
8:40 AM	Sachin Jose (MAE)	Zhong Zhang (CSE)	Waqas Ali (EE)	Giulia Pasquesi (BIOL)	Cong Zhao (PHYS)	Ji Yea Kim (LING)	Anthony Musselman (HIST)	Alissa Hendricks (BE)
9:00 AM	Sheikh Fahad Ferdous (MAE)	Mahdi Nasrullah Al-Ameen (CSE)	Muhammad Usman Raza (EE)	Mohammadmehdi Eslamieh (BIOL)	Joaquin Noyola (PHYS)	Darcey Browning (LING)	Doreen Hernandez (HIST)	Samir Nathu (EE)
9:20 AM	Sajith Anantharaman (MAE)	Abolfazl Asudeh (CSE)	Shweta Hardas (EE)	Diwash Jangam (BIOL)	Kinjal Gandha (PHYS)	Laura Copeland (LING)	Isaac Frias (POL)	Raja Khanzada (BE)
9:40 AM	Sushma Pothana (MAE)	Kanis Fatema (CSE)	Mohammad Hasan (EE)	Drew Schield (BIOL)		Daniel Amy (LING)	Peter Hedleston (ENGL)	Hussain Mucklai (CSE)
10:00 AM	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK
10:20 AM	Prashanth Ravi (MAE)	Mohsen Imani (CSE)	Manouchehr Teimouri (MSE)	Jonathan Thacker (CHEM)	Pam Richardson-Greenfield (BUSA)	Stephanie Sulik (HIST)	Jayr Logan (LING)	Brittney Cox (BIOL)
10:40 AM	Sarah Hussein (MAE)	Muhymin Islam (EE)	Vibhu Sharma (MSE)	JP Nimmo II (CHEM)	Adam Harper (BUSA)	Jacob Jones (HIST)	Jessica Nordon (LING)	John Crouch (PHYS)
11:00 AM	Salman Khan (MAE)	Manoj Niraula (EE)	Sina Moeendarbari (MSE)	Atreyi Dasmahapatra (CHEM)	Dennis Marquardt (BUSA)	Michael Deliz (HIST)	Diana Moreno (MODL)	Joshua Medford (PHYS)
11:20 AM	Asif Ahmed (CE)	Nuzhat Mansur (EE)	Alireza Noroziroshan (IE)	Hongzhu Liao (CHEM)	Jinsuk Yang (BUSA)	Adam Guerrero (HIST)	Felipe Javier Garcia (MODL)	Melissa Daniels (PSYC)
11:40 AM	Sandip Tamrakar (CE)	Md Ishtiaque Hossain (CE)	S M Taiabul Haque (CSE)	Cuong Le (CHEM)			Karina Martinez (MODL)	

2015 ACES Afternoon Oral Presentations

	CONCHO	RED RIVER	PALO PINTO	PEDARNALES	NECHES	SAN SABA	GUADALUPE - Undergraduate	SAN JACINTO – Undergraduate
1:00 PM	Christopher Conly (CSE)	Malini Kotak (BIOL)	Jose De La Garza (PHYS)	Dananjaya Kalu Appulage (CHEM)	Jazmin China Barreto (MODL)	Shafaq Amdani Moten (PHYS)	Jeremy Schack (COMM)	Yashaswini Nagarajan (CHEM)
1:20 PM	Nikhil Pandey (BE)	Contessa Ricci (BIOL)	Cedric Mayfield (PHYS)	Emmanuel Varona-Torres (CHEM)	Alicia Garza (MODL)	Trang Thai (BUSA)	Lawanda McKelvy (COMM)	Nicky Hales (CHEM)
1:40 PM	Sai Santosh Sasank Peri (BE)	Richard Adams (BIOL)	Sunil Sahi (PHYS)	Arunoday Bhan (CHEM)	Robert Philips (MODL)	Jack Philips (SUPA)	Nicholas R. Wilson (ENGL)	Yu-Shen (Sam) Sung (CHEM)
2:00 PM	Lyndon Lee (BE)	Alex Hall (BIOL)	Bright Izudike (PHYS)	Taylor Hughlett (EES)	Karily Garcia Cruz (MODL)	Sima Namin (SUPA)	Hannah Bradley (ENGL)	Dirsha Luevano (BUSA)
2:20 PM	Anna Breytus (CE)	Kyle O'Connell (BIOL)	Kamyar Ahmadi Majlan (PHYS)	Monica Barbery (EES)	Morgan Chivers (ART)	Jennifer Sloan (SUPA)	Breann Brown (MUSI)	
2:40 PM	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK	BREAK
3:00 PM	Akshay Malhotra (EE)	Veronica Waybright (CHEM)	Audra Andrew (BIOL)	Jarryd Willis (PSYC)	Lukas Szrot (SOCI)	Leona Peterson (SOCW)	Dianna Nguyen (BIOL)	
3:20 PM	Hadis Anahideh (IE)	Ruchika Bhawal (CHEM)	Collin Funkhouser (BIOL)	Audrey Snowden (PSYC)	Lucianne Nelson (POLS)	Karen Abonza (SOCW)	Karen Truong (BIOL)	
3:40 PM	Zi Wei (MSE)	Maheshika Wanigasekara (CHEM)	Dylan Parks (BIOL)	Sali Asih (PSYC)	Jason Hogue (ENGL)	Anna Prieto (COMM)	Cristina Gonzalez (BIOL)	
4:00 PM	Naima Rahman (CE)	Evelyn Wang (CHEM)	Rakesh Chaudhary (PHYS)	Eric Russell (PSYC)	Jennifer Omaña (ENGL)	LaDonna Aiken (COMM)	Justin McCullars (BIOL)	
4:20 PM	Mohammad Faysal (CE)	Ling Bai (CHEM)	Pranab Sarker (PHYS)	Lauren Coursey (PSYC)	Todd Womble (ENGL)	John Watson (COMM)	Madiha Hanf (BIOL)	
4:40 PM	Reza Broun (CE)	Shawn Ridlen (CHEM)		Meredith Hartzell (PSYC)		Karen McAlister (COMM)		

Concho, 8:00 AM

Micro-Vortex Generators (MVGs)

Presenter: Ezgihan Baydar, Mechanical and Aerospace Engineering Graduate

Mentor: Frank Lu

Abstract:

An optimization study will be conducted on micro-vortex generators (MVGs) at Mach numbers and other flow conditions expected within streamline-traced inlets of interest to the NASA High Speed Project of the Fundamental Aeronautics Program. The approach is computational. The goals are (i) to examine the feasibility of MVGs to mitigate shock-induced boundary-layer separation that is expected to be present in such inlets and (ii) to benchmark the distortion through monitoring the inlet exit total pressure for a range of incoming conditions. Possible topics for future work include exploring advanced optimization techniques and analysis of unsteady flow.

Concho, 8:20 AM

Rack level evaluation of Hybrid cooled servers in Data Centers

Presenter: Manasa Sahini, Mechanical and Aerospace Engineering Graduate

Mentor: Dereje Agonafer

Group Members: John Fernandes

Abstract:

In the wake of ever-growing demand for power and energy across US and world- wide, development of energy efficient solutions has become very important. Considering data center applications, cooling power consumption constitutes significant part of the overall energy usage of the system. In the process of optimizing the energy consumed per performance unit, liquid cooling has become one of the key solutions. Liquid cooling addresses the critical issues related to typical air cooling in servers because of its better heat transfer characteristics. / In this study, 2OU (OpenU) web servers are tested at rack level across the ASHRAE liquid cooling envelope and the effect of higher inlet temperatures in terms of IT and cooling powers, and internal component temperatures are reported. The cooling set up includes a mini rack capable of housing up to eleven liquid cooled web servers, two heat exchangers that exhaust the heat dissipated from the servers to the environment.

This work is supported by Facebook Inc. and Cool IT systems Inc.

Concho, 8:40 AM

Additive Manufacturing and Stress Analysis Of Topology Optimized Biocompatible Pla Based Polymer Structures

Presenter: Sachin Jose, Mechanical and Aerospace Engineering Graduate

Mentor: Adnan Ashfaq

Abstract:

The main objective of our research is to successfully manufacture a bio-inspired topology structure using 3D printing. These structures can be used for bone implant. But the most important thing while manufacturing these structures is to make sure that they have the same density, high fidelity and biocompatibility. Here, with the help of 3D printing we make PLA based bio structures. The performance of the structures are first assessed by performing static tensile/compression tests and also by using finite element based stress analysis. Parametric studies have been performed to quantitatively determine the structure property relations of the fabricated structure and to improve their mechanical properties so that they can be used for bio implant application such as bone implant.

Concho, 9:00 AM

Nanoceramics for Reliable Space Shuttle Thermal Protection System

Presenter: Sheikh Fahad Ferdous, Mechanical and Aerospace Engineering Graduate

Mentor: Ashfaq Adnan

Abstract:

The thermal protection system (TPS) is a very important element of space shuttles because it not only protects the Space Shuttle Orbiter from extreme 1,650 °C (3,000 °F) heat during atmospheric reentry but it also protects the orbiter from the severe change in temperature (~1800°C) during orbit. To sustain such excessive temperature, high melting point ceramic based materials are the only option as other types of materials such as metals would melt. Currently reinforced carbon-carbon (RCC) material system is used as TPS which is made of laminated graphite rayon-phenolic epoxy. The RCCs can sustain extreme heat but are very prone to premature degradation due to oxidation. For this, the outer layers of the RCC were coated with silicon carbide. While Silicon Carbide (SiC) is a strong and hard engineering material, its fragility is one of the limitations that could cause unexpected disaster in space shuttles (for example, Space Shuttle Columbia disaster). We have proposed three methods for significantly eliminating the fragility of SiC material by blending it with Diamond at the nanoscale. They are: (1) Nanodiamond reinforced SiC nanoco

Concho, 9:20 AM

3D Printing of Optimal Structures for Ultra-light aircraft wings

Presenter: Sajith Anantharaman, Mechanical and Aerospace Engineering Graduate

Mentor: Bo P Wang

Group Members: Ashfaq Adnan

Abstract:

The advancement of technology has been pushing the scientists and researchers for continuous improvement. On point of view of designers, it means to reduce the weight of any part that one plans to build, but still serves its purpose. This in a way is to optimize the part to make it lighter in weight and stronger in strength. In this research we design a program in computational software called MATLAB, which will come up with the design. This design is then realized using new manufacturing techniques called 3D printing. The cross section of the light weight aircraft can be designed using cellular structures. A method to optimize the structure for better stiffness is designed. The loads are applied as uniformly distributed loads across the cross section. The application of this technique to mimic aircraft wings have been studied previously but this research unique presents a potential micro structure design. The results are then 3D printed, layer by layer. This research work has the potential to be applied to automotive applications as well, which would make cars lighter and safer.

Concho, 9:40 AM

Fabrication of ultra light Bioinspired nanocomposites using novel 3D+ manufacturing

Presenter: Sushma Pothana, Mechanical and Aerospace Engineering Graduate

Mentor: Adnan Ashfaq

Abstract:

The inner part of bones is spongy cell-type three dimensional structure called cancellous bone which is the major contributor in keeping the bone weight very low. Yet, bone can sustain body weight and reasonable impact loads implying bone is a naturally optimized light-weight but strong structure. This study demonstrates a novel approach to manufacture bone-like nanocomposite structure for weight saving structural applications. For this, Silicon Carbide (SiC) nano particles are dispersed in SC-15 epoxy resin (a two part liquid resin that solidifies when mixed together at room temperature). Using our novel 3D+ manufacturing technique we developed lighter but stronger nanocomposite structure. The compression test results showed an improvement in the strength and stiffness of epoxy polymer when a small percentage of SiC nano particles are dispersed in pure epoxy matrix.

Concho, 10:20 AM

Development of a modular 3D bioprinter for fabricating tailorable biomedical implants using a combination of Inkjet, Viscous Extrusion and Fused Filament Fabrication print technologies

Presenter: Prashanth Ravi, Mechanical and Aerospace Engineering Graduate

Mentor: Panos S. Shiakolas

Abstract:

A novel modular 3D bioprinter was conceived and developed to allow easy access to customize the hardware and enable rapid fabrication of tailored biomedical implants. Current hardware capability of the bioprinter includes the Inkjet (IJ), Viscous Extrusion (VE) and Fused Filament Fabrication (FFF) print-technologies (modules). Tailored test constructs were fabricated and characterized to demonstrate the custom 3D bioprinter's capability to fabricate using different combinations of available modules, and establish its applicability towards biofabrication research. Commercial 3D bioprinters developed for research purposes are expensive and difficult to customize owing to the limited user accessibility to both hardware and software. It is envisioned that the successful development of the modular printer will enable researchers and clinicians alike to rapidly fabricate tailored constructs using multiple modules on a single fabrication platform without loss in positional calibration.

Concho, 10:40 AM

Analysis of the Dynamics of a Detonation-Turbulence Interaction

Presenter: Sarah Hussein, Mechanical and Aerospace Engineering Graduate

Mentor: Frank Lu

Abstract:

From stirred morning coffee to propagating forest fires, turbulence has many shapes. It is chaotic flow which is insufficiently understood. My research investigates a turbulence model in which a turbulent flow propagates through a test section and interacts with a shock/detonation wave. A shock is a field of sudden flow property changes; a detonation is a shock added to an ignition source. This model is computationally generated. The outputs are analyzed for velocity, energy, and stress properties. Visualizations reveal the behavior of the undisturbed flow and its interaction with the disturbances. The results show a mutual interaction between the turbulence and the disturbances. This indicates that decoupling is required to distinguish the effects of the interaction components. This research increases our understanding of turbulence, and detonation-turbulence interaction that models industrial explosions. Applications range from disaster mitigation to innovative detonation engines.

This work is sponsored by the National Science Foundation Graduate Research Fellowship Program (NSF GRFP) Fellowship.

Concho, 11:00 AM

Finite Element Structural Analysis of the Human Cornea to Understand and Alleviate Myopia

Presenter: Salman Khan, Mechanical and Aerospace Engineering Graduate

Mentor: Panos S Shiakolas

Group Members: Md Abu Hasan

Abstract:

Myopia is a visual impairment condition that is affecting more than 32 million Americans according to the American Academy of Ophthalmology. Myopia occurs when light rays entering the cornea are focused in front of the retina. Corneal shape plays a pivotal role in refraction of light, therefore the presented research aims to study the shape of the cornea with the help of a finite element (FE) model. Once, the model results were validated with experimental data, Intrastromal corneal rings (ICRs) were introduced in the FE model and their effect on the corneal shape was analyzed and discussed. ICRs are transparent implants inserted into the cornea to provide structural support to the eye in an attempt to alleviate myopia. The results of the ICR implanted FE model provide confidence in the ability of the ICR implants to reduce myopia. The knowledge gained from this analysis could eventually be utilized to formulate the design of customized implants for personalized vision care.

Concho, 11:20 AM

Behavior of Expansive Subgrade on a State Highway in North Texas

Presenter: Asif Ahmed, Civil Engineering Graduate

Mentor: MD. Sahadat Hossain

Group Members: Mohammad Sadik Khan

Abstract:

Pavement distress caused by volumetric change in subgrade required a significant maintenance budget to the transportation agencies. Expansive soil in pavement subgrade experiences volume change in due to the seasonal moisture and temperature variation which also affect the matric suction of the subgrade soil. For the clear understanding of the subgrade behaviour is necessary which connects the gap between moisture, temperature and suction variation with inducted pressure on the pavement and pavement deformation. The current study present an extensive instrumentation program of a subgrade soil and performance of an asphalt pavement on expansive clay with seasonal variation of moisture temperature and suction. A section over 2- lane State Highway (SH) 342 in Lancaster, Texas, was instrumented with moisture and temperature sensor, water potential probe, total pressure sensor and piezometer to monitor the seasonal variation on continuous basis using automated data collection system. On the other hand, horizontal inclinometer was installed across the pavement and routine topographic survey was conducted to monitor the pavement deformation. Based on the preliminary monitoring results of almost one year, a 5-7% variation of moisture was observed in the subgrade soil whereas, 2 inch of movement was noticed over the pavement.

This work was supported by the Texas Department of Transportation (TxDOT)

Concho, 11:40 AM

Cost Benefit of Using Recycle Plastic Pins over Other Retaining Structure to Stabilize the Highway Embankments

Presenter: Sandip Tamrakar, Civil Engineering Graduate

Mentor: Sahadat Hossain

Group Members: Md Faysal

Abstract:

The United States earth retaining structure market exceeds 170 million square feet annually and there are over 50 different retaining systems to select from which are unique in design and construction. Depending on the type of retaining structure, unit costs vary from less than \$20 to in excess of \$250 per square foot (ASCE 2011 Seminar). Selecting the technically appropriate and cost-effective system is often critical to project cost and schedule. Among many retaining structure currently available, using Recycle Plastic Pins (RPP) for repair of shallow slope failure is one of the most environmentally friendly and economic option available for Department of Transportation to fix the surficial slope failures. RPPs are manufactured using post-consumer waste plastic, which has been used as an acceptable material for construction of docks, piers and bulkheads. RPP's have been successfully used in Missouri, Iowa and Texas to repair the surficial slope failure of highway embankment. There are extensive research been done for various types of retaining wall design and construction. However, cost comparisons of the various types of retaining wall versus RPP have not been performed. Hence the need of this study is essential for various types of department of transportation. In this study we will compare construction cost between RPP and other retaining structures such as conventional reinforced concrete retaining wall, MSE wall, drilled shaft wall, and soil nail wall.

Concho, 1:00 PM

An American Sign Language Video Dictionary System

Presenter: Christopher Conly, Computer Science Engineering Graduate

Mentor: Vassilis Athitsos

Abstract:

As users of written languages, we have the distinct advantage of the ability to quickly and easily search for the meaning of any unknown words we encounter; the inherent sortable nature of alphabets affords us this capability. Those who are users of sign languages, however, do not have such a luxury, as it is difficult to assign an order to a system of movements and hand shapes. While sign-to-written language dictionaries do exist, they are cumbersome and time consuming to use. We present herein an American Sign Language (ASL) video dictionary system that allows users to perform an unknown sign in front of a Microsoft Kinect 2 sensor and quickly retrieve a list of signs in our dictionary, with video examples, ranked by similarity. The user can then view the videos to determine the meaning of the sign. In our preliminary studies, participants unfamiliar with ASL each used the dictionary system to search for the meanings of a set of signs randomly selected from the 1,113 sign vocabulary. The results show that for roughly 57% of the tested signs, the correct meaning is found among the top 20 video matches.

Concho, 1:20 PM

Biodegradable thermo-responsive, multimodal imaging enabled nanoparticles towards cancer therapy.

Presenter: Nikhil Pandey, Bioengineering Graduate

Mentor: Kytai Nguyen

Group Members: , Aniket S. Wadajkar, Jyothi U. Menon, Varsha Sundaresan, Elizabeth Hernandez, Jer-Tsong Hsieh, Liping Tang, Jiang Yang

Abstract:

Cancer will be accountable for 1,665,540 new cases and 585,720 deaths in the United States in 2015. Thus, there is an immense need to develop efficient theranostic drug delivery systems to treat this deadly disease. In this regard, nanoparticles incorporating stimuli responsive polymers and imaging agents are attracting significant attention due to their potential to be tracked following in vivo administration and to serve as stimuli-responsive drug releasing vehicles. Therefore, the objective of this research project is to develop biodegradable thermo-responsive fluorescent polymer-coated magnetic nanoparticles (TFP-MNPs) to be used as theranostic drug delivery systems for cancer therapy. / The TFP-MNPs were formulated and characterized for their temperature dependent fluorescence, magnetic properties, drug releasing kinetics, degradation profiles, size and surface charge. In vitro cytotoxicity and cellular uptake were assessed using normal human skin cells and prostate epithelial cells and on prostate cancer cell lines. In vitro and in vivo detection of TFP-MNPs by magnetic resonance imaging (MRI) and fluorescence imaging were per

Concho, 1:40 PM

Drug Delivery with Hollow Sodium Alginate Microfibers Generated with a Microfluidic Device

Presenter: Sai Santosh Sasank Peri, Bioengineering Graduate

Mentor: Samir M. Iqbal

Group Members: Madiha Hanif, Uyen H.T. Pham

Abstract:

We report a novel drug delivery system, where we use hollow fibers made of sodium alginate, a biodegradable and biocompatible polymer. We pre-mixed bovine serum albumin (BSA), as a model drug in the alginate solution. The walls of the hollow fiber contained the drug. When the fibers were placed at the site of delivery, the drug diffused into the surroundings. These fibers were made using a simple microfluidic device which had three inlets and one outlet. It was made of polydimethylsiloxane (PDMS). The inlets were arranged such that the two side channels were used to flow alginate/BSA and the middle channel was used to flow calcium chloride (CaCl₂). These three merged into one outlet. When alginate came in contact with CaCl₂ at the alginate-calcium interface, both solutions crosslinked to form gelled wall of a hollow fiber. The fibers were passed out from the outlet. The microfluidic device provided a rapid and efficient platform to create microfibers in a benchtop setting.

Concho, 2:00 PM

A Novel Gene Promotes an Invasive Phenotype in Breast Cancer

Presenter: Lyndon Lee, Bioengineering Graduate

Mentor: Jung-Chih Chiao

Group Members: Steven Bean, Sylvia Loh, Mouhamed Nashawi, Smitha Rao, Victor Lin

Abstract:

Breast cancer is the second-leading cause of cancer death in women. Metastatic cancer is responsible for 90% of cancer-related deaths and is marked by the migration of cancer cells to distant sites. Migration and invasion enhancer 1 (MIEN1) is a novel gene that is abundantly expressed in many cancers. The MIEN1 protein contains an immunoreceptor tyrosine-based activation motif (ITAM). We used a microfluidic platform to assess the migration of human breast carcinoma cells MDA-MB 231 that overexpress either the wild-type or an ITAM mutant of MIEN1. Our results indicate that the ITAM domain is essential to gene function and that overexpression of wild type MIEN1 enhanced the speed and persistence of cellular migration. This work demonstrates the possible role that MIEN1 plays in cancer progression and elucidates the importance of a previously unexplored protein domain. These results present a new potential target for therapies in the ongoing battle to treat invasive and metastatic cancer.

This work was supported by National Institutes of Health (NIH) National Cancer Institute grant R15CA133623, North Texas Cancer Research Foundation and TxMRC.

Concho, 2:20 PM

Fate of chlorate and perchlorate in hypochlorite storage tanks and its influence on drinking water quality

Presenter: Anna Breytus, Civil Engineering Graduate

Mentor: Andrew Kruzic

Group Members: Srinivas Prabakar

Abstract:

Many water treatment facilities switch from chlorine gas to liquid hypochlorite (bleach) as a disinfectant due to concerns over terrorism. However, chlorate and perchlorate can be introduced into the drinking water as a result of hypochlorite use. Both of these contaminants are considered for federal regulation. The health reference levels (HRL) in drinking water are 210ppb for chlorate and 15ppb for perchlorate. / The focus of the current study is to investigate the formation of chlorate and perchlorate in hypochlorite solutions in two water treatment plants and compare the results to a theoretical model. In addition, the goal is to test the impacts of dilution of high strength hypochlorite on the rates of perchlorate and chlorate formation. / It was found that during the summer, both facilities had increased chlorate levels to the point where chlorate levels in the drinking water would exceed the HRL. On the other hand, perchlorate levels were below HRL. It was also found that dilution of high strength hypochlorite will significantly decrease the formation rate of chlorate and perchlorate, thus improving our drinking water quality.

This work is funded by a grant from Tarrant Regional Water District.

Concho, 3:00 PM

Consensus Based Decentralized Scheduling Algorithm for Electric Vehicle Charging

Presenter: Akshay Malhotra, Electrical Engineering Graduate

Mentor: Ioannis Schizas

Group Members: Giulio Binetti, Ali Davoudi

Abstract:

The Usage of Electric Vehicles (EV) has been extensively promoted in the last few years as an alternative to the fossil fuel based vehicles. These vehicles bring along with them the promise of reduction in pollution, global warming and our dependence on the fossil fuels. But the migration to EVs comes at the cost of an increased power demand. Studies indicate that even in the case of just 20-30% of the current vehicles being replaced by EVs, uncoordinated charging would result in a steep increment in the peak power requirements accommodating which would require setting up of new power plants. A strategy to resolve this problem would be to coordinate and schedule the charging of the EVs in a smart way such that the charging load is disseminated to periods of the day when the overall power requirement is low. Our work focuses on a coordinated electric vehicle scheduling strategy to distribute the charging load to off peak periods without the need of a central coordination unit. The exclusion of a central unit ensures that there is no single point of failure, and the system consisting of many independent units collaborating with each other can be easily scaled up to accommodate a constantly increasing number of EVs.

Our scheduling strategy is efficient from the communication as-well as computation viewpoints. In comparison to one of the recent schemes, we have a 30% lesser computational load and nearly 90% lesser communication load. Furthermore, our proposed scheme always adheres to the power limitations imposed due to the power generation and distribution infrastructure, which is an extremely important and necessary condition for the EV charging strategies. Finally, the proposed structure is robust to failures and errors.

Concho, 3:20 PM

Cost Assessment of Future Transportation Fuels: Will Ethanol Fuel Dominate?

Presenter: Hadis Anahideh, Industrial, Manufacturing, and Systems Engineering Graduate

Mentor: Jay Rosenberger

Abstract:

Transportation, as one the most energy-consuming sectors with the major energy source of gasoline, has been addressed in low-carbon energy consumption planning and policy designs. Gasoline is the dominant contributor to the emission of greenhouse gases. Thereby, alternative fuels, such as CNG, Propane, and E-85, have been introduced to satisfy a considerable transportation energy demand. However, with regard to the beginning of the era of alternative fuels, cost analysis is required to assure the preference of options from the consumers' point of view. In this research, different scenarios, based on governmental incentive laws and carbon tax, are implemented, in order to explore the cost effective states of E-85 (85% ethanol blend with 15% gasoline) versus conventional fuels (gasoline and diesel), ethanol blend fuel types (E-5,E-10), and other alternative fuels (Propane and CNG). The results imply that E-85 will become economical during the time horizon based on incentive and carbon tax policies.

Concho, 3:40 PM

An all vanadium redox TiO₂ solar energy storage cell

Presenter: Zi Wei, Materials Science Engineering Graduate

Mentor: Fuqiang Liu

Group Members: Dong Liu, Yi Shen

Abstract:

Environment pollution has been a severe issue for mankind and there are problems along with it such as global warming and green house effect. Also energy crisis gathers a lot concern as our demands for energy increases while the energy resources deplete. These situations bring us to seek for clean and renewable energy resources, and a popular candidate is solar energy. The current obstacle to utilize sun light is how to store it since conventional solar cell design can only provide instant power. In this study, we demonstrated a new solar cell system—All Vanadium Redox Electrolyte-TiO₂ photocatalyst Solar Cell. All vanadium redox flow battery has been proved to be an efficient energy storage system and it has been on the top list of energy storage project of U.S. We combined the idea of all vanadium redox flow battery and concept of photo electrochemical effect. All vanadium redox served as the energy storage media while TiO₂ transferred solar energy into electrochemical energy: when sun light strikes the TiO₂ semiconductor, it can be transferred into electrochemical energy by TiO₂, and the carriers for the electrochemical energy are the vanadium redox pairs. The photo generated holes will oxidize VO²⁺ into VO²⁺, and electrons will reduce V³⁺ to V²⁺ at the same time. The oxidized form of VO²⁺ and reduced form of V²⁺ possess chemical energy and can release electricity in a reversible way. This system resolved the instant output problem of conventional solar cell. We obtained a preliminary 95% efficiency photo charging which indicated great potential of this design.

This work was supported in part by the National Science Foundation.

Concho, 4:00 PM

Effect of Municipal Solid Waste Management on Health Hazard: A Review

Presenter: Naima Rahman, Civil Engineering Graduate

Mentor: Md Sahadat Hossain

Abstract:

The issue of efficient solid waste management (SWM) is a challenge throughout the world, especially in developing countries. Solid waste needs to be properly managed in a way so that it ensures proper storage, collection and disposal, which minimizes risk to the environment and human health. At the same time solid waste management creates livelihoods for the urban poor in terms of employment and business. This paper focus into one aspect of SWM: the collection service. In developed countries, the collection service ensures the proper disposal of waste into the landfill after collecting from door to door as it involves advance technology, better workmanship and environmental protection, which reduces the risk of direct contact with waste of the worker. On the other hand, the informal waste picker plays a vital role in solid waste collection in developing countries due to lack of availability of advance technology and economic support. Although, the collection system creates job opportunities in the developing countries, it may create health hazard of the worker from both uncollected waste and unsafe work environment. The occupation risk of the informal waste picker should be reduced which will increase the efficiency of the worker resulting more collection coverage in developing countries and significant environmental benefits for the world.

Concho, 4:20 PM

Strength Characterization of Untreated and Cement Treated Recycled Flex-Base Materials

Presenter: Mohammad Faysal, Civil Engineering Graduate

Mentor: Md Sahadat Hossain

Group Members: Masrur Mahedi

Abstract:

The use of recycled Reclaimed Asphalt Pavement (RAP) material as an alternative to conventional pavement materials has been considered to be the most viable solution. According to the National Asphalt Pavement Association (NAPA), the amount of RAP generated in the United States of America is 76.1 million tons. In pavement base and sub-base construction, the use of cement stabilized RAP and RAP-virgin aggregate mixes reduces the amount of recycled materials. Whereas, lack of laboratory and field evaluation is limiting the use of RAP and other recycled material mixes which may demonstrate more efficiency in terms of cost, depletion of resource, construction waste disposal and environmental conservation. On the basis of laboratory experimental works, this study describes the strength response of different cement treated RAP- recycled Grade 2 aggregate mixes. For the evaluation purpose, Unconfined Compressive Strength Tests were performed on six different combinations of RAP-Grade 2 aggregate mixes while, samples for each combination were prepared with 4 different cement dosages and cured for 7 days in moist room. Results have indicated that RAP mixed with other recycled materials can also perform as a structurally sound component of the pavement if it is stabilized with cement. Based on the test results of Grade 2, strength and elasticity modulus prediction models for different percentage of RAP were proposed in this study. Two different design charts for compressive strength and modulus of elasticity were also prepared to facilitate the design of pavement construction in selecting the appropriate aggregate blend and cement content.

This work was supported in part by the Texas Department of Transportation (TxDOT).

Concho, 4:40 PM

Environmental performance of landfill biogas management for conventional vs. bioreactor landfills

Presenter: Reza Broun, Civil Engineering Graduate

Mentor: Melanie Sattler

Abstract:

After municipal solid waste (MSW) is buried in a landfill, biogas, which includes methane and carbon dioxide, is generated through the degradation of the organic fractions of the waste in the absence of oxygen. The fraction of landfill biogas that is collected can be flared or utilized for production of renewable energy. As methane constitutes about 50% of landfill biogas, reduction of methane emissions from MSW landfills results in climate change mitigation, since methane is a potent greenhouse gas (GHG). As such, it is imperative for a landfill model to properly reflect the manner in which biogas is managed. The goal of this research was to compare landfill biogas management strategies (generation of renewable energy, flaring, and venting to the atmosphere) in a conventional landfill with a bioreactor landfill, designed to provide optimal conditions for fast microbial decomposition of waste. With a focus on GHG emissions and energy generation, the results estimated that the total amount of GHG balance was 117 and 298 kg carbon dioxide equivalents per ton of landfilled MSW for the conventional and the bioreactor landfill, respectively.

Guadalupe, 8:00 AM

The Texas Home Front During the Mexican American War, 1846-1848

Presenter: Courtney Broderick, History Undergraduate

Mentor: Gerald Saxon

Abstract:

The study of the Texas home front during the Mexican American War, 1846-1848, is important not only because of Texas's proximity to Mexico, but also because the annexation of Texas to the United States was one of the most significant causes of the Mexican American War. This research focuses on how the Mexican American War contributed to fervent patriotism, with specific emphasis on the effect of military presence across the Texas home front. County organization and town growth continued during the years of war, and in fact, the Mexican American War actually contributed to the growth of certain Texas towns and counties. Additionally, the war affected Texas settlers economically, most of the time, in a positive way. This research also argues that the Texas government continued to function normally, not only in county and town growth, but also in the matter of Indian affairs during wartime. The experiences/conditions of German immigrants, Tejanos, Native Americans, and Anglos are all examined.

Guadalupe, 8:20 AM

Police Perception and Body Worn Cameras

Presenter: Heriberto Rodriguez, Criminal Justice Undergraduate

Mentor: Chris Copeland

Abstract:

Historically, the word of a peace officer, in regards to actions during investigation, and in witness testimony, has been considered unimpeachable. Through the evolution of the legal system, it has become imparitve for substantial proof of the conduct of a peace officer beyond verbal testimony. In recent events, including officer-involved shootings, it has become more essential for an officer verify, support and justify any action taken. The introduction of dash mounted and body worn cameras, have been useful in this endeavor. This paper seeks to present the peace officers of the use of body worn cameras and the media obtained from their operation. Additionally, this paper will attempt to discuss the acceptance of the new point of view technologies by peace officers.

Guadalupe, 8:40 AM

The Insanity Defense and Mental Illness

Presenter: Anthony Musselman, History Undergraduate

Mentor: Sarah Rose

Abstract:

Over the past century in the United States, the idea of “madness” in the eyes of the law, as well as the court of public opinion, has evolved over the course of several Supreme Court cases and congressional acts. By examining both the legal history of the insanity defense and the general history of mental health in the U.S., this paper seeks to discuss the nature of madness in America, particularly as a social construct and stigma. Emphasis is placed on the trial of John Hinckley Jr for the attempted assassination of President Ronald Reagan, as well as the political aftermath of the decision in 1982. By examining the consequences of the trial, supported by the legal history prior to the decision as well as the history of mental illness in the U.S., I was able to gain better insight into how madness fits into the American psyche. However, the question of how the American criminal justice system should treat those considered insane persists, and the answers developed over the course of the legal history of our country remain incomplete and yet continue to have far reaching consequences for those considered “mad”.

Guadalupe, 9:00 AM

Mexican-American Child Migrant Workers in the Lower Rio Grande Valley from the 1960s to the 1980s

Presenter: Doreen Hernandez, History Undergraduate

Mentor: Cristina Salinas

Abstract:

Migrant and seasonal agricultural workers have always been vital to farmers to help cultivate, pick, and pack the produce that grows in the nation's fields. Migrant workers toiled under the scorching sun for long hours with very little pay picking the fruits and vegetables that fed millions of American families. Farm workers were forced to work in harsh conditions, travel thousands of miles looking for work, and were denied social welfare. When one thinks of a migrant worker, the image of a man or woman comes to mind, but we often forget that child migrant workers were alongside their parents on the farms. Thousands of children were forced to work in the fields, whether school was in session or not, and even if they were under the legal minimum working age. Despite the 1938 Federal Labor Standards Act, which regulated minimum age of employment and hours for children, they continued to work in the fields throughout the latter half of the twentieth century. This paper describes the circumstances that Mexican-American child migrant workers faced while working in the Rio Grande Valley and across the country from the 1960s to 1980s.

Guadalupe, 9:20 AM

The Impact of the Illicit Drug Industry on Mexico's Democratization

Presenter: Isaac Frias, Political Science Undergraduate

Mentor: Dale Story

Abstract:

In Mexico, the drug problem and the war on drugs are contemporary issues made infamous by an increase in cartel presence, drug-related violence, and nondemocratic practices. However, it is important to note that the Mexican government has become more democratic in recent decades within the legislative, judicial, and executive branches through political competition and reform. This democratic progression occurred as Mexico simultaneously experienced an increase in levels of violence, in particular with recent elevated homicide statistics. The role of the Mexican cartels as major actors within the international drug industry facilitates illegal activity targeting structural democratic components such as government effectiveness, autonomy and transparency, all pillars for democratic sustainability. Thus, the promotion of conflict, corruption, and illegal practices by members of the illicit drug industry continues to create a negative impact on Mexico's transition toward a sustainable democracy.

Guadalupe, 9:40 AM

Pragmatism in Mark Twain's "The Adventures of Huckleberry Finn"

Presenter: Peter Hedleston, English Undergraduate

Mentor: Kathryn Warren

Abstract:

Critics have interpreted Mark Twain's Huck Finn for over a century, but few have noted Huck's pragmatism, and none looks at the novel as a whole through the lens of neopragmatism. As a philosophy, pragmatism considers the use-value of ideas, beliefs, and notions. In a similar vein, this thesis reconsiders the purpose of characters and their interactions. This thesis takes its foundation from the lectures of William James and bricks and mortar from Richard Rorty's Contingency, Irony, and Solidarity. Understanding pragmatism, and Rorty's neopragmatism, a rhetorical construct develops early in the thesis that allows a reconsideration of the role of the narrator, Huck. This reconsideration is accomplished by removing Huck and Tom from the extremes in which critics have tended to place them: the poles of realism versus romance. Reading the book through the lens of neopragmatism complicates this binary, a staple of criticism on the novel for decades, while also examining the influences key characters have on Huck.

Guadalupe, 10:20 AM

Catalan vs Spain: The Possible Separation

Presenter: Jayr Logan, Linguistics Undergraduate

Mentor: Ignacio Ruiz Perez

Abstract:

For centuries, the Catalan region in Spain has been culturally, politically and economically independent from the whole country of Spain which explains the difference in culture, the economic stability of the region in relation to some poorer Spanish regions and why Catalan has always been synonymous with Spain. Over taxation of Catalan, uneven distribution of government funding and the power play between the government and the Catalonians has been greatly publicized and these reasons are just the tip of the iceberg of this long tension within the country. Different scenarios and factors will be discussed to better understand what will happen to the Catalan region in the event of a successful separation. Will Catalan remain a member of the European Union? How will restructuring of Catalan interact with international laws? Will the United Nation accept Catalan as a country or will they stay unrecognized mainly due to the lack of international ties? The presentation will be an overview of the hurdles, problems and steps Catalan will have to face following a successful secession.

Guadalupe, 10:40 AM

Human Trafficking

Presenter: Jessica Nordon, Linguistics Undergraduate

Mentor: Ignacio Ruiz-Pérez

Abstract:

Human Trafficking / Human Trafficking is the transportation or transfer of people by using threats, force, or abduction for the purpose of exploitation. The issue of selling people for profit has been and still is an ongoing and gruesome problem all over the world. Unfortunately, people are unaware of the appalling mistreatment that victims of this crime go through. Millions of people are trafficked to different locations either globally or locally. People that don't experience the horrors of this crime have no idea of the billions of dollars in profit that traffickers make from selling human beings. The traffickers profit either financially or they get the utmost satisfaction of stealing another person's humanity, security, and body. The victims that are trafficked are either forced into the sex or forced labor industry. The question that I want to answer in the paper is: What type of prevention plan should the United Nations and local government systems enforce in order to prevent this crime from happening? Just spreading awareness on the subject of Human Trafficking is not enough. Certain steps need to be taken in order to make

Guadalupe, 11:00 AM

Las Soldaderas: From Mexican Feminism to Chicano/a Identity

Presenter: Diana Moreno, Modern Languages Undergraduate

Mentor: Alicia Rueda-Acedo

Abstract:

In the history of Mexican society, there have always been strong women who have fought against countless injustices that plagued them as a subjugated minority. However, for centuries, they have been victims of oppression and prejudice within their own culture. In the early twentieth century, at the dawn of the Mexican Revolution, these women took a stand against these grievances that they were suffering and started to take matters, both domestic and political, into their own hands. In this paper, I will analyze the role of Las Soldaderas, female soldiers who fought alongside the men during the Revolution, and how their emergence became a turning point in the role of the Mexican woman. I will study how the Soldaderas are represented in Mexican literature and culture after the Revolution, and how Mexican artists and writers reinscribe these women in Mexican history. Also, I will explore how Chicano/a artists recuperate the Soldaderas as a form of resistance and as a symbol of Chicano/a identity. / / Keywords: Mexico, Mexican Revolution, Soldaderas, women's studies, feminism, Chicano/a identity /

Guadalupe, 11:20 AM

Towards a Useful Language Learning Method: A Comparative Analysis of Spanish and Portuguese Linguistic Systems

Presenter: Felipe Javier Garcia, Modern Languages Undergraduate

Mentor: Ignacio Ruiz-Perez

Abstract:

/ In our ever-globalizing world, there are many advantages to learning a new language. Portuguese and Spanish are among the most widely spoken languages in the world. Moreover, to a native monolingual Spanish or Portuguese speaker, the two languages can sound drastically different, when in fact they share approximately 89% of the same linguistic characteristics. Unfortunately, there are currently no teaching methods in place that highlight the linguistic similarities between both languages. A study of this nature would aid either speaker in rapidly learning their non-native language by using their native tongue as an asset and learning tool. By equipping these individuals with the ability to identify specific syntactical and grammatical considerations, or as I call them, language associations (cognates, verb conjugations, etc.), my proposal is to create a comparative analysis of both the Spanish and Portuguese linguistic systems. As part of my presentation, I will provide the foundation for an instructional manual towards teaching these grammar principles. /

Guadalupe, 11:40 AM

Hispanic Population Growth and the Importance of Professional Translation and Interpreting

Presenter: Karina Martinez, Modern Languages Undergraduate

Mentor: Alicia Rita Rueda-Acedo

Abstract:

The world is becoming smaller and smaller as the population is growing in the U.S. and around the world. According to U.S. Census Bureau population estimates as of July 1, 2013, there are approximately 54 million Hispanics living in the United States, representing approximately 17% of the U.S. total population. The impact of non-profit organizations such as Proyecto Inmigrante that serves thousands of families with citizenship eligibility, Dream Act, and immigration counseling services in general, is crucial to the Hispanic Community. At the same time, as the Hispanic population grows, there is dramatic demand of professional translators and interpreters with a command of both Spanish and English. Translators projected growth is 48% in the year 2020, according to the U.S. Bureau of Labor Statistics. With this been said, being a professional translator / interpreter will bring a bright future for students in this field. That is the reason why more students who are heritage and non-heritage speakers of Spanish are interested in Translation and Interpreting programs currently offered at UTA. This Spring 15, I am collaborating in a Service Learning project helping Proyecto Inmigrante with the translation of birth, death, and marriage certificates, municipal letters, criminal records, and other immigration related documents. In my paper I will explore the connections between the Hispanic population growth, the demand for professional translators and interpreters, and the importance of students training and Service Learning in this field.

Guadalupe, 1:00 PM

Equal access in education and sports for the disabled pushed by Jim Hayes

Presenter: Jeremy Schack, Communication Undergraduate

Mentor: Sarah Rose

Abstract:

Jim Hayes helped create a barrier-free campus at UT Arlington. From the early 1970s until his death in 2008, Hayes worked with administrators to make the campus accessible, establish wheelchair sports, and start the first full scholarship program for wheelchair athletes—efforts that gave people with disabilities who would have not had the opportunity to attend university. The UT Arlington campus became an epicenter for unique architectural and social changes in the 1970s. / From the first grant in 1974 to the first full scholarship in 1989 for adaptive sports athletes UT-Arlington continues to set the standard for individuals with disabilities. So many landmarks on the UT-Arlington campus are the result of the tireless effort put forth by Jim Hayes with the knowledge that people who have disabilities are capable of achieving their goals. Hayes passed away in 2008, but the changes he helped create still have a changing effect on people`s lives today. My research draws on the records of the Movin` Mavs, records kept by his sister Laura Kelsey, and the Shorthorn. /

Guadalupe, 1:20 PM

The Impact of internet Based communication on the Acculturation of Muslim Women in the United States

Presenter: Lawanda Mckelvy, Communication Undergraduate

Mentor: Karishma Chatterjee

Abstract:

This study examined the impact of internet-based communication on acculturation of Muslim women in the United States. Grounded theory methodology (Glaser, 1992) and Sam and Berry's (2006) model of acculturation were used as theoretical and analytical frameworks. Semi-structured interviews were conducted with ten Muslim women to learn about their media use and experiences in forming and maintaining relationships in the United States. The data indicated that Muslim women use a variety of internet-based media such as Facebook, Skype, WhatsApp, Instagram, and Viber. These communication options allowed them to build and create relationships in their new communities as well as allowed them to stay connected with family and friends in their native countries. The data suggest that the participants attained the level of acculturation defined as integration... In addition, being active in their communities through religious activities, seemed to also contribute to their acculturation.

Guadalupe, 1:40 PM

A Narrator's Guide to Sexual Identity and Discovery

Presenter: Nicholas R. Wilson, English Undergraduate

Mentor: Barbara Chiarello

Abstract:

Literary works from and about marginalized groups of people can serve as a gateway to understanding for mainstream audiences. In my paper, I analyze how the narrative choices of an author can establish an understanding of under-recognized gender identities as presented in Virginia Woolf's "Orlando: A Biography". Woolf's use of genre blurs the line of reality, taking the remarkable and placing it firmly in the realm of the believable. The titular character flows unconsciously between genders, introduced to society without this fluidity of gender serving as an obstacle. This interaction is performed successfully due to Woolf's unique use of the biographical narrator's voice; a voice typically found in a non-fiction setting but used in a fictional work as a reader's guide to the unfamiliar. As a result, the presentation of ambiguous gender identities which would normally be reacted to with incredulity by mainstream readers is approached with a distinct narrative strategy which allows these same readers to accept unfamiliar identities as within the realm of possibility.

Guadalupe, 2:00 PM

Consequences of Female Heroism

Presenter: Hannah Bradley, English Undergraduate

Mentor: Desiree Henderson

Abstract:

Female heroes in literature are not often visible because they are in the shadow of the supposed hero, the protagonist. It can also be difficult to identify these side-stepped heroines because of the unusually heavy price that they pay for their heroic acts. Why do female heroes suffer instead of being rewarded for their acts of heroism? To answer this question, I analyze two works of American literature, *Hope Leslie* (1827) by Catharine Maria Sedgewick and *March* (2005) by Geraldine Brooks. I argue that the heroines within these novels are not rewarded for brave acts in which they save their male romantic partners; instead the women are rejected for emasculating the men and become physically and symbolically mutilated, losing their desirability. Women in literature are not often allowed to overstep their roles as submissive damsels in distress; only when a romantic partner's life is endangered are they permitted, but the consequences are often severe. I conclude that even though these novels were written 180 years apart, the gender roles still hold true regarding female heroism; it is often minimized and carries a dreadful price.

Guadalupe, 2:20 PM

Text Painting in Music: An Analysis of Franz Schubert's Compositional Techniques in German Songs

Presenter: Breann Brown, Music Undergraduate

Mentor: George Chave

Abstract:

This analysis will evaluate and illustrate the effectiveness of the musical setting of the poetic text “Der Jungling un Bache” composed by Franz Schubert and based on a poem by Friedrech Schiller. Franz Schubert was most notable for his lieds, which are German songs based on poems that are generally associated with romantic themes. “Der Jungling un Bache” displays a wide arrangement of compositional techniques such as changes in musical texture, recurring motifs to symbolize changes within the text and the music, and clever use of musical dissonance and consonance to reflect the character’s feelings within the poem. Upon analyzing “Der Jungling un Bache”, I found that Schubert utilizes subtle changes to smoothly transition between different musical and textual ideas to create an organic evolution throughout the piece. By examining the techniques that Schubert used in his vocal music, contemporary listeners may gain better understanding and insight into both his vocal and instrumental compositions.

Guadalupe, 3:00 PM

Determining optimal vaccination strategies for the BCG vaccine in combating tuberculosis with a mathematical model of resistance and altered diagnosis.

Presenter: Dianna Nguyen, Biology Undergraduate

Mentor: Christopher Kribs

Group Members: Michael DeBellevue and Isheanesu Nyangani

Abstract:

The commonly used Bacille Calmette-Guerin (BCG) Tuberculosis vaccine confers only partial immunity, and renders ineffective the tuberculin skin test, a common tool in areas without adequate laboratory facilities. Undetected infections in individuals whose vaccines failed could then cause more cases than the vaccine prevents. A modified version of the standard infection model consisting of a system of five nonlinear differential equations was created to represent the two effects of the BCG vaccine in order to understand its true role in tuberculosis dynamics. Analysis yielded a simple criterion under which vaccination increases the reproductive number of the disease. When applied to a particular setting, the model can predict whether a strategy of tuberculin skin test use is superior to vaccination. Our results indicate that the vaccine's quantitative effectiveness is lower than predicted by the conferred immunity rating. However, in numerical simulations of realistic scenarios, done using MATLAB, vaccine use is generally superior to reliance on the skin test.

This research is part of an undergraduate research training program at UT Arlington (UTTER, <http://www.uta.edu/math/utter/>), supported by an NSF UBM-Institutional grant DUE#0827136.

Guadalupe, 3:20 PM

**Investigating Urban and Rural Ecotypes of the Native Prairie Grass Little Bluestem
(*Schizachyrium scoparium*)**

Presenter: Karen Truong, Biology Undergraduate

Mentor: Laura Gough

Group Members: Michelle Green

Abstract:

With urbanization rapidly occurring across the nation, human activities are changing the environment in and around urban areas. Higher temperatures and elevated carbon dioxide and nitrogen oxides in the atmosphere can potentially impact plant growth and reproduction. To investigate whether native plants are adapting to the altered urban environment, a common garden experiment was conducted by growing individuals of *Schizachyrium scoparium* (little bluestem; a native prairie grass) from two urban and two rural sites in North Texas at one location to keep the environment the same for all individuals. Measurements of plant growth and sexual reproduction were taken by monitoring the number and length of vegetative tillers (leaves) and reproductive tillers (flowering stalks) during one growing season before obtaining biomass at the conclusion of the experiment. Timing of flowering was also monitored. Differences in biomass among the plants from the urban sites and differences in numbers of vegetative and reproductive tillers among the plants from the rural sites suggest that some characteristics of the plants may have genetically adapted

Guadalupe, 3:40 PM

Stories to our Children: Promoting Writing and Reading in the Hispanic Community Through Service Learning

Presenter: Cristina Gonzalez, Biology Undergraduate

Mentor: Ignacio Ruiz-Perez

Abstract:

Literacy is a very valuable skill, it is the first stepping stone on becoming a good student and employee. According to the New York Times, children who are read and talked to more tend to have a larger vocabulary early in life, and often succeed more in school (Motoko 1). Endorsing reading also stimulates cognitive development and improves memory. Research illustrates how children in professional families are exposed to an average of 2153 words an hour, whereas children in working families only to 1251 (Duursma et al. 1). The majority of Hispanic families in the U.S. are working class, and the difference in exposure to words can create a disadvantage in school. Through the project Stories to our Children of the Arlington Public Library, other UTA students and I will be revising and helping to edit stories created by Hispanic parents for their children. In this presentation I aim to demonstrate: 1) how the promotion of reading and writing can increase the academic competency of Hispanic children; and 2) how the participation of UTA students through service learning is an invaluable tool to accomplish this goal in our community.

Guadalupe, 4:00 PM

Using *Schizachyrium scoparium* to Determine the effects of Urbanization: A Season in Review

Presenter: Justin McCullars, Biology Undergraduate

Mentor: Laura Gough

Group Members: James Hobbs, Michelle Green

Abstract:

With an increase in the migration of humans to urban centers, it is more important to study the effects of urbanization on the native ecosystem. In an effort to study the effects of the urban environment on native prairie plants in the DFW region, an experiment was conducted using the native grass, little bluestem (*Schizachyrium scoparium*) to determine regional effects on growth and reproductive success. Pots of Little Bluestem were grown at six sites along an urban to rural gradient in North Texas from May-July 2014. Plant growth and reproductive output, nitrogen deposition, and other site characteristics were measured during this period. We hypothesized that the elevated nitrogen availability and higher temperatures commonly found in urban areas would result in larger plant size and greater reproduction in Little Bluestem. Preliminary results reveal differences in both plant size and reproductive output among the sites, but the differences do not directly correlate to level of urbanness. Further investigation is necessary to determine the causes of the differences among sites.

Guadalupe, 4:20 PM

Controlling Dimensions of Porous Microfibers

Presenter: Madiha Hanf, Biology Undergraduate

Mentor: Samir M. Iqbal

Group Members: Sai Santosh S. Peri, Uyen H. T. Pham, Amit Asthana

Abstract:

Tissue and organ regeneration can transform how organ transplants are done. There are many obstacles in making organs in vitro. Hollow microfibers have been used to flow blood through and exchange gas flow through their surfaces. A microfluidic device was used to fabricate alginate hollow microfibers in an easy and controlled method. The microfluidic device had two side inlets that were used to pump the sheath, which was mixture of alginate and cell in medium. The middle inlet had the core flow, which was calcium chloride (CaCl_2). As these solutions flowed through, these came in contact at the intersection. On contact, ionic crosslinking occurred resulting into gelation to form the wall of the hollow circular fiber. The rate of flow at the core and sheath was used to control the inner diameter of the microfiber and the thickness of the fiber wall. The thicker wall can be used to seed cells that can be grown to create tissue matrices of desired design. It is an effective and simple way to mass produce microfibers for engineered growth of cell structures.

Neches, 8:00 AM

Correlation between Poynting flux and soft electron precipitation around the cusp region

Presenter: Cheng Sheng, Physics Graduate

Mentor: Yue Deng

Group Members: Yi-Jiun Su, Delores Knipp, Cheryl Y. Huang, Daniel Ober, and Rob Redmon

Abstract:

The Earth's cusp is a special region with open magnetic field lines, through which the mass, momentum and energy from the solar wind have direct access to the ionosphere (100-600 km in altitude). Observations have revealed large Poynting flux (electromagnetic energy) and particle precipitation around the cusp region. Commonly the enhancement of Poynting flux and the enhancement of particle precipitation are expected to happen at the same time and at the same location. Through analyzing the Defense Meteorological Satellite Program (DMSP) observation data, the correlation between them is found to be more complex. In about 2/3 of the cusp crossings we have identified, the time and locations of Poynting flux and particle precipitation enhancements are rather consistent, while they are quite different in the other cases. The displacement can be as large as 1 degree in latitude. One possible mechanism for the displacement is that the electromagnetic energy may have been converted to the kinetic energy of particles during propagation. Some other possible mechanisms have been investigated as well. This result will improve our understanding of magnetosphere-ionosphere coupling, especially in the cusp region.

This research at the University of Texas at Arlington was supported by NSF and NASA.

Neches, 8:20 AM

3-dimensional modeling of neural synapses-quantifying the constraints for independent evoked and spontaneous synaptic currents in NMDA receptors

Presenter: Sat byul Seo, Mathematics Graduate

Mentor: Su, Jianzhong

Abstract:

Synapses play a significant role in neuron communication in the brain. The synapse act through a chemical process called synapse fusion between pre-synaptic and post-synaptic terminals. Two different events of evoked and spontaneous synaptic vesicle release are main features of all synaptic actions. These release events typically activate receptors within a single postsynaptic site and give rise to miniature postsynaptic currents through activations of NMDA and AMPA receptors, and therefore, they have been extremely instrumental in neurotransmissions. In this pater, we will use a mathematical model to simulate spontaneous and evoked neurotransmission resulted from glutamate release within a synapse. Among issues that modeling can provide quantitative assessment, the issue of independent signaling of spontaneous and evoked neurotransmission has been prominent. In earlier studies, it has been shown spontaneous and evoke currents are resulted from releases in different pools of glutamate vesicles. This is the most plausible cause of the independent spontaneous and evoked currents. Our main goal is to determine the geometric of biophysical conditions for synapses to obtain independent signaling. We examine how different factors, including the release rate of the neurotransmitter, size and geometry of synaptic cleft, and different coefficient will affect post-synaptic.

Neches, 8:40 AM

A moving blocker method for cone-beam computed tomography scatter correction

Presenter: Cong Zhao, Physics Graduate

Mentor: Mingwu Jin

Group Members: Jing Wang, Luo Ouyang

Abstract:

Cone-beam computed tomography (CBCT) is widely used in radiation treatment planning and dose calculation. Scatter contamination is a source that significantly decreasing the image quality in CBCT. In this work, we developed a moving blocker method to accurately estimate scatter for better reconstruction of the complete volume within the field of view (FOV) from a single CBCT scan. A physical blocker consisting of six equally spaced lead strips is set between the x-ray source and the phantom. The blocker moves back and forth during the process of acquiring projection data. The signals detected in the blocked regions are deemed as scatter and used to estimate scatter signals in the unblocked regions. An iterative reconstruction method is then used to reconstruct CBCT images from unblocked projection data with the scatter signals removed. An experimental study is performed to evaluate the performance of the proposed scatter correction method. Our results show that the scatter-induced shading artifacts are substantially reduced in CBCT and the CT number errors in the selected regions of interest are greatly reduced.

Neches, 9:00 AM

Detection of Exomoons through Observation of Radio Emissions

Presenter: Joaquin Noyola, Physics Graduate

Mentor: Zdzislaw Musielak

Group Members: Suman Satyal, Marialis Rosario

Abstract:

In the Jupiter–Io system, the moon’s motion produces currents along the field lines that connect it to Jupiter’s polar regions. The currents generate and modulate radio emissions along their paths via the electron–cyclotron maser instability. Based on this process, we suggest that such modulation of planetary radio emissions may reveal the presence of exomoons around giant planets in exoplanetary systems. A model explaining the modulation mechanism in the Jupiter–Io system is extrapolated and used to define criteria for exomoon detectability. A cautiously optimistic scenario of the possible detection of such exomoons around Epsilon Eridani b and Gliese 876 b is provided.

This work was partially supported by the GAANN Fellowship, and NSF grant No. AGS 1246074

Neches, 9:20 AM

Synthesis and magnetic properties of Co/CoO core-shell nanowires

Presenter: Kinjal Gandha, Physics Graduate

Mentor: J Ping. Liu

Abstract:

Cobalt nanowires with high coercivity have been synthesized via a solvothermal chemical process. A record high room-temperature coercivity value of 12.5 kOe has been measured in aligned Co nanowires with a diameter of about 15 nm and a mean length of 200 nm. When the surface of the Co nanowires were oxidized, exchange-bias (EB) was detected at low temperatures owing to the exchange coupling between the ferromagnetic (FM) Co core and the antiferromagnetic (AFM) CoO shell of the nanowires. EB fields of ~ 2.0 kOe were measured at 10 K, along the parallel direction of nanowires. Manipulation and control of the EB in the nanowires may lead to a better understanding of the EB effect and the applications of the nanowires in for future permanent magnets and recording media.

This work has been supported by the DoD/ARO under grant W911NF-11-1-0507, and the / Center for Nanostructured Materials and Characterization Center for Materials and / Biology at the University of Texas at Arlington.

Neches, 10:20 AM

Now Available at your Local Store! Reverse Contagion Effect on Locale of Consumer Purchase

Presenter: Pam Richardson-Greenfield, Business Graduate

Mentor: Lawrence Chonko

Abstract:

Contagion theory explores the qualities of a source object that are transferred to a target object. Most contagion studies, to date, have focused on a target object receiving the positive (negative) properties from a positive (negative) source object. Previous research has not verified whether a “reverse” contagion effect may occur; where a target object receives the negative (positive) properties from a positive (negative) source object. This study examines the “reverse” contagion effect of the positive-to-negative transfer of properties of a home-based brand (i.e. product/brand that is sold from the home, but not a direct sales product/brand). “Reverse” contagion effect was evaluated under four conditions: control, local venue, traditional retailer (e.g. local drug or grocery store) and specialty store. Brand attributes of brand attitude, brand trust, willingness to pay, likelihood of purchase and social responsibility were also measured. This research demonstrates the strong influence of a retailer’s reputation on the equity of a home-based brand. The results indicated strong brand attributes for a home-based brand that is sold via a local venue versus when sold in a traditional retailer or specialty store setting.

Neches, 10:40 AM

Solving the puzzle of lost value in diversified firms: A study of overconfidence and regional effects.

Presenter: Adam Harper, Business Graduate

Mentor: Salil Sarkar

Abstract:

Research in corporate finance has found that multi-segmented firms experience diminished market value relative to single-segmented firms--a phenomenon dubbed the diversification discount. This study has found evidence suggesting that the presence of a confident or aggressive CEO may reduce this discount leading to increased firm value. This effect is more prevalent for small stocks and during times of high market volatility. Furthermore, analysis of variance techniques clearly show that the diversification discount is driven by regional effects. Conglomerate firms headquartered in the Northeast and West regions experience no loss in value, whereas firms headquartered in the South in Midwest experience a significant loss in value. The data is drawn from COMPUSTAT's Segment database as well as CRSP and Execucomp all derived from the WRDS database collection.

Neches, 11:00 AM

Moral Person and Moral Manager: A Meta-Analytic Mediation Model of Ethical Leadership

Presenter: Dennis Marquardt, Business Graduate

Mentor: Marcus Butts

Group Members: Lee Brown, Hoda Vaziri

Abstract:

Ethical leadership is broadly conceptualized as influencing important work outcomes jointly through social learning and social exchange processes. However, little attention has been given to the influence of the two espoused conceptual pillars of the construct (i.e., moral person and moral manager) and their separate alignments with either social learning and social exchange processes and outcomes. Using a meta-analysis of all relevant empirical ethical leadership studies ($k=81$, $N=19,101$), we test a nuanced theoretical model linking the moral person pillar primarily with social exchange processes and outcomes and the moral manager pillar with social learning processes and outcomes. LMX is hypothesized as a social exchange mediator and ethical climate as a social learning mediator. From our meta-analytic mediation model, support is found for a primary social exchange explanation for follower OCBs and a social learning explanation for follower unethical behavior.

Neches, 11:20 AM

Impact of foreclosure and spillover effect on residential sales

Presenter: Jinsuk Yang, Business Graduate

Mentor: Ramya R Aroul

Abstract:

This research investigates foreclosure spillover effects on residential sales from Tarrant County, TX for 2003-2014. After accounting for spatial, temporal, and locational effects over the recent housing market cycle using hedonic models to control for property characteristics, neighborhood and time of sale fixed effects, I find significant negative impacts between foreclosures and housing values. These discounts should remain consistent even after controlling for endogeneity of time-on-the-market and self-selection bias. This implies that sales of the previous foreclosure property generate premium if the property is held for between 90 and 360 days. I also expect consistent findings to previous studies that have shown negative spillover effects in the neighborhood due to foreclosures. In addition, I discover the optimal holding period for investors using flipping houses associated with the foreclosure condition. The finding indicates that the period of 90 days for improving and reselling the property gives the highest profit. Furthermore, the lower price segment of housing value provides investors with the higher premium.

Neches, 1:00 PM

Breaking the Silence: Unveiling Latin America's Government Corruption against Human Trafficking

Presenter: Jazmin China Barreto, Modern Languages Graduate

Mentor: Amy Austin

Abstract:

Contemporary art and literature play a vital role in revealing the political corruption behind human trafficking in Latin America. Despite the government's efforts to hide the effects of human trafficking, literary and artistic pieces are making the public more aware of this clandestine subject. This study will analyze how the art and poetry of Puerto Rican artist J'van China critiques the government's role in human trafficking. In his "NO 7R4735," currently displayed at the University of Puerto Rico at Ponce, China combines contrasting lightness and darkness, along with images of a woman trapped in a plastic bag with chains, drugs, and female adornments to reveal the monstrous effects of the commodification of women through trafficking. The painting is accompanied by a poem, in which the artist aligns himself with Argentinian activist Eva Perón and Mexican journalist Lydia Cacho. Serving as a protest against a worldwide issue that remains occult in many Latin American countries, an analysis of this work sheds light on the truth of trafficking revealed by artists who use freedom of expression without fear of government oppression.

Neches, 1:20 PM

The Body, Power, and Identity Crisis of the Spaniards in the New World / at the Mercy of the Indigenous Peoples of the Americas

Presenter: Alicia Garza, Modern Languages Graduate

Mentor: Amy Austin

Abstract:

Alicia Garza / / The Body, Power, and Identity Crisis of the Spaniards in the New World / at the Mercy of the Indigenous Peoples of the Americas / / The chronicle *Nafragios* (1542), by Álvaro Nuñez Cabeza de Vaca, has been read as the first Chicano writing in Latin American literature for its recounting of the identity crisis experienced by the author in his encounters with the indigenous people of what would later become the Southeast of the United States and the North of Mexico. In this narrative, Cabeza de Vaca's description of the physical effects of starvation, torture, and extreme exhaustion become a key factor in defining the new cultural identity formed through contact with the native people. Through a close analysis of the representation of the body in the text, this presentation will examine how the widely-held vision of how the Spaniards first arrived to the New World with unabashed power and authority limits the representation of hybrid identities in this chronicle. I argue that *Nafragios* blurs the lines of power between the Spanish colonizers and the indigenous peoples of the Americas by placing the body and its needs at the center of intercultural exchange. The research concludes that representing identity in Cabeza de Vaca's text is not merely a mix between Spanish and indigenous cultures, but must also take into consideration the relationship between power and the body. The Spanish colonizer's efforts and failures to define their position of power in the New World illuminates our modern-day idea of Latin American identity formation. /

Neches, 1:40 PM

Bodies and Souls: The Sociopolitical Mechanism of Religious Conversion and Its Representation in the Medieval Spanish Manuscript the Cantigas de Santa Maria

Presenter: Robert Philips, Modern Languages Graduate

Mentor: Amy Austin

Abstract:

Over the past decade the medieval Spanish manuscript *las Cantigas de Santa María*, compiled under Alfonso X, has become well known outside medievalist circles. Its combination of image, word and music serves as a powerful propaganda tool created during a time of political transition. Castilla-Leon now controlled most of the peninsula and faced the challenges of re-population and integration of the remaining Jewish and Muslim population. The options were limited: allow religious freedom, expel all non-Christians, or promote conversion. In this presentation, I will focus on the social mechanism of conversion and how its representation in the work is an adept piece of propaganda that encourages conversion while at the same time mocking the religion of the converts, Islam. I will center my investigation on Canticle 46, of note for its subject, a “Moorish” man who converts, as well as his representation during the conversion scene in which he appears completely nude. Finally, I will show how a work written 700 years ago remains relevant as it addresses the same issues of integration, assimilation and tolerance being faced in Spain today.

Neches, 2:00 PM

Re-imagining the Latin American Matriarchy through Memory of "My Melancholy Whores" (2004)

Presenter: Karily Garcia Cruz, Modern Languages Graduate

Mentor: Amy Austin

Abstract:

The late Colombian author Gabriel García Márquez (1927-2014), winner of the Nobel Prize in Literature, was instrumental in defining Latin American identity. García Márquez played a vital role in the Latin American Boom, a phenomenon in the 1960's and 70's when Latin American literature was translated and exported to the United States. In contrast to his earlier works that centered on the Latin American patriarchy, his more recent, lesser-known novel, "Memoria de mis putas tristes" (Memory of My Melancholy Whores, 2004), shows a significant shift in his narrative, telling the story of an old man who seeks solace in a prostitute. While this novel has been characterized as a representation of Latin American patriarchal society, through a close reading of the novel within its historical context, this presentation will show the underlying force of the matriarchy that forms the foundation of a male-dominated society. Analyzing this work by García Márquez reveals a renewed 21st-century vision of Latin American patriarchal culture and its role in identity formation in Latin America.

Neches, 2:20 PM

3D Printing Processes Applied to the Creation of Glass Art

Presenter: Morgan Chivers, Art and Art History Graduate

Mentor: Nancy Palmeri

Group Members: Brad Bell (Associate Professor in Architecture, crucial assistance with one of the techniques) / Austin Ede (Architecture Digital Fabrication Lab Technician, also critical assistance with the same technique)

Abstract:

3D-printing processes are radically changing how we design & create, with ramifications throughout society. Recognizing this methodology as a profound shift in potentiality for artists, I have made use of resources at UTA to learn how to engage with this emerging technology. The control of Computer-Aided Design allows for geometric precision, inter-fitting components, even the possibilities of creating previously impossible forms. // Thinking about the technological promise causes me to contemplate the enabling achievements of previous generations. Perhaps the most fundamentally advantageous material of human invention is clear glass; advancements in glass shaping technologies (windows, mirrors, laboratory instruments, lenses, fiber optics, etc) have shattered cultural paradigms and opened pathways to previously unfathomable vistas of human potential. // With this context in mind, I am experimenting with the application of several CAD processes to glass forming techniques. Successful results (so far) have been achieved with printed-ABS models for both glass castings & blow-molds, and printed-plaster molds for both casting & slumping.

Neches, 3:00 PM

Sites of Skepticism: Evolution, the Big Bang, Scientific Curiosity and Religious Orthodoxy in the United States

Presenter: Lukas Szrot, Sociology Graduate

Mentor: Robert Kunovich

Abstract:

An enduring controversy over evolution, particularly human evolution, and the Big Bang theory exists in the public sphere. Popular science writers often assume that this public controversy persists in the United States due to the theological implications of these scientific findings. However, evidence from the 2012 General Social Survey (GSS) calls this assumption into question. First, analyses of measures of religious orthodoxy, including feelings about the Bible, fundamentalism, prayer and worship service attendance suggest that theological perceptions play a significant but modest role in the rejection of human evolution and the Big Bang theory. Second, measures of education and scientific curiosity prove somewhat more salient in explaining views on evolution and the Big Bang. Findings support a broader theory emerging in the science and religion literature that the gap between religious orthodoxy and modern science in America is not as broad as has often been assumed.

Neches, 3:20 PM

American Compliance with the Nafta Environmental Commission

Presenter: Lucianne Nelson, Political Science Graduate

Mentor: A. Burcu Bayram

Abstract:

Why do powerful states comply with international environmental treaties when it would be more advantageous to violate them? This project argues that legitimacy plays an important role in shaping states' compliance with their international legal responsibilities regarding the protection of the environment. I analyze American compliance with the North American Agreement on Environmental Cooperation (NAAEC), the side agreement to the North American Free Trade Agreement (NAFTA) to evaluate the legitimacy argument. Employing a qualitative methodology, I examine the reports generated by NAFTA's Commission for Environmental Cooperation (CEC) and other related interest groups, as well as investigate the complaints filed with the CEC. I find that legitimacy played a crucial role in shaping the United States' compliance behavior. This project contributes to a better understanding of the politics of compliance with international law by demonstrating the impact of non-coercive factors on governments' compliance preferences. My findings also improve our understanding of America's cooperative behavior within NAFTA.

Neches, 3:40 PM

Fish Out of Water: What Can Robin Hood Tell Us About Early Modern Seafood Culture? /

Presenter: Jason Hogue, English Graduate

Mentor: Amy Tigner

Abstract:

Among early Robin Hood stories, one in particular stands out as being rather “out of place.” The seventeenth century ballad *Robin Hood’s Fishing* principally takes place not in the merry greenwood but at sea, and it features our outlaw hero as either an unlucky or an incompetent fisherman. The oddity or incongruity of this scenario in comparison with more orthodox portrayals of the legend, however, affords us the unique perspective of seeing the outlaw’s interaction with an early modern fishing community, that of Scarborough in Yorkshire. I suggest that *Robin Hood’s Fishing*, although it has been shunned by some scholars, ultimately reinforces the accepted notion of Robin Hood as a liminal figure; in this tale, he sails along the border of a mythic past and a mercantile future, as well as standing temporarily between hunting and fishing culture. The text portrays an inherent disparity between inland and coastal cultures, but in drawing our focus to the threshold of early modern food culture, this story capitalizes on Robin Hood’s liminal quality to highlight a certain unity between those cultures at the same time.

Neches, 4:00 PM

Neither Past nor Present: A Magical Realist Manipulation of Time in Enrique Bernardo Núñez's Novel *Cubagua*

Presenter: Jennifer Omaña, English Graduate

Mentor: Sonja Watson

Abstract:

In 1939 Enrique Bernardo Núñez published *Cubagua*, a novel based on the history of the island of Cubagua, off the coast of Venezuela. For Núñez, a historian, the original Spanish conquest of the island is a metaphor for the foreign exploitation of oil in Venezuela during the first part of the 20th century. His novel is a work of historical fiction which jumps back and forth between the 400 years that separate his characters. Through the consumption of an ancient elixir, opportunistic businessmen of the 1930s experience more than simple time travel when they realize that they are reincarnations of the Spanish conquistadors that they witness in the midst of the first conquest of the island. I examine *Cubagua* as a work of magical realism since key characteristics of this approach—the fact that it questions the notions of time, space, and identity—are essential to understanding the themes of exploitation presented in the novel. The magical realist elements in the novel break down the idea of a single truth, which allows for an unofficial version of history to be presented as an alternative to the official version. In this way the author questions traditionally accepted judgments of historical actions. In *Cubagua*, the line that normally separates past and present is blurred, allowing the author to protest foreign exploitation by collapsing 400 years worth of conquests into one assault—neither past nor present—of the island.

Neches, 4:20 PM

The Reader-as-Translator: Code-Switching and Non-Translation in Contemporary American Literature

Presenter: Todd Womble, English Graduate

Mentor: Jim Warren

Abstract:

This paper focuses on code-switching in recent American fiction. I posit that code-switching is more than a linguistic element; instead, I see it as a narrative device used to enact crucial rhetorical, cultural, and epistemological implications on these narratives and—more prominently—on the reading experiences they afford. Looking at works from Cormac McCarthy and Junot Diaz, I argue that these texts create unique experiences and positions for their readers. On one hand, mono- and bilingual readers alike are faced with the effects of the authorly motivations behind this code-switching. On the other hand, the untranslated portions of these narratives create a situation in which the reader becomes the translator; this role involves access to distinct forms of readerly power. Utilizing elements of translation studies, bilingual studies, and narrative theory, this paper highlights the manner in which these texts force readers to navigate between these theoretical and rhetorical factors.

Palo Pinto, 8:00 AM

Surface Modification of Porous PLGA Nanoparticles

Presenter: Mohammad Abdallah, Electrical Engineering Graduate

Mentor: Samir Iqbal

Abstract:

Poly lactic-co-glycolic acid(PLGA) nanoparticles are widely used for drug delivery. We have developed a simple and effective method to synthesize and modify porous PLGA nanoparticles using oil-water emulsion method. PLGA was first dissolved in dichloromethane(DCM). In parallel, 2gm of PVP was dissolved in deionized (DI) water to make a 5% solution. A 2% NaHCO_3 solution was added to PLGA solution, to form pores on the surface of the nanoparticles. The mixture was then vortexed for 1min to ensure homogeneity and then added drop wise to PVP solution. The solution was kept on stir plate overnight, allowing DCM to evaporate. It was then transferred into a 50ml tube and centrifuged at 10K rpm for 5min. The pellets were collected and washed with DI water resulting in porous features. Afterwards, 30mg N-hydroxysuccinimide (NHS) and 80 μl of 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDC) were added to the nanoparticles. The samples were freeze dried to -80°C after incubation. XPS analysis showed the presence of N, C and O confirming EDC/NHS. This amine modification of nanoparticles can be further used to bind a variety of agents

Palo Pinto, 8:20 AM

Speech Analysis and Vowel Recognition Technology (SAVoRTech): Signature Extraction for Vocal Passwords

Presenter: Md Bellah, Electrical Engineering Graduate

Mentor: Samir M. Iqbal

Abstract:

A speaker recognition system is presented that extracts and analyzes the sounds of English vowels (A[e], E[i], I[ai], O[o], and U[yu:]) for speaker recognition. We call this Speech Analysis and Vowel Recognition Technology (SAVoRTech). The sound detection is inspired from our brains where an individual is recognized from only vocal signatures. Every speaker produces a unique set of frequencies to pronounce particular sounds. The distribution of these frequencies was used as signature of the speaker. The frequency distribution was computed to get magnitude spectrum of the sounds. The signatures were first extracted and stored to form a database and each speaker was then identified from the vowels they pronounced by comparing with the stored ones in the database. The run-time efficiencies and memories needed for 4 algorithms were analyzed to compare strengths and limitations. The technology has potential applications in areas including personalized equipment, forensics, home/car automation, security, etc. where voice is poised to be next generation biometric. Voice recognition may very well replace text passwords also in near future.

Palo Pinto, 8:40 AM

Highly Sensitive Micropore based Electromechanical Transducers for Tumor Cell Detection and Differentiation

Presenter: Waqas Ali, Electrical Engineering Graduate

Mentor: Samir Iqbal

Group Members: Adeel Sajid, Young-Tae Kim and Samir M. Iqbal,

Abstract:

Early cancer detection is the key to successful cancer treatment. It requires the development of assays that are highly sensitive and selective. Various types of assays have been developed for early cancer detection but they lack the sensitivity and selectivity requirements of efficient cancer diagnosis. We have developed micropore based electromechanical transducers that efficiently ($\eta \sim 75\%$) differentiated tumor cells from normal cells and also metastatic ones from non-metastatic tumor cells. These biosensors are sensitive enough to detect the tumor cells even if only few hundreds of these are present in a sample. We were able to detect 8, 16 and 30 metastatic tumor cells (MTCs) when there were total 100, 200 and 400 MTCs in 10 ml NaCl solution respectively. Also we were able to detect 25, 11 and 6 MTCs from mixtures containing MTCs and non-metastatic tumor cells (NMTCs) in ratios of 1:25, 1:50 and 1:100, respectively. We also used breast cancer cells MCF7 (NMTCs) and MB-231 (MTCs) for these experiments. Micropore based electromechanical transducers differentiated cells on the basis of their mechanophysical properties and generated

Palo Pinto, 9:00 AM

Understanding the Electromechanics of Molecular Motion through a Solid-State Nanopore /

Presenter: Muhammad Usman Raza, Electrical Engineering Graduate

Mentor: Samir M. Iqbal

Group Members: Sajid Saleem

Abstract:

Cancer is the top reason for human mortality. The best way to control deaths is by early stage detection tools for effective treatment. Nanopore based biosensors are among the most promising disease sensors. Nanopore based sensors detect biomarkers in very low concentrations as they detect individual molecule translocation through the nanopore. The sensors consist of two containers of ionic solution at a specific pH value separated by a nanopore channel. When bias is applied across two containers the biomarkers have only the nanopore to travel from one container to the other. As these translocate through the nanopore the flow of ionic current is impeded, resulting in characteristic downward dips in ionic current traces. In this work, we conducted multiphysics simulations of a nanopore to understand how the biomarker translocation through a solid-state nanopore could be controlled by varying different parameters such as pH of solution, electric bias, size and shape of nanopore, size and shape of molecule, etc. This gives us a better understanding of the multivariate system that we are running for detection of key cancer biomarkers.

Palo Pinto, 9:20 AM

Design of Grid-Tied Solar Array

Presenter: Shweta Hardas, Electrical Engineering Graduate

Mentor: Taylor Johnson

Abstract:

This paper details the idea of hardware prototyping of a distributed controlled multilevel inverter used as a grid-tie interface for photovoltaic. The system framework consists of multilevel inverters composed of solar panel array connected in series with the inverter module, enabling the use of renewable energy resources. The inverter module is built of buck-boost converter and a cascaded h-bridge inverter, which converts the obtained independent DC voltage source from each of the solar array to AC. With the increasing convenience of using a small photovoltaic grid for residential purposes, this system can be used to facilitate various DC appliances that require medium voltage and high power configurations. Moreover, the ability of multilevel inverter to operate at the switching frequencies higher as well as lower than the fundamental switching frequencies helps the user to control the total harmonic distortions by extracting the maximum power from each h-bridge inverter. A control algorithm allows the system to regulate at different output dc voltages obtained from the buck-boost converter and determine the switching times for the h-bridges in the grid-tie. The distributed inverter was evaluated by designing three to dozen inverter modules in the PLECS software. Further, for developing the hardware prototype, a detailed schematic using Kicad was generated. The DS1103 PPC Controller Board was used for interfacing and controlling the hardware prototype. The framework, consisting of multilevel inverters, suggested that the total harmonic distortions can be reduced using this structure and therefore, we can integrate the solar arrays for electricity generation.

Palo Pinto, 9:40 AM

Effect of Transmembrane Potential on Protein Translocation through Solid-State Nanopore

Presenter: Mohammad Hasan, Electrical Engineering Graduate

Mentor: Samir Iqbal

Group Members: Adnan Ashfaq

Abstract:

Label-free detection of biomarkers through solid-state nanopore is a promising technique. We investigated the variations in 3D structure of thrombin at increasing potential as it translocated through a SiN nanopore. Nanoscale Molecular Dynamics was used to simulate the ionic current profile of thrombin inside the nanopore. The results of translocation events showed the nature of atomic interactions. The potential across 6 nm thick nanopore was varied gradually from 50 to 500 mV and the conformational changes with time were recorded. The deviation of the protein structure from its initial form was quantified with root mean square deviation, change in energy states and Radial Distribution Function (RDF). At large electric field, thrombin's structure gradually deviated by approximately 15% within 20 ns. The RDF profile also indicated that the protein got stretched as it traveled through the nanopore. The effects of electric field on the protein's velocity and movement were also studied. Results showed that the protein traveled faster in the nanopore at higher electric field and the ionic current changed proportionally to the voltage.

Palo Pinto, 10:20 AM

Amplification-free Direct Detection of Ultra-Low Concentrations of DNA Molecules using Nanoparticle-Based DNA Sensing

Presenter: Manouchehr Teimouri, Materials Science Engineering Graduate

Mentor: Seong Jin Koh

Abstract:

A capability of detecting low-concentrations of DNA or RNA molecules would enable early detection of various diseases, development of medicines, and early detection of biological threats. Typical techniques of oligonucleotide detection rely on amplifications using polymerase chain reaction (PCR) which needs trained personnel, and are time-consuming. Here, we present a nanoparticle-based DNA detection technique, in which single-stranded target DNA (t-ssDNA) can be detected without any amplification. In this approach, t-ssDNA molecules are detected through formation of nanoparticle satellite structure between two electrodes, leading to the creation of electrical path. To form nanoparticle satellite structure, t-ssDNA is captured by capture Au nanoparticles (C-AuNPs) and probed by probe Au nanoparticles (P-AuNPs). We were able to detect t-ssDNA in a concentration of 50 fM without any amplification.

This work was supported by the National Science Foundation (NSF).

Palo Pinto, 10:40 AM

Mechanism of wear and tribofilm formation due to the synergistic interaction of ionic liquids with ashless fluorothiophosphates (FTP) antiwear additives

Presenter: Vibhu Sharma, Materials Science Engineering Graduate

Mentor: Pranesh Aswath

Abstract:

For many decades ZDDP is being used as an effective antiwear additive in engine oils. But the use of ZDDP is limited to the presence of volatile species such as Zn, P and S that results in increased emissions due to sludge formation. In this study, possibly synergistic interactions of ionic liquids with the ashless FTPs were studied to evaluate their joint low friction and anti-wear behavior. Six different ionic liquids by themselves or in mixture of 80wt%IL+20wt%FTP were assessed in blends of base oil group I at 0.1%P levels on HFRR tribometer. Surface topography of worn surface were studied using SEM and SPM technique. The chemical nature of the films was explored using advanced surface characterization techniques such as XANES. Base oil and ZDDP in base oil tests were also run for baseline comparison. IL17 by itself or in addition with ashless FTPs show a comparable or improved wear protection on the rubbed surfaces in comparison to ZDDP at equal phosphorous levels i.e. 0.1%P.

Palo Pinto, 11:00 AM

Radioactive Nanoparticles for Internal Radiation Therapy of Cancer

Presenter: Sina Moeendarbari, Materials Science Engineering Graduate

Mentor: Yaowu Hao

Group Members: Xiankai Sun, Rakesh Tekade, Preston Christensen, Saleh Ramezani, Gedaa Hassan, Ruiqian Jiang

Abstract:

Malignant tumors are considered “unresectable” if they adhere to vital structures or the surgery would cause irreversible damages to the patients and impair their quality of life. Though a variety of cytotoxic drugs and radiation therapies are currently in clinical practice to treat such tumor masses, these therapeutic modalities are always associated with severe side effects. Here, I report a new nano-agent, palladium-103 coated hollow gold nanoparticles ($^{103}\text{Pd}@\text{Au}$ nanoseeds), for internal radiation therapy for more efficient treatment of unresectable solid tumor cancers with significant reduction of adverse side effects. The unique radiolabeling process reported here provides a solution for current challenges, enabling the incorporation of radioactive isotopes with therapeutic dose to monodispersed relatively large gold nanoparticles ($>120\text{nm}$). In this method, a Cu layer is first coated to Au nanoparticles by a simple but robust electroless deposition process. Then, the Cu layer is replaced by inert metals through a galvanic reaction. Using this method, a commonly used isotope for brachytherapy seeds, ^{103}Pd , was incorporated onto hollow gold nanoparticles ($\sim 150\text{ nm}$ in diameter). The resulting $^{103}\text{Pd}@\text{Au}$ nanoseeds were tested in vivo by intratumoral injection into a prostate cancer xenograft model. After 35 days of a single dose treatment, a virtually 100% retention rate of nanoseeds inside tumors, an at least 80% tumor burden reduction, and no noticeable side effects on liver, kidney and other organs were observed. The reported fabrication process can be easily adopted to produce other Au nanoparticle-based nanoseeds with various radioactive properties for different cancers and other diseases. This opens up many possible applications of nanoseed-based internal radiation therapy. In addition, the process can also be used in other nanotechnology research areas such as for fabricating new bimetallic catalysts.

Palo Pinto, 11:20 AM

Improvement of Constraint Optimal Selection Technique for Linear Programming

Presenter: Alireza Noroziroshan, Industrial, Manufacturing, and Systems Engineering Graduate

Mentor: Bill Corley

Group Members: Jay Rosenberger

Abstract:

Linear programming has been studied for over 60 years. It has been considered as one of the most valuable optimization tool for many industrial problems. However, even the best commercial solvers are not capable of solving high density, large scale optimization problems due to a huge number of computations involved. Diet problems with minimum cost is an example of such problem which is very useful for hospitals. Different elements such as proteins, vitamins, carbohydrates can be selected at the best quantity and with the minimum cost. In this research, a constraint selection technique is developed to prioritize the constraints having a higher chance of being binding at optimal solution and add them to the main problem iteratively. Also, a dynamic constraint adding mechanism is developed to regulate the number of cuts allowed to be taken at each iteration to balance between system overload and under load. The superior performance of the developed constraint optimal selection techniques is proven by in a wide range of problem densities. In the very high density problems, the obtained improvements are up to 20 times faster than the available commercial solvers. On average the results represent up to 1300% improvements for the developed methods.

Palo Pinto, 11:40 AM

A Novel Method for Memorizing System Assigned Random Passwords

Presenter: S M Taiabul Haque, Computer Science Engineering Graduate

Mentor: Matthew Wright

Group Members: Shannon Scielzo

Abstract:

System assigned random passwords ('krvzpt', for example) are hard to guess, even by friends or family members. The major bottleneck, on the other hand, is the memorability issue. In this work, we review the literature of memorization techniques and select the technique that is most pertinent to memorization of system assigned random passwords. The technique, also known as the method of loci, leverages spatial memory to memorize a list of items. We apply the method of loci in the context of password memorization and design video clips that would assist users in memorizing their system assigned passwords by exploiting the method of loci. We find out that our clips effectively helps users to memorize their passwords and recall them after a week. The users also give positive reviews about the method. We believe that our technique could be deployed in real world for enhancing the memorability of system assigned random passwords.

This work is supported by a National Science Foundation grant.

Palo Pinto, 1:00 PM

Analysis of equatorial F-region vertical neutral winds from Brazil FPI observations

Presenter: Jose De La Garza, Physics Graduate

Mentor: Yue Deng

Group Members: Cheng Sheng, Yang Lu, Cissi Lin.

Abstract:

An accurate description of vertical neutral winds in the thermosphere is essential to understand the upper atmosphere variations. Recent observation deployments permit substantial progress on specifying the vertical wind. In this paper, neutral vertical wind data from Brazil FPI observations at around 240-km altitude during 2010 to 2012 are used for a climatological study, including the dependencies on seasonal and geomagnetic activities. First, the data have been binned according to the local time, and the seasonal dependence of the local time variation is analyzed. Second, the variation of vertical wind during storm time has been studied. The results give us an unprecedented view of the nighttime vertical wind at low latitudes.

Palo Pinto, 1:20 PM

Red Shifted Absorbance of a Multi-metal Oxide Photocatalyst by Cation Manipulation: Characterization and Stability Analysis from First Principles

Presenter: Cedric Mayfield, Physics Graduate

Mentor: Professor Muhammad Huda

Group Members: Pranab Sarker, Sarah Hernandez, Shafaq Moten, Sajib Barman

Abstract:

Transition metal inclusion has enhanced photocatalytic activity of bismuth titanate ($\text{Bi}_2\text{Ti}_2\text{O}_7$) up to an impurity threshold concentration. Beyond the threshold, spectral absorbance is continually red shifted but increased photocurrent is not reciprocated. We investigated, from first principles, the origin of decreased photocurrent in modified $\text{Bi}_2\text{Ti}_2\text{O}_7$ (BTO) by calculating the electronic structures of a representative set of doping configurations and by performing a phase stability analysis of the doping. We report our theoretical/computational strategy of analyzing free energy space and show an explicit dependence of pure phase synthesis on changes in free energy. Also, we present a probability distribution of the doping configurations based on formation enthalpy to better understand the nature of doping in BTO. We found that transition metal substitutions are favorable at the A-sites due to unchanging coordination with O ions.

This work is supported by National Science Foundation, award no. 1133672.

Palo Pinto, 1:40 PM

Transparent ceramic Scintillators for gamma spectroscopy

Presenter: Sunil Sahi, Physics Graduate

Mentor: Wei Chen

Group Members: Rasool Kenarangui

Abstract:

Scintillators are the materials that emit light when excited by ionizing radiation. Scintillators are used in different field from security, medical imaging, industries and nuclear/particle physics. Demands of scintillators are increasing not only due to ever increasing nuclear threat but also due to growing field of medical imaging. Currently used single crystal scintillators are difficult to grow in large size and hence expensive. Furthermore, some single crystal like NaI, CsI and LaBr₃-Ce are hygroscopic and need to protect from the moisture which further increase the cost of these scintillators.

In this work we have studied the transparent ceramic as a cost effective alternative to single crystal scintillators. The goal of our research is to replace the conventional single crystal growth method with ceramic fabrication process to produce inexpensive scintillators. Transparent ceramic can be easily grow in large volume and are mechanically stronger than single crystals. We have fabricated different ceramics and studied their luminescence and scintillation properties. We have characterized the ceramics with XRD and TEM. We have also compared their scintillation properties with commercial single crystal scintillators. Photopeaks which is related to the identification of nuclear material source can be clearly seen with transparent ceramic. The most important is the energy resolution of La_{0.2}Y_{1.8}O₃ ceramic, which is comparable to that of commercial NaI single crystal. Our preliminary results show that transparent ceramic can be used for gamma spectroscopy. Further study is required with different size scintillators for quantitative comparison with commercial single crystal scintillators.

We would like to acknowledge the support from the NSF and DHS joint ARI program (2011-DN-077-ARI053-02&3 /

Palo Pinto, 2:00 PM

Simulation of Kev electrons traveling in water

Presenter: Bright Izudike, Physics Graduate

Mentor: Mingwu Jin

Abstract:

Motivation: Nuclear imaging is widely used in medicine and leads to more accurate diagnosis and more effective treatment for cancer. Current imaging techniques used in clinic can not efficiently detect cancer at a very early stage partly because of the weak signals from small tumors. With the advance of detector technology in high energy physics, the detection of beta particles (positron and electron) from medical radiotracers, such as Cu-64, may open a new avenue for image-guided treatment of cancer. / / Method: This research aims to use high energy particle transportation simulation toolkit (Geant4) to study the path(s) of electron(s) propagating through matter. As an initial demonstration of this working principle, we simulate electrons with the energy spectrum of Cu-64 (max energy of 579 KeV) traveling through water (mimicking human soft tissues) using Geant4 (Geometry And Tracking – 4). / / Results: The profiles of the electron tracks, their interactions, and scatter patterns are extracted as electrons at different energy levels propagate through water. The results are summarized statistically and provide the feasibility and efficiency of detection of beta particles emitted from different depths in water. This study will guide the next step of experiments with real detector and radiotracers.

Palo Pinto, 2:20 PM

Band-gap engineering at a semiconductor - crystalline oxide interface

Presenter: Kamyar Ahmadi Majlan, Physics Graduate

Mentor: Joseph Ngai

Group Members: Mohammadreza Jahangir-Moghadam, Xuan Shen, Timothy Droubay, Mark Bowden, Matthew Chrysler, Dong Su, Scott A. Chambers, and Joseph H. Ngai

Abstract:

The epitaxial growth of crystalline oxides on semiconductors provides a pathway to introduce new functionalities to semiconductor devices. Key to electrically coupling crystalline oxides with semiconductors to realize functional behavior is controlling the manner in which their bands align at interfaces. Here we apply principles of band gap engineering traditionally used at heterojunctions between conventional semiconductors to control the band offset between a single crystalline oxide and a semiconductor. Reactive molecular beam epitaxy is used to realize atomically abrupt and structurally coherent interfaces between $\text{SrZr}_x\text{Ti}_{1-x}\text{O}_3$ and Ge, in which the band-gap of the former is enhanced with Zr content x . We present structural and electrical characterization of $\text{SrZr}_x\text{Ti}_{1-x}\text{O}_3$ -Ge heterojunctions for $x = 0.2$ to 0.75 and demonstrate the band offset can be tuned from type-II to type-I, with the latter being verified using photoemission measurements. The type-I band offset provides a platform to integrate the dielectric, ferroelectric and ferromagnetic functionalities of oxides with semiconducting devices

*The University of Texas - Arlington / U.S. Department of Energy, Office of Basic Energy Sciences, contract # DEAC02-98CH10886.
/ U.S. Department of Energy, Office of Science, Division of Materials Sciences and Engineering Award # 10122. /*

Palo Pinto, 3:00 PM

Patterns of gene expression underlying extreme physiological remodeling in snakes

Presenter: Audra Andrew, Biology Graduate

Mentor: Todd Castoe

Group Members: Daren C. Card, Robert P. Ruggiero, Drew R. Schield, Richard H. Adams, David D. Pollock, Stephen M. Secor, Elizabeth La, Todd A. Castoe

Abstract:

Snakes are a valuable model system for studying the extremes of physiological remodeling due to the ability of some species to rapidly upregulate organ form and function upon feeding. The prime model species used to study such remodeling has been the Burmese python (*Python molurus bivittatus*) due to its massive changes in organ mass and function following feeding. An analysis of the python small intestine identified thousands of genes significantly differentially expressed shortly after feeding. Many of these genes were found to be involved in key cellular processes. Preliminary analyses of the liver, heart, and kidney identified hundreds of genes significantly differentially expressed during organ remodeling, including genes involved in cellular processes. In order to understand genes essential to organ remodeling, we have conducted comparative analyses for the kidney and liver of the Burmese python and the prairie rattlesnake (*Crotalus viridis*; another remodeler) and identified genes significantly differentially expressed in both species that are likely essential to organ remodeling and not species-specific responses to feeding.

Palo Pinto, 3:20 PM

Location, location, location: predator-induced evolution in fish body shape

Presenter: Collin Funkhouser, Biology Graduate

Mentor: Matthew R. Walsh

Abstract:

The body shape of many organisms, including fish, provides a direct connection to the performance and fitness of individuals and is thus assumed to be subject to strong natural selection. *Rivulus hartii* inhabits sites with and without predators on the island of Trinidad. Predators are predicted to select for enhanced escape response (i.e., swimming performance) via underlying shifts in body shape. We tested for genetic differences in body shape by rearing *Rivulus* from four streams in a common garden environment for two generations. We found that both body shape and body size varied between populations. Our results show that previously documented phenotypic differences in wild caught specimens have a genetic basis and thus illustrate the evolutionary impact of predators on prey body shape.

Palo Pinto, 3:40 PM

Circadian Regulation of Symbiotic Genes in Nitrogen-Fixing Bacteria

Presenter: Dylan Parks, Biology Graduate

Mentor: Woo-Suk Chang

Abstract:

The photosynthetic soil bacterium *Bradyrhizobium* sp. strain ORS278 forms a mutualism with *Aeschynomene* plants resulting in root and stem nodulation. In this process not only does the bacterium provide the plant with N source via nitrogen fixation, but also carries out photosynthesis. In a previous study, a gene encoding a photosynthetic circadian feedback protein in cyanobacteria, was mutagenized and the mutant showed a nitrogen fixing deficiency in its phenotype. The enzyme responsible for nitrogen fixation, nitrogenase, is inhibited by oxygen. Thus, we hypothesize that if nitrogenase activity is restricted to the night-time, the deleterious effect of oxygen production could be avoided. In this study, two genes, BRADO4470 (*labA*) encoding a putative protein that may function in circadian feedback and BRADO3946 encoding a putative sensor histidine kinase, thought to be involved in the temporal regulation of nitrogen fixation and possibly feedback control of circadian rhythm in photosynthesis, were independently mutagenized via double-homologous recombination. Then, their phenotype was compared with the wild type for nitrogen fixing ability in *Aeschynomene indica* plants. Acetylene reduction assays showed that the wild type fixed nitrogen during the night time while the mutant strains did not. This result indicates that BRADO4470 and BRADO3946 are likely involved in the temporal regulation of nitrogen fixation through circadian feedback systems. A better understanding of the symbiotic genes could allow optimization of nitrogen fixation (e.g., in night-time) and photosynthesis (e.g., day-time) resulting in a more productive agricultural practice for members of symbiotic nitrogen-fixing rhizobia.

Palo Pinto, 4:00 PM

Ferromagnetism in graphene - like nanographite

Presenter: Rakesh Chaudhary, Physics Graduate

Mentor: Ali R. Koymen

Abstract:

Traditional ferromagnets of transition metal or rare earth elements are based on 3d and 4f electrons. Synthesis of room temperature ferromagnets with only s and p electrons is of fundamental importance in research and may offer ample scope for new technological applications. In this study we report magnetism of carbon-based ferromagnet with several layers of graphene-like graphite sheets synthesized by plasma in the cavitation field of toluene due to ultrasonication. Graphite is diamagnetic at room temperature. However, literatures of experimental studies on magnetism of graphite have suggested that disorder and hydrogen adsorption on the surface and on the zigzag edges in graphite may trigger ferromagnetism. Here, we show ferromagnetic order of the synthesized powder from magnetization measurements measured using a vibrating sample magnetometer (VSM). The saturation magnetization of $5 \times 10^{-2} \text{ A m}^2 / \text{kg}$ and coercivity of $5.97 \text{ kA} / \text{m}$ was measured at room temperature. The observed ferromagnetic order is of intrinsic origin rather ferromagnetic impurity as confirmed by laser ablation inductively coupled plasma mass spectrometry. Degree of disorder in crystal was observed using Raman spectroscopy. Transmission electron microscopy (TEM) observations show transparent planar graphene-like sheets of few microns in size. Carbon-based magnetic materials can pave the way for realization of rare earth and transition metal free magnets which could have potential applications in spintronic devices.

Palo Pinto, 4:20 PM

Role of intrinsic defects on pure-phase formation of kesterite-Cu₂ZnSnS₄

Presenter: Pranab Sarker, Physics Graduate

Mentor: Muhammad N. Huda

Abstract:

It is well known that converting the solar energy into current can be a perfect alternative to the use of global warming-causing fossil fuels. To complete that conversion process efficiently and effectively, a suitable material, which is needed, neither exists in nature nor has been discovered so far. Kesterite-Cu₂ZnSnS₄ (CZTS) promises to be such a suitable material because all the constituting elements are cheap and non-toxic, and further, it can absorb visible sunlight sufficiently. However, it fails to exhibit optimal conversion efficiency. This happens because of the presence of (i) various detrimental defects and (ii) unwanted secondary phases in the CZTS sample while growing. In the present work, we aim to determine the factors, which promote co-existence of unwanted phases with CZTS. Our work discovers that, it is a single defect in the sample that can destroy the pure phase formation of CZTS. This explains, to date, the unavailability of having pure phase CZTS experimentally.

This work was supported in part by the National Renewable Energy Laboratory.

Pedarnales, 8:00 AM

Genomic basis of adaptive island dwarfism in *Boa constrictor*

Presenter: Daren Card, Biology Graduate

Mentor: Todd Castoe

Group Members: Drew Schield, Richard Adams, Warren Booth, Scott Boback

Abstract:

Island fauna present natural experiments that can enable biologists to address the processes of evolution and adaptation, especially in instances where the adaptive response is measurable, extreme, and replicated across independent systems. *Boa constrictor*, a typically large snake on the mainland, is ideal for this work due to the establishment of multiple insular populations composed entirely of snakes with a drastically dwarfed phenotype. This dwarfism appears to be adaptive, as all island prey species represent a tiny fraction of an island snake's mass, with adult snakes subsisting largely on migratory passerine birds. Moreover, common-garden experiments have ruled out the possibility of phenotypic plasticity and indicate a genetic mechanism. Using low-density genomic sampling from multiple island and mainland populations, we determined that dwarfism has apparently evolved independently at least twice. We also used high-density genomic sampling of a single island-mainland population pair to identify genomic regions that have undergone selective sweeps and the linked genes putatively underlying the dwarf phenotype.

Pedarnales, 8:20 AM

Mystery killer: investigating sea star immune response to a novel disease

Presenter: Lauren Fuess, Biology Graduate

Mentor: Laura Mydlarz

Group Members: Steven Roberts, Drew Harvell

Abstract:

Sea stars are important keystone species that maintain species balances in rocky intertidal zones. Recently, a new disease known as sea star wasting disease (SSWD) killed up to 90% of sea stars along the North American Pacific coast. Despite their ecological importance and growing susceptibility to disease, little is known about this disease or sea star immunity. In order to better understand how sea stars respond to SSWD, we conducted an inoculation experiment, exposing sea stars to either a mixture derived from diseased stars, or to an inactivated mixture. Nine days after exposure, sea stars treated with the diseased star mixture started showing signs of disease. Body tissue was removed and used to analyze gene expression. Genes involved in a number immune processes, including complement and toll like receptor signaling as well as melanization, were more active in infected stars. Our findings indicate that sea stars mount a strong immune response to SSWD. These results should improve both our understanding of sea star response to SSWD and of sea star immune function.

This work was supported by the National Science Foundation and the Ecology of Infectious Marine Disease Research Coordination Network (OCE #1215977). Additional funding for this project was provided by the Friday Harbor Labs Adopt-a-Student Program.

Pedarnales, 8:40 AM

Novel insights into the evolution of the Mesothelin gene

Presenter: Giulia Pasquesi, Biology Graduate

Mentor: Todd Castoe

Abstract:

The human Mesothelin (MSLN) gene codes for two functional elements: the Megakaryocyte Potentiating Factor (MPF) and the Mesothelin peptide. MPF is released from mesothelial cells, but Mesothelin is expressed as a cell specific membrane-bounded glycoprotein whose function has not been validated yet. An ectopic over-expression of Mesothelin characterizes several human cancers, where it likely plays a role in mediating heterotypical cellular adhesion, proliferation and invasiveness. Placental mammals have two major forms of the MSLN gene: one that encodes for both products, and another that encodes only for the Mesothelin peptide, with the latter considered the derived form. In the present study, more comprehensive analyses were conducted in order to explore the evolutionary history of the gene. / Contrary to current opinion, it was found that the sequence encoding for Mesothelin only is likely the ancestral state in placental mammals. Low ω values and a high proportion of negatively selected sites suggest overall conserved biological function of Mesothelin in the mammalian clade.

Pedarnales, 9:00 AM

Nuclearly Encoded Mitochondrial Gene Duplicates in Humans and Male Germline Functions

Presenter: Mohammadmehdi Eslamieh, Biology Graduate

Mentor: Esther Betran

Group Members: Anna Williford

Abstract:

Mitochondrion is an essential organelle which serves as power-house of aerobic Eukaryota cells. Mitochondrial DNA encodes only a few proteins of the respiratory chain, while the majorities of proteins in mitochondria are imported from the nucleus and are known as nuclear encoded mitochondria genes (N-mt genes). Due to the maternal transmission of mitochondria, females can directly select in favor or against of mutations in the mitochondrial DNA that affect their fitness but this is not the case for males. It has been proposed that the males can respond by selecting for N-mt gene duplicates with male-specific functions and supporting data has been obtained in *Drosophila*. These fly duplicates genes are often involved in energy production instead of transcription or translation in the mitochondria and are located far from the parental genes to acquire testis-specific function and evolve independently. We have studied the duplication of N-mt genes in the human genome and have described their localization respect to the parental genes, pattern of expression and function assessed by gene ontology. We find some testis-biased duplicates that were likely duplicated to keep male fertility high and have features similar to the duplicated genes of *Drosophila*. Taken together, our results support the existence of male response in humans.

Pedarnales, 9:20 AM

DPLG1: a gene domesticated from PIF transposable element in drosophila.

Presenter: Diwash Jangam, biology Graduate

Mentor: Esther Betrán

Group Members: Cedric Feschotte

Abstract:

Transposable elements (TEs) are selfish genetic units that are able to move and amplify within a host genome. Genes of the PIF/Harbinger TEs have been shown to be domesticated as host genes in many species including insects and humans. Why would well functioning genomes need TE proteins? To answer this question we are studying the function of a PIF/Harbinger derived gene in *Drosophila melanogaster* (*Drosophila* PIF like gene 1 or DPLG1). DPLG1 resides next to *piwi* (a transcription regulator that is used to silence TEs in the germline), and these genes are in head to head orientation. It is known that genes in head to head direction can share common regulatory sequences. Therefore we hypothesize that DPLG1 and *piwi* may be co-regulated and potentially function together to regulate transcription and TE silencing. We knocked down DPLG1 (i.e., interfere with its transcript using small complementary RNAs) in the somatic and male germline cells and studied the effects on the viability and fertility. Knocking down DPLG1 did not affect viability; however, it resulted in male sterility. In situ hybridization results from DPLG1 knock-down flies showed remarkable decrease in DPLG1 transcripts compared to the control which confirmed that DPLG1 is knocked down. In the sterile males, it was observed that the elongated spermatids did not individualize into mature sperms and the seminal vesicles were empty. Sterility in males and females has been observed before in *piwi* mutants, however lack of individualization is not the phenotype observed in *piwi*. The effects of DPLG1 knockdown in female germline remain to be studied. Our results show that DPLG1 is vital during spermatogenesis in *D. melanogaster*. Taken together, our study sheds light into how these selfish elements can be recycled into functional units to generate genomic novelty.

Pedarnales, 9:40 AM

Population structure, genetic diversity, and gene flow dynamics of the highly venomous Mohave Rattlesnake (*Crotalus scutulatus*) with perspectives on historical biogeography

Presenter: Drew Schield, Biology Graduate

Mentor: Todd Castoe

Group Members: Daren Card, Richard Adams, Carol Spencer, Stephen Mackessy

Abstract:

The Mohave rattlesnake (*Crotalus scutulatus*) is a wide-ranging pitviper that inhabits the desert regions of the United States and Mexico. Despite considerable interest regarding the species' highly toxic venom and its relevance to human health, there have been no molecular studies characterizing the genetic diversity and population structure found within *C. scutulatus*. We used mitochondrial DNA and thousands of nuclear single nucleotide polymorphisms (SNPs) acquired via double-digest restriction site associated DNA (ddRADseq) sequencing to assess the population genetic structure of *C. scutulatus* throughout their range. We find strong support for several monophyletic clades of *C. scutulatus* in our mitochondrial dataset, including the monophyly of the subspecies *C. s. salvini* with respect to *C. s. scutulatus*. We also identify a putative northern range expansion, which may have been facilitated by the recession of the Last Glacial Maximum. Our findings are consistent with a large degree of diversity within *C. scutulatus*, and highlight the need for a complete appraisal of venom variation within the species, given its diversity.

Pedarnales, 10:20 AM

Chemical Characterization of Wastewater from Hydraulic Fracturing

Presenter: Jonathan Thacker, Chemistry and Biochemistry Graduate

Mentor: Kevin Schug

Group Members: Doug D. Carlton, Jr., Zacariah L. Hildenbrand, Akinde F. Kadjo

Abstract:

Oil and gas obtained from hydraulic fracturing (HF) have become important domestic energy resources. HF is an oil and gas extraction technique that involves the injection of fluids at high pressures into wells to induce fractures in tight geological formations. This practice also results in the generation of a substantial amount of wastewater. Detailed chemical analyses of the wastewater would be beneficial in the determination of the most appropriate management strategy due to its highly variable quality and composition. / Analytical chemistry methods were developed and applied to wastewater samples to identify organic compounds and to measure metals and ions as well as nonspecific parameters. Several compounds known to compose HF fluid were detected in the samples. These methods may also be applied to wastewater samples from other sources, groundwater, and the assessment of remediation strategies. /

Pedarnales, 10:40 AM

Computational investigations into the structure of amorphous silicon oxycarbide: revealing structural details and the nature of the C_{free}-to-glass interface

Presenter: JP Nimmo II, Chemistry and Biochemistry Graduate

Mentor: Peter Kroll

Group Members: Atreyi Dasmapatra, James Mao, Munuve Mwanja, T.S. Mahadevan, Nisha Mohan, Susana Aguirre-Medel,

Abstract:

Silicon oxycarbide (SiCO) is an amorphous ceramic material important in many thermal and mechanical applications. It is widely used in high-temperature settings such as heat shields, thermal barrier coatings, and spark plugs. There is a very strong relationship between structure and properties in ceramics, so structural characterization is quite important. / SiCO can be considered as a mixture of silica (SiO₂), silicon carbide (SiC), and a phase of graphite-like carbon inclusions, so-called "free" carbon (C_{free}). Using accurate computational methods and model structures, we have recently developed a simple method to relate structure and peak location and shape in ²⁹Si nuclear magnetic resonance (NMR) spectroscopy. The structure of the ceramic is composed of corner-linked SiC-xO_{4-x} tetrahedra, and the NMR signal of the central silicon depends entirely on the number of oxygen atoms attached and a linear relation to the average of the bonding angles at the attached oxygen atoms. In glass models with free carbon, a new distribution of wide angles resulting in larger NMR shifts, appears. This had not been previously noted or explained.

Pedarnales, 11:00 AM

First principles modeling and simulation of ZrSiBCN ceramics: An approach to develop hard-coatings

Presenter: Atreyi Dasmahapatra, Chemistry and Biochemistry Graduate

Mentor: Peter Kroll

Abstract:

Zirconium based ceramics exhibit high melting point (> 3000 K) and high thermal conductivity. These materials are also very hard and are used in cutting tools, drill bits and as hard coatings on engine valves. However, these materials have poor resistance to oxidation. In contrast, silicon based ceramics (e.g. SiC, Si₃N₄, etc.) possess excellent oxidation resistance at high temperatures (up to 1800 K). Thus, by combining properties such as hardness and oxidation resistance of different compounds (here zirconium and silicon based ceramics respectively), we can design new materials. / In this project, we model ceramic coatings that are mixtures of zirconium diboride (ZrB₂), zirconium nitride (ZrN), zirconium carbide (ZrC) and silicon nitride (Si₃N₄). We study their mechanical properties as a function of their composition. Starting with the experimentally realized composition Zr₄₂B₃₀C₈N₂₀, we investigate systematically the impact of adding Si₃N₄ to the material. Using accurate quantum mechanical calculations, we generate models comprising of 100 atoms. Subsequently, we also compute various mechanical properties of the material, namely the bulk modulus, shear modulus and Vicker's hardness. / Our results show that all models have ordered regions that resemble ZrN(C) and ZrB₂ crystals, and include typical honeycomb networks of boron. The tendency to form such regions decreases with increasing Si₃N₄ content. / We compute high hardness for compositions that are low in Si₃N₄ content and high in ZrN. Only if Si₃N₄ is added at the expense of ZrB₂, the system retains high hardness values. Therefore, we project that a balance between Si₃N₄ and ZrB₂ must be sought to achieve hard coatings with improved oxidation resistance.

Pedarnales, 11:20 AM

Sensitive Conductometric Detection of Sulfide and Cyanide in a Suppressed Ion Chromatography System

Presenter: Hongzhu Liao, Chemistry and Biochemistry Graduate

Mentor: Purnendu K. Dasgupta

Abstract:

Sulfide and cyanide derive from the corresponding highly toxic acids play important roles in different fields, including corrosion in petrochemical plants, mine wastes, wastewater treatment. Although suppressed conductometric ion chromatography (SCIC) has become the benchmark in anion analysis in general, very weak acids like sulfide and cyanide are hardly determined by SCIC because these very weak acids do not ionize sufficiently to be conductive. By far the most popular technique in conjunction with IC to measure sulfide and cyanide has been pulsed amperometric detection. However, in order to achieve optimum performance, many special steps are required. One of them is a deep deoxygenation of the sample for at least 10 min. Efforts to detect these weakly dissociated acids better by conductometric detection have also been made for some time. The most promising involved introduction of a base at constant concentrations after the suppressed conductivity detector and monitor the conductivity again. All anions, including very weak acids show up as negative peaks, because hydroxide anions are replaced by analyte anions. In present work, a lab-made volatile acid transfer device assists the mass transfer and preconcentration of the suppressed Hydrogen sulfide and hydrogen cyanide. The current method can reduce the baseline noise level at 100 times, compared with previous studies. The limit of detections of hydrogen sulfide and hydrogen cyanide are 0.1-0.5 micromoles per liter.

Pedarnales, 11:40 AM

An improved purification method and kinetic characterization of a biofuel enzyme from an archaeon

Presenter: Cuong Le, Chemistry and Biochemistry Graduate

Mentor: Kayunta Johnson-Winters

Group Members: Toan Nguyen / Ebenezer Joseph

Abstract:

Enzymes that catalyze the transfer a hydride (: H-) from the F420 Cofactor molecule, to NADP+ are known as F420H2: NADP+ Oxidoreductases or simply Fno. The Fno reaction produces a biologically relevant molecule, known as NADPH (equation 1). / / F420H2 + NADP+ <-----> F420 + NADPH + H+ Eq. 1 / / F420 Cofactor is essential for methane producing and sulfate reducing microorganisms, such as methanogens. Methanogens play a critical role in carbon cycling, producing methane, which is a renewable energy source. We have purified the wild-type Fno along with three variants (I135A, I135G, and I135V Fno). Here, we will discuss an improved procedure for the purification of Fno enzymes. We also briefly discuss the characterization of the Fno reaction using steady-state and pre-steady state methods.

This work was supported in part by the National Science Foundation.

Pedarnales, 1:00 PM

Separation, Detection, and Quantitation of Disease Indicators in Blood and Urine using Multipath Liquid Chromatography – Mass Spectrometry

Presenter: Dananjaya Kalu Appulage, Chemistry and Biochemistry Graduate

Mentor: Kevin A Schug

Group Members: Evelyn H Wang

Abstract:

A wide variety of chemical compounds have been identified as measurable indicators for diseases, such as cancers. Analysis of blood or urine often involves removal of proteins prior to analysis of small molecules, requiring multiple analyses for multiple analyte classes. This study focused on development of a liquid chromatography – mass spectrometry based method for simultaneous analysis of blood or urine samples for multiple classes of molecules from a single injection. Mixture of drugs, vitamins, nicotine and metabolites with five different proteins were used in our preliminary studies. We used a trap to capture one class of molecules, leaving others to pass through and be captured on a chromatography column. Analytical protein and small molecule columns were used to achieve simultaneous separation of multiple classes and detection by a highly sensitive mass spectrometer. Establishing the ability to simultaneously determine multiple classes of molecules from a single injection will improve the information obtained from blood or urine tests and may aid early diagnosis of diseases or condition which otherwise would go unnoticed.

Pedarnales, 1:20 PM

An Application of Ionic Liquids for the Determination of BTEX in Contaminated Soils by Headspace Gas Chromatography Mass Spectrometry

Presenter: Emmanuel Varona-Torres, Chemistry and Biochemistry Graduate

Mentor: Kevin A. Schug

Group Members: Doug D. Carlton Jr

Abstract:

Concerns about the environmental impact of fossil fuel extraction activities (i.e. hydraulic fracturing, and other drilling and well-stimulation techniques) have risen due to their wide use in the United States and in other countries. Soil can be easily contaminated by volatile organic compounds (VOCs), such as: benzene, toluene, ethylbenzene and xylene isomers (BTEX) as a consequence of industrial activity. The quantification of BTEX from soil poses a challenge due to its complex composition (sand, clay, silt); a variable response depending on composition reduces precision and accuracy of soil contamination determinations. In this study, the application of ionic liquids (ILs) as a solvent, in headspace gas chromatography mass spectrometry (HS-GC/MS) was evaluated in an effort to reduce and normalize matrix effects associated with the analysis of different soils. The negligible volatility of ILs have shown to improve the linearity response of BTEX in two soils of different composition. ILs show promising results for quantification of BTEX by reducing and normalizing the matrix effect caused by the different compositions in soil.

Pedarnales, 1:40 PM

Long non-coding RNA, HOTAIR is transcriptionally regulated by estradiol and endocrine disruptors

Presenter: Arunoday Bhan, Chemistry and Biochemistry Graduate

Mentor: Subhrangsu S. Mandal

Abstract:

HOTAIR (HOX antisense intergenic RNA) is a long noncoding RNA (lncRNA) that is transcribed from the antisense strand of homeobox C gene locus in chromosome 12. HOTAIR coordinates with chromatin-modifying enzymes and regulates gene silencing. It is overexpressed in various carcinomas including breast cancer. Herein, we demonstrated that HOTAIR is crucial for cell growth and viability and its knockdown induced apoptosis in breast cancer cells. We also demonstrated that HOTAIR is transcriptionally induced by estradiol (E2) and BPA (bisphenol-A) both in vitro in breast cancer cells as well as in vivo, in ovariectomized female rats. We also demonstrated that, similar to protein-coding gene transcription, E2 and BPA induced transcription of antisense transcript HOTAIR is coordinated via ERs and ER coregulators, and this mechanism of HOTAIR overexpression potentially contributes towards breast cancer progression.

Pedarnales, 2:00 PM

The role of greenhouse gas and orbital variations on the Younger Dryas climate in the Community Earth System Model version 1

Presenter: Taylor Hughlett, Earth and Environmental Science Graduate

Mentor: Arne Winguth

Abstract:

The last recorded instance of abrupt climate change occurred approximately 12,900 years ago during a period known as the Younger Dryas (YD), which was characterized by an intense cooling of the Northern Hemisphere over approximately 1,400 years. The cause for this cooling event remains controversial, though it is widely attributed to the reduction of the Atlantic meridional overturning circulation (AMOC) due to the input of glacial meltwater from the Laurentide Ice Sheet (LIS) into the Northern Atlantic Ocean. During the Bølling-Allerød event prior to the YD, the climate warmed, causing the LIS to melt and discharge into the Northern Atlantic Ocean. This glacial discharge caused the water masses of the North Atlantic Ocean to stratify, shutting down circulation and cooling the climate. Using the National Center for Atmospheric Research's Community Earth System Model version 1, a series of sensitivity experiments have been conducted to investigate the role of greenhouse gases and orbital parameters on the AMOC and temperature of the Northern Hemisphere. Compared to a present day simulation, adjusting greenhouse gas concentrations to that of the YD decreased average ocean temperatures by approximately 0.2°C. A simulation reflecting YD climate showed a 0.55°C temperature decrease on average. Ocean circulation slowed down by approximately 2.75 and 3.5 Sverdrups (Sv) for the greenhouse gas experiment and orbital simulations respectively, while the YD simulation showed a strengthening of the AMOC by over 6.0 Sv. It is likely that lack of freshwater input into the Northern Atlantic Ocean in the YD simulation is the cause for the intense strengthening of the AMOC. With the recent increased emissions of greenhouse gases, global temperature has increased, and the Greenland Ice Sheet has begun to melt. Should this fresh meltwater enter the Northern Atlantic Ocean, it could cause the ocean to stratify and an abrupt cooling similar to the YD could occur in the near future.

Pedarnales, 2:20 PM

Earthquakes and fault friction: dynamic weakening of rock gouges in high speed, high pressure shear experiments

Presenter: Monica Barbery, Earth and Environmental Science Graduate

Mentor: W. Ashley Griffith

Abstract:

Earthquake ruptures occur when frictional resistance to sliding on faults in the earth is transiently reduced from static to kinetic values. It has been hypothesized that much of this weakening is due to flash heating of microcontacts. To date, no experiments have been performed to test this hypothesis at pressures and sliding rates expected at the depths of most earthquakes (5-15km). To investigate our hypothesis, we sheared granite and shale samples at pressures of 50-120 MPa and sliding rates of 1-5 m/s using a torsional Kolsky-bar apparatus. Significant weakening was observed in most experiments, and the degree of weakening varied as a function of pressure and sliding rate, but this behavior is lithology dependent. A simple model of the flash heating process constrained by SEM observations of the deformed specimens explains the dependence of both lithologies on pressure and sliding rate, suggesting that we are capturing critical aspects of the earthquake weakening process.

This work was supported in part by the National Science Foundation.

Pedarnales, 3:00 PM

The Electorate's Role in Incentivizing Congressional Compromise vs. Political Partisanship

Presenter: Jarryd Willis, MS, ABD, Psychology Graduate

Mentor: William Ickes

Abstract:

Despite the partisan gridlock that has engulfed US politics, little empirical research has been done on interparty compromise. Thus, the purpose of this dissertation was to test the premise that citizens create congress, and thus voters' desire for compromise (or partisanship) should serve as enough of an electorally consequential incentive to influence the outcomes of interparty negotiations. / Using a dyadic negotiation paradigm, I had 112 self-identified Democrats and Republicans (N = 56 dyads) play the role of Representatives with compromise-desiring or partisanship-desiring voters as they negotiated over several political issues: Immigration, ObamaCare, Voter ID, and Guns. Dyads whose (hypothetical) voters desired partisanship were farther apart in their negotiation outcomes than dyads whose voters desired compromise. / The dissertation results support for the view that negotiators will adjust the tact they take in political negotiations to satisfy the disposition of their voters

Pedarnales, 3:20 PM

Quick Decisions Involving Threatening and Non-threatening Images

Presenter: Audrey Snowden, Psychology Graduate

Mentor: Levine

Abstract:

The purpose of this research was to investigate the role of facial expressions with respect to quick decisions involving threatening and non-threatening images. Participants completed several surveys and played a categorization game where they viewed pictures for 1.25 seconds and then made a categorizing decision of “dangerous” or “safe” based on the presence of weapons in the photo. Participants had 1 second to decide. Pictures included men, women, and children, with either angry or neutral facial expressions, holding either weapons or innocuous items. Participant’s reaction time was recorded. It was hypothesized that dangerous pictures would be categorized more quickly and accurately than safe and angry pictures more quickly and accurately than pictures with neutral expressions. It was also hypothesized that there would be an interaction between the categories. Main effects of object held (dangerous or safe) were found for both reaction times and accuracy rates. A main effect was found for facial expression with respect to accuracy rate. Interaction effects were also found for object held by facial expression with respect to both reaction times and accuracy rates. Analyses revealed that dangerous pictures were more accurately and quickly categorized than safe pictures and angry pictures were the least accurately categorized. These results indicate that facial expressions influence the categorization of safe and dangerous situations. Real world implications include better decision making for police officers and military personnel.

This work was supported by the Office of Naval Research.

Pedarnales, 3:40 PM

Long Length of Disability: Is It Truly a Risk Factor for Rehabilitation? A Study on a Chronic Disabling Occupational Musculoskeletal Disorder Population /

Presenter: Sali Asih, Psychology Graduate

Mentor: Robert J. Gatchel

Group Members: Meredith Hartzell, M.S. Ph.D Candidate / Ryan Hulla, B.S. / Randy Neblett, M.A., L.P.C., BCB / Tom G. Mayer, M.D. /

Abstract:

INTRODUCTION / Length of disability (LOD), or the amount of time between injury and treatment admission, is perceived as a factor affecting outcomes for chronic musculoskeletal disorders. There is a widely held belief that longer LOD is associated with worse treatment outcomes. Few studies have actually examined populations with LOD duration longer than two years. / / AIMS AND METHODS / To examine whether LOD would predict treatment completion of a functional restoration program (FRP) and was associated to psychosocial outcomes. There were 3150 patients. All of them were part of Workers Compensation system. Patients were categorized into six groups based on LOD. The groups were: short-term (n=418, 3-6m), intermediate-term (n=1341, 7-17m), and four long LOD groups consisting of the 18-23m (n=84, 391), the 24-35m (n=412), the 36-71m (n=324) and the 72m+ (n=267). Analysis on one-year socioeconomic outcomes was conducted on patients who completed FRP. The outcomes included work return, work retention and health-related outcomes. / / RESULTS AND CONCLUSION / LOD significantly predicted FRP completion. As disability lengthened, FRP completion rate decreased. LOD was significantly associated with psychosocial outcomes. High work return and work retention rates were found for patients whom were not working upon admission. No significant differences were found for health utilization outcomes. / / In conclusion, although there is an impact of LOD on one-year outcomes, the long LOD groups demonstrate good outcomes. The long LOD groups had good work-return and work retention rates, especially considering that patients have been disabled for more than two years. The long LOD groups were relatively similar to short and intermediate LOD groups in healthcare utilization one-year post rehabilitation. The results did not support the widely held belief that longer LOD is associated with worse treatment outcomes. /

Pedarnales, 4:00 PM

Why (and When) Straight Women Trust Gay Men: Ulterior Mating Motives and Female Competition

Presenter: Eric Russell, Psychology Graduate

Mentor: William Ickes

Abstract:

Previous literature has suggested that straight women experience an increased sense of comfort and trust in their friendships with gay men. Alone, however, this descriptive finding does not offer an explanation for why women exhibit this heightened trust in gay men nor when (i.e., in what contexts) this effect occurs. In three studies, I test whether gay men's lack of ulterior mating motives enhances women's trust in gay men and women's openness to gay male friends. Study 1 demonstrated that women place greater trust in gay men's mating advice relative to the same advice from heterosexual individuals. In Study 2, exposing women to a visualization of increased mating competition enhanced their trust in gay men. Study 3 further demonstrated that women who perceive high levels of mating competition are more open to befriending gay men. These results provide novel insight into the contexts in which the unique interpersonal bond between straight women and gay men most likely forms.

Pedarnales, 4:20 PM

Hindu-Muslim Attitudes and Desire for Distinctiveness: The Roles of Contact, Self-Disclosure, and Perspective Taking /

Presenter: Lauren Coursey, Psychology Graduate

Mentor: Jared B. Kenworthy

Group Members: Jennifer Jones

Abstract:

Social Identity Theory and Optimal Distinctiveness Theory argue that group members possess a desire to positively distinguish the ingroup from the outgroup. We predicted that intergroup contact would decrease this desire and lead to more positive outgroup attitudes. In study 1, conducted in India, quality contact led to increased reciprocal self-disclosure which in turn decreased desire for distinctiveness and increased positive outgroup attitudes among a sample of Hindus and Muslims. This model was extended in study 2 to include perspective-taking as a mediator for the effects of self-disclosure. Among a sample of Hindu and Muslim students in the U.S., the overall model in which quality contact predicted increased self-disclosure which in turn produced decreased desire for distinctiveness and more positive outgroup attitudes via increased perspective-taking was supported. Despite the overall model fit, perspective-taking did not significantly directly or indirectly predict desire for distinctiveness. The theoretical and practical implications of the current findings are discussed.

Pedarnales, 4:40 PM

Examination of Clinically-relevant severity levels for the central sensitization inventory (CSI) in a chronic disabling occupational musculoskeletal disorder population

Presenter: Meredith Hartzell, Psychology Graduate

Mentor: Robert Gatchel

Group Members: Tom G. Mayer, Randy Neblett, Sali Asih

Abstract:

INTRODUCTION: The Central Sensitization Inventory (CSI) is a valid and reliable patient-reported outcome instrument designed to identify patients whose presenting symptoms may be related to a Central Sensitivity Syndrome [(CSS); e.g., fibromyalgia, chronic fatigue syndrome, irritable bowel syndrome, etc.], with a common etiology of Central Sensitization (CS). / **AIMS AND METHODS:** The following CSI severity levels were established in a psychiatric chronic pain sample: Subclinical = 0-29; Mild = 30-39; Moderate = 40-49; Severe = 50-59; and Extreme = 60-100. The aim of this study is to validate the severity levels in a new sample population: chronic disabling occupational musculoskeletal disorder (CDOMD) patients (N = 681), by comparing the CSI severity levels on demographic, psychosocial, and psychiatric data, as well as their patient-report of CSS diagnoses. / **RESULTS AND CONCLUSIONS:** The concurrent validity of the CSI severity levels was confirmed by strong associations with psychiatric

Red River, 8:00 AM

Mixed-mode malware and its analysis

Presenter: Shabnam Aboughadareh, Computer Science Engineering Graduate

Mentor: Christoph Csallner

Abstract:

Malware and malware analysis are in an arms race. While analysis tries to understand the latest malware, malware tries to evade the latest analysis techniques. In our research we provide proof-of-concept of mixed-mode malware and show it evades analysis with current malware analysis tools such as TEMU developed at Berkeley University and Ether built at Georgia Institute of Technology. Such malware orchestrates actions between two components with user and kernel level access to the victim system's resources. We found current malware analysis tools suffer from one or both of the following shortcomings against mixed-mode malware. 1) Running in kernel and thus exposing the analysis to kernel-level component of malware. 2) Operating in single domain, either kernel-mode or user-mode, but not capturing malware's operations in both modes. To address these shortcomings we developed SEMU, a malware analysis tool that operates both outside the domain of mixed-mode malware and performs analysis in both user and kernel modes. The runtime performance of SEMU is in line with the most closely related analysis tools TEMU and Ether.

This material is based upon work supported by the National / Science Foundation under Grants No. 1017305 and 1117369.

Red River, 8:20 AM

History Based Learning Model for Predicting Contact Volume in Opportunistic Networks

Presenter: Md Mehrab Shahriar, Computer Science Engineering Graduate

Mentor: Yonghe Liu

Group Members: Sajal Das

Abstract:

In absence of fixed infrastructure, connectivity between / nodes is one of the most challenging issues in opportunistic / networks (OppNets). OppNet nodes, usually characterized by / human-portable devices, get connected to each other during proximity / triggered opportunistic contacts. Due to dynamic nature of / human mobility, these contacts are supposed to be short lived and / vulnerable implying that the mere contacts doesn't necessarily / translate into successful connectivity. Successful completion of / data transmission in every contact is therefore an over-optimistic / assumption. Surprisingly, this wrong concept about the OppNet / connectivity has been the basic assumption in most of research / works so far and only a few have focused on the vital issues / like contact duration and contact volume measurement. In this / paper, we propose a novel scheme called HiPCV that predicts / contact volume in soft real-time to enable efficient and reliable / data transfers during opportunistic contacts. HiPCV is a distributed / learning model, which captures individual's preferential / movements with spatial contexts and directional information, / and paves the way for mobility history assisted accurate contact / volume predictions. Experimenting on real world human mobility / traces, we first learn and structure the human walk patterns / imbued with spatial context and directional information, on / individuals preferred trails. By creating a Mobility Markov Chain / (MMC) out of this pattern and infusing it into HiPCV algorithm, / we then devise a decision model for data transmissions during / opportunistic contacts. Experimental results show the robustness / of HiPCV in terms of reliable opportunistic data transfers and / bandwidth saving, at places where people show regularity in their / movements.

Red River, 8:40 AM

**Evaluating Depth-Based Computer Vision
Methods for Fall Detection Under Occlusions**

Presenter: Zhong Zhang, Computer Science Engineering Graduate

Mentor: Vassilis Athitsos

Abstract:

Falls are one of the major risks for seniors living alone at / home. Fall detection has been widely studied in the computer vision / community, especially since the advent of affordable depth sensing technology like the Kinect. / Most existing methods assume that the whole fall / process is visible to the camera. This is not always the case, however, / since the end of the fall can be completely occluded by a certain object, / like a bed. For a system to be usable in real life, the occlusion problem / must be addressed. To quantify the challenges and assess performance / in this topic, we present an occluded fall detection benchmark dataset / containing 60 occluded falls for which the end of the fall is completely / occluded. We also evaluate four existing fall detection methods using a / single depth camera [1–4] on this benchmark dataset.

Red River, 9:00 AM

Towards Making Random Passwords Memorable: Leveraging Users' Cognitive Ability Through Multiple Cues

Presenter: Mahdi Nasrullah Al-Ameen, Computer Science Engineering Graduate

Mentor: Matthew Wright

Group Members: Shannon Scielzo

Abstract:

Given the choice, users produce passwords reflecting common strategies and patterns that ease recall but offer uncertain and often weak security. System-assigned passwords provide measurable security but suffer from poor memorability. To address this usability-security tension, we argue that systems should assign random passwords but also help with memorization and recall. We investigate the feasibility of this approach / with CuedR, a novel cued-recognition authentication scheme that provides users with multiple cues (visual, verbal, and spatial) and lets them choose the cues that best fit their learning process for later recognition of system-assigned keywords. In our lab study, all 37 of our participants could log in within three attempts one week after registration (mean login time: 38:0 seconds). Based on our results, we suggest appropriate applications for CuedR, such as financial and e-commerce accounts.

Red River, 9:20 AM

A General Model for MAC Protocol Selection in Wireless Sensor Networks

Presenter: Abolfazl Asudeh, Computer Science Engineering Graduate

Mentor: Gergely Zaruba

Abstract:

Wireless Sensor Networks (WSNs) are being deployed for different applications, each having its own structure, goals and requirements. Medium access control (MAC) protocols play a significant role in WSNs and hence should be tuned to the applications. However, there is no for selecting MAC protocols for different situations. Therefore, it is hard to decide which MAC protocol is good for a given situation. Having a precise model for each MAC protocol, on the other hand, is almost impossible. Using the intuition that the protocols in the same behavioral category perform similarly, our goal in this paper is to introduce a general model that selects the protocol(s) that satisfy the given requirements from the category that performs better for a given context. We define the Combined Performance Function (CPF) to demonstrate the performance of different categories protocols for different contexts. Having the general model, we then discuss the model scalability for adding new protocols, categories, requirements, and performance criteria. We consider energy consumption and delay as the initial performance criteria of the model

Red River, 9:40 AM

Exploring the Usability of Combining Passfaces with Object Images for Graphical Authentication

Presenter: Kanis Fatema, Computer Science Engineering Graduate

Mentor: Matthew Wright

Abstract:

Graphical password is an emerging field in authentication research, which leverages 'Picture Superiority Effect' to offer secure and memorable passwords. 'Passfaces' is a widely deployed commercial graphical password scheme, in which the user is assigned a set of faces as the authentication secret. However, the research shows that memorability in Passfaces is not satisfactory. We address this issue through a novel approach, in which we provide users with pairs of face and object images (linked with a verbal cue) instead of only face images. For example, a face (say, 'John') is linked with a museum-image: 'John works in museum'. We compared the memorability in our approach with that in two other conditions: i) Remembering only face images, and ii) Remembering only object images. In our multi-session lab-study, we had 15 participants in each condition, where each participant was assigned 15 images (or, pairs of images) to remember. Our results show that the memorability in our approach was 96.3% over the span of one week, which was significantly higher than that in other conditions: face images (89.5%) and object images (92%).

Red River, 10:20 AM

All-In-One Path Selection for Tor

Presenter: Mohsen Imani, Computer Science Engineering Graduate

Mentor: Matthew Wright

Abstract:

Tor is a popular privacy technology that helps Internet users to hide their identity on the Internet. Tor consists of thousands of volunteer computers and several million daily users. Using Tor, users are connected to a network of computers (relays) and send their traffic through an encrypted tunnel. One of the main problems of the Tor network is its low performance, and a key cause of this is the Tor path selection algorithm that picks relays for the secure tunnel. The Tor path selection algorithm selects relays according to their capacities (bandwidth), this results in selecting relays that are far away from each other and constructing long tunnels with high latency. In this work, we improve the Tor performance by proposing three new path selection algorithms. Our algorithms in addition to bandwidth use distance between relays and the user as a factor to reduce the delay, and they also monitor the congestion of tunnels and avoid using them whenever they are congested. In the first algorithm, we use a weighting function that assigns a weight to each relay which consists the relay's bandwidth and distance. In the second algorithm, instead of using a mixing function, we break the tie between a set relays one time by bandwidth and the other time with distance. In the third algorithm, we divide the entire world into a few parts and construct tunnels in each part and avoid hops between parts. We simulated our algorithms in a Tor simulator and our results show a significant improvement in performance compared to previous works.

Red River, 10:40 AM

Nanotextured Microfluidics to Isolate Brain Tumor Cells

Presenter: Muhymin Islam, Electrical Engineering Graduate

Mentor: Samir Iqbal

Group Members: Adeel Sajid and Young-Tae Kim

Abstract:

Cancer is the leading cause of mortality worldwide. The detection and enumeration of tumor cells is a promising field for cancer research. Early detection of cancer needs highly sensitive and selective approaches. Nanotextured polydimethylsiloxane (PDMS) substrates were implemented to detect metastatic human glioblastoma (hGBM) cells. RNA aptamers that were specific to epidermal growth factor receptors (EGFR) were used to functionalize the substrates. EGFR is an established biomarker for many cancer cells (including hGBM). Nanotextured PDMS was prepared by micro reactive ion etching. Nanotextured PDMS provided 300% more cell capture compared to plain PDMS. This enhancement stemmed from increased effective surface area of roughened substrates at nanoscale. Next, aptamer functionalized nanotextured PDMS was incorporated in microfluidic devices and tumor cells were detected from the mixture of white blood cells at an efficiency of 73%. The shear stresses from the flow pressure and heterogeneity of the EGFR overexpression on cell membranes of the tumor cells had significant impact on the cell capture efficiency of the devices.

Red River, 11:00 AM

Narrow-linewidth bandpass filters made with single layer of nanopatterned silicon

Presenter: Manoj Niraula, Electrical Engineering Graduate

Mentor: Robert Magnusson

Group Members: Jae Woong Yoon

Abstract:

Light is an electromagnetic wave comprising of a continuum of wavelengths, also known as light spectrum. Bandpass filters, used to only pass a narrow band of spectrum out of a broad spectrum of light, are of great interest in optical engineering and have applications in telecommunications, astronomical observations, display pixels, and spectroscopic analyses. Traditionally, bandpass filtering is achieved through thin layers of transparent materials known as distributed Bragg stacks. However, most practical applications demand 30-40 layers, making the fabrication of distributed Bragg stacks tedious and their integration infeasible. Moreover, this class of bandpass filters isn't practical for longer wavelength of light due to the large device size that would be required. In contrast, here we experimentally demonstrate high-performance bandpass filtering with a single layer of nano-patterned silicon film. The obtained bandpass filter profile is centered at a wavelength of 1304 nm and has 72.1% transmission efficiency. The full-width at half-maximum linewidth is 0.48 nm. The stopbands surrounding the transmission peak block >99% of light for a 100 nm spectral band. This proposed bandpass filtering technology is simplistic, integration friendly, and scalable to be operative at different spectral domains. Our experimental demonstration opens doors for further development of this technology in various application areas.

Red River, 11:20 AM

Early Detection of Metastatic Breast Cancer from Computerized Analysis of Optical Images

Presenter: Nuzhat Mansur, Electrical Engineering Graduate

Mentor: Samir Iqbal

Group Members: M. Arif Iftakher Mahmood, Young-tae Kim

Abstract:

Metastatic breast cancer (MBC) is an advanced cancer that spreads beyond originating organ to other organs. Early detection of MBC cells can tell presence of metastasis before clinical symptoms. We developed a platform to detect MBC cells using aptamer functionalized glass substrates. The aptamer was an RNA molecule that specifically recognized EGFR, overexpressed on MBC cells. While captured on substrate by aptamer, MBC cells showed characteristic morphological behavior. We developed a computerized imaging process to track the morphological variations over time and analyzed the data with custom software. The results showed that MBC cells created more pseudopods (1 to 3 in 30 min) while non-MBC cells created none. We calculated a similarity matrix of Hausdorff's distance. The higher the distance, the more dissimilar two images of the same cell were. The MBC cells showed higher dissimilarity from one image to another. We saw a threshold of Hausdorff's distance at 125 (au) above which the cells were metastatic. This cell capture procedure and calculation of the features presents an efficient technique to detect MBC at early stage.

Red River, 11:40 AM

Effect of Seasonal Variation on Fugitive Emissions from a Landfill

Presenter: Md Ishtiaque Hossain, Civil Engineering Graduate

Mentor: MD Sahadat Hossain

Group Members: Sonia Samir

Abstract:

The organic fractions present in the landfilled solid wastes, undergoes anaerobic decomposition to produce methane and carbon-di-oxide gas. These generated gases might migrate to the atmosphere mostly due to dispersion, through the fissures/cracks present on the cover. Several studies have been reported the effect of climatological conditions (i.e. temperature, precipitation, barometric pressures, and wind velocity) on methane emission from the landfills. However, no detailed studies have been conducted to date, to evaluate the impact of seasonal variation on fugitive emissions. Therefore, the objective of this study is to investigate the effect of seasonal variation on the fugitive emissions from landfills. The City of Denton landfill, TX was selected for the current study and both bioreactor/Enhanced Leachate Recirculated (ELR) cell, and traditional landfill cell from the landfill were monitored for approximately two years. The emission from bioreactor cell was observed to vary between 0.25 ppm to 11 ppm (an average of 4.45 ppm) and the emission from traditional landfill cell was observed between 0.2 to 8.5 ppm (an average of 2.95 ppm). Based on the results, a direct trend was observed between the temperature and the fugitive emission from the landfills, the higher the temperature was, the higher the average emission was observed from the landfills. However, the emission from the bioreactor cell was observed to be higher than the emission from the conventional landfill cell.

Red River, 1:00 PM

Genomic characterization of Termite Associated Verrucomicrobia (TAV) strain 5, of the wood feeding termite *Reticulitermes flavipes*

Presenter: Malini Kotak, Biology Graduate

Mentor: Jorge Rodrigues

Group Members: Jantiya Isanapong

Abstract:

The ability of termites to digest wood makes them promising models for biofuel production. Although this ability is attributed to their gut microorganisms, very little is known about their identities and roles because these organisms are difficult to culture. We sequenced the genome of the Verrucomicrobium strain TAV5, isolated from the hindgut of the termite *Reticulitermes flavipes*. Genomic analysis revealed that TAV5 might be involved in important processes like lignocellulose digestion, nitrogen fixation and oxygen removal in the termite hindgut. We are performing a detailed comparison of the TAV5 genome with other members of the phylum Verrucomicrobia, to help us further investigate the potential roles of TAV strains and understand their metabolism. This study will advance our understanding of the termite gut microbial community structure, their interrelationships and symbiotic mechanism.

This work was supported by U. S. Department of Energy.

Red River, 1:20 PM

A Turbulent Past May Help Corals Cope With a Hotter Future

Presenter: Contessa Ricci, Biology Graduate

Mentor: Laura Mydlarz

Group Members: Christopher Wall, Laura Mydlarz, Hollie Putnam, Grace Foulds, Ruth Gates

Abstract:

Coral reefs have evolved for millions of years in relatively stable habitats. As such, many are currently being lost because they cannot adapt to rapid global change. Responses to environmental stress can vary within the same species, and local-level adaptations can contribute to this. This study explores whether a thermally variable environment can predispose corals to better cope with thermal stress as compared to those from a more stable one. Fragments of the coral species *Montipora capitata* originating from a near shore (variable environment) and offshore (stable environment) reef were experimentally exposed to elevated temperatures for one week. Their health was then assessed using assays for physiological stress and immunity. Results suggest near shore corals better handle thermal stress, as indicated by increased photosynthesis by the algal symbionts under elevated temperatures and lower levels of stress indicators from the corals as a whole. These data suggest that coral reef abundance further from shore may decrease as thermally stressful events increase in frequency.

Red River, 1:40 PM

The fiction of partitions and the reality of mixture models

Presenter: Richard Adams, Biology Graduate

Mentor: Todd Castoe

Group Members: Daren C. Card, Jacobo Reyes-Velasco, Drew R. Schield

Abstract:

Statistical methods of phylogenetic inference rely on the accurate estimation and assignment of probabilistic models describing the stochastic processes underlying nucleotide substitution patterns. Failure to account for among-site variation in substitution patterns introduces severe biases in tree reconstruction estimates, thus partition strategies are often implemented to reflect differences in rates resulting from functional constraints, such as codon position, coding regions, and amino acid structure. Contemporary partitioning strategies rely on the assumption that substitution models are homogenous across large subsets of the sequence alignment and can be assigned a priori to these subsets from a hierarchy of named models. Recent evidence challenges the ability of a priori partition schemes to accurately capture the landscape of among-site variation in nucleotide substitution rates in large, complex datasets. Here we conduct a comprehensive analysis and comparison of partition models across multiple representative datasets, including mitochondrial genome alignments and matching orthologous nuclear genes for 71 vertebrate species, as well as simulated data. Our results indicate that predetermined partition schemes fail to account for variation in nucleotide substitution rates across the sequences. Additionally, we compare partitioning strategies to the implementation of mixture models that estimate partition components as informed by patterns observed in the dataset. Our evidence and that of others, support a final rejection of a priori partition models in favor of mixture models, which accurately predict the reality of substitution rate heterogeneity across large datasets

Red River, 2:00 PM

Who Are the Fathers? Characterizing Hybrid Origins of Parthenogenetic *Aspidoscelis* Lizards

Presenter: Alex Hall, Biology Graduate

Mentor: Matthew Fujita

Group Members: Jose. A. Maldonado

Abstract:

Conclusive population assignments for North American whiptail lizards (*Aspidoscelis*) eludes investigators using several techniques. Hybridization between several whiptail species complicates phylogenies because female F1 hybrids reproduce via parthenogenesis. Interestingly, parthenogenetic lizards exhibit phenotypic variation in scalation, size, and color. I sought to infer lineages within the parthenogenetic *A. tessellata* complex. I hypothesized multiple hybridization events between the parent species. To capture maximal genetic information across many individuals per species and across species, I sequenced thousands of shared loci using restriction-associated DNA sequencing and sequenced entire mitochondrial genomes. I will present parental population assignments to *A. tessellata* inferred using structure and species tree inference. Multiple origins of a vertebrate parthenogen would constitute diversity not otherwise expected of a completely clonal lineage from one origin.

Red River, 2:20 PM

Identifying Drivers of Speciation on an Ancient Tropical Island Using Next Generation Sequencing Data

Presenter: Kyle O'Connell, Biology Graduate

Mentor: Matthew Fujita

Group Members: Alex Hall, James Titus, Jose Maldonado

Abstract:

Since before the time of Darwin scientists have hypothesized as to how species diversified on islands. Many have believed that the primary driver of diversification is island hopping, or colonization events. In other cases it seems more likely that within-island processes have promoted speciation in situ. This study proposes to compare these two processes on two large tropical islands in South-East Asia. Using genetic sequence data from a frog and gecko species group, I will compare patterns of genetic diversity between and within islands to identify the primary drivers of diversity. Genetic data consists of complete mitochondrial genomes, generated using a novel next-generation sequencing technique. This study concludes that the frog group has primarily diversified on Sumatra by within-island processes, while the gecko group has primarily diversified by island hopping and colonization. These findings suggest that both processes have contributed to present diversity on islands.

This work was supported in part by the National Science Foundation.

Red River, 3:00 PM

Validated Performance Evaluation of a Commercial Drug Disposal Product using Liquid Chromatography - Mass Spectrometry

Presenter: Veronica Waybright, Chemistry and Biochemistry Graduate

Mentor: Kevin A. Schug

Group Members: Stephanie H. Ma

Abstract:

Unused and expired medications are improperly disposed in many ways. They are thrown down the sink, toilet or trash. They are also stockpiled by consumers in their own homes, where the risk of misuse and accidental ingestion by other family members and friends increases. Without proper drug disposal, drugs may remain in circulation and be diverted to others for drug abuse. Significant environmental implications also exist. Here, we investigate the effectiveness of a new drug disposal product. This product claims to sequester drugs' active ingredient making them safe to dispose in the trash. The formulation's efficacy was measured liquid chromatography – mass spectrometry for a wide variety of drugs, which included opioids, barbiturates, statins, steroids, amphetamine, and benzodiazepine drugs. The quantification of these drugs was obtained by utilizing an external calibration curve built from a series of diluted standards. Samples taken from the product indicated an excellent ability to sequester the drugs, making them unrecoverable, and proving the product to be a viable alternative for drug disposal.

Red River, 3:20 PM

Mass spectrometry based method for identification of prenylated peptides- a target for several cancers.

Presenter: Ruchika Bhawal, Chemistry and Biochemistry Graduate

Mentor: Saiful Chowdhury

Abstract:

Prenylation of proteins is involved in several human cancers like prostate, colon, and acute myeloid leukemia. It is of two types- Farnesylation and Geranylgeranylation. Most of the studies on protein prenylation detection use radioactive labelling, chemical reporters, LC-MS analysis and tagging via substrate method. They are either tailored to specific protein or need long analysis time and not suitable for large scale samples. A novel method for detection of prenylated peptides using the mass spectrometric fragmentation method was developed. It utilizes the cleavable properties of sulfoxide formed by oxidation of prenylated peptides to form signature mass loss fragment. The epoxy groups are introduced to increase the hydrophilicity and to make it enrichable. All the mass spectrometric studies were done using MALDI-IT-TOF and ESI-IT-TOF. This method will advance the identification of prenyl proteins from large-scale samples and improve our understanding about cancer diagnosis.

Red River, 3:40 PM

Profiling reactive arginine residues of proteins by amino acid specific chemical labeling and mass spectrometry

Presenter: Maheshika Wanigasekara, Chemistry and Biochemistry Graduate

Mentor: Saiful Chowdhury

Abstract:

Post-translational modification (PTM) is a series of covalent processing of protein which results cleavage of amino acid sequence or an addition or removal of chemical moieties to amino acid residues. Several approaches are available for studying the arginine reactivity towards various reagents and the fragmentation pattern identification in mass spectrometer. Residue-specific peptide/protein modification requires reaction conditions that allow to selectively modifying the amino acid of interest. We carried out the reaction under alkaline medium. To compare the reactivity of the two reagents we performed the reaction with 1,2 cyclohexanedione and phenylglyoxal. Mass spectrometric (MS) analysis was done with MALDI-QIT-TOF-MS. Peptides are fragmented by MS to identify the peptide and localize its modification. Overall, the approach presented herein allows profiling the reactive arginine residues in proteins. Future experiments will explore the reactive arginine.

Red River, 4:00 PM

Protein Separation, Detection, and Quantitation in Biological Fluids

Presenter: Evelyn Wang, Chemistry and Biochemistry Graduate

Mentor: Kevin A. Schug

Group Members: Dananjaya Kalu appulage, Frances Carroll

Abstract:

The demand for detecting and quantifying proteins is increasing in biological fluid analysis, protein therapeutics, and drug development. Current methods use highly sensitive triple quadrupole mass spectrometers (QQQ-MS), but require prior protein digestion. Methods that bypass digestion and directly analyze the protein on QQQ-MS simplify the process, thus advance clinical diagnostics and treatment. Protein standards for myoglobin, cytochrome c, lactalbumin, lysozyme, and ubiquitin, were detected and quantified on QQQ-MS. Calibration curves were developed with respectable linearity ($R^2 > 0.99$). To enhance detection in complex biological fluids, chromatographic development was facilitated with a pump system providing up to 16 solvents and 6 columns combinations and method scouting software to generate sequences for automated separation optimization. This research presents our success in direct analysis of proteins by QQQ-MS along with a sophisticated liquid chromatography system that allows automated method development. This method is a model for future analysis of important disease indicators such as protein in biological fluids.

This work was supported in part by Shimadzu Scientific Instruments, Inc. and Restek Corporation.

Red River, 4:20 PM

Determination of Natural Gas Components in Drinking Water and Lithium Ion Battery Off-gassing by Gas Chromatography with Vacuum Ultraviolet Detection

Presenter: Ling Bai, Chemistry and Biochemistry Graduate

Mentor: Kevin A Schug

Group Members: Jonathan Smuts, Phillip Walsh, Hui Fan, Zacariah Hildenbrand, Derek Wong, David Wetz

Abstract:

Natural gas and lithium ion batteries are two important energy sources in our life. However, methane from natural gas can create a problem for either aquifer drinking water or air quality. Lithium ion batteries will release toxic gases when undergoing the thermal runaway reaction when overheated from overcharging or exposed to high temperatures during transportation process. To address these problems, a new gas chromatography detector based on vacuum ultraviolet (VUV) spectroscopy (GC-VUV) has been used to identify natural gas components in drinking water and off-gassing from lithium ion batteries. The results showed us the drinking water has been contaminated by thermogenic methane from natural gas, and also showed us that toxic gases, such as methane, ethylene, chloromethane, dimethyl ether, 1,3-butadiene, CS₂, and methylpropionate are generated during thermal runaway events from lithium ion batteries. Our study shows a great potential of GC-VUV technology and also features the sensitivity and universal detection capabilities where mass spectrometry performance could not achieve.

Red River, 4:40 PM

Designing Molecules to Extend the Shelf Life of Commercial Plants and Produce

Presenter: Shawn Ridlen, Chemistry and Biochemistry Graduate

Mentor: Rasika Dias

Abstract:

Ethylene is a simple gas molecule that plays an important role in the agricultural industry. As a plant hormone, ethylene triggers ripening in many types of fruit and wilting in many types of flowers by binding to copper centers available in the plants. It is therefore desirable to understand and control the plant response to ethylene. The most widely used chemical to control the response is methylcyclopropene (MCP). MCP works by blocking the ethylene receptor, but it is not well known how this takes place. Although it works well, MCP is a gas and can be a challenge to administer. In our research we would like to understand the activity of MCP by fully characterizing a model compound and to develop a chemical that will have similar activity to MCP but will be easier to handle and apply to the plants and produce. Several steps have been made toward achieving these goals. Two model complexes have been made and examined for their ability to bind to ethylene. One compound has been shown to bind more strongly to ethylene than the other. This will help to get a broader range of binding strength for modeling the how MCP binds in plants. Additionally, several potentially ethylene inhibiting compounds have been prepared and show good solubility in water. This is important for ease in application. These compounds are currently being tested directly in plants for the desired activity. These results of the binding studies and live plant testing will be discussed as available.

San Jacinto, 8:00 AM

Marketability of Nanotextured Substrates based Tumor Cell Capture Systems

Presenter: Adeel Sajid, College of Science Undergraduate

Mentor: Samir M. Iqbal

Group Members: Adeel Sajid, Madiha Hanif, Samir P. Nathu, M. Arif Iftakher Mahmood, Young-Tae Kim

Abstract:

Circulating Tumor Cells (CTCs) have become a very useful metric in early cancer detection. However, it has been a challenge to capture CTCs because they are rare in the peripheral blood during the early stages of cancer. Nanotextured PDMS substrates with surface-immobilized anti-EGFR aptamer molecules have proven to be an effective method for capturing and isolating CTCs. The nanotexture surface mimics the basal membrane, providing a conducive environment for tumor cells to interact. It also increases the surface area for aptamer immobilization, allowing for a higher number of available ligands to bind to overexpressed EGFR proteins in tumor cells. This results in greater cell adhesion and interaction. A study was carried out to translate this technology into a prototype for commercialization. This paper presents a market analysis of the state of the art in early cancer detection, the gaps in technology available, and comparison of our approach to the other technologies. The analysis showed that the market for new entrants in the CTC detection segment required multiple players to work together for a viable product.

San Jacinto, 8:20 AM

Urbanization and the native prairie: Effects of human activity on growth and reproduction of Texas Wintergrass

Presenter: James Hobbs, Earth and Environmental Science Undergraduate

Mentor: Laura Gough

Group Members: Michelle Green

Abstract:

The Fort Worth Prairie was a once prominent 1.3 million acre ecosystem that has diminished into a few thousand acres. This transformation has resulted in new land uses, elevated temperatures, and increased pollution levels, all which could affect growth of indigenous biota. This research project focused on the effect urbanization had on the growth and reproduction of the native plant, Texas Wintergrass and sought to explore the correlation between nitrogen-based pollutants and growth. Six sites across Dallas-Ft. Worth were selected based upon differing degrees of urban proximity. Methods for calculating plant growth and reproduction included measuring the width of each plant along with the length and number of leaves and flowering stalks. Quantifying levels of pollutants was achieved by using resin columns, which collected nitrogen molecules from precipitation. Preliminary results indicate significant differences among the sites; however the influence is still being investigated. Understanding this is important to consider when dealing with expansion of populations and rural areas becoming more developed.

San Jacinto, 8:40 AM

In-vitro Model of Cancer Cell Perineural Invasion

Presenter: Alissa Hendricks, Bioengineering Undergraduate

Mentor: Young-Tae Kim

Group Members: Loan Bui, Richard Leviner

Abstract:

Cancer lethality comes from tumor metastasis and migration via the circulatory, lymphatic and neural systems. Currently there are few clinically used techniques using the neural system, though many suffer the pain of perineural invasion (PNI). This study investigated the affinity of cancer cell lines to dorsal root ganglia (DRG) cells by culturing the cells in microfluidic devices; then using immunostaining and fluorescence imaging determined if cancer cells exhibited visibly noticeable structure changes when in the vicinity of DRG. First, two breast cancer lines (aggressive MDA-MB-231 and non MCF-7) and lung cancer (H460) were used given that these cancers rarely lead to PNI in patients, therefore cells should not exhibit structure alterations in-vitro. Furthermore, we analyzed pancreatic cancer (AsPC-1) given that nearly all pancreatic cancers lead to PNI. We found no structural changes in the non-pancreatic cell lines, while we did find structural changes and associations in the pancreatic cells. In the future we will analyze more pancreatic cell lines, and determine if there are effects on the cells beyond morphology.

San Jacinto, 9:00 AM

Identifying Human Voice Features using Spectral Analysis

Presenter: Samir Nathu, Electrical Engineering Undergraduate

Mentor: Samir Iqbal

Group Members: Mohammad Motasim Bellah

Abstract:

We computationally investigated spectral features of human sound of two English vowels [a,o] from 12 subjects. The time domain signal was converted into frequency domain by using Fast Fourier Transform (FFT) and spectrograms were computed to find FFT peaks for each spoken vowel. Every speaker had a distinct set of peaks associated with each vowel. This distribution of peaks was used as a signature. A prominent peak was defined as a peak on a normalized FFT magnitude spectrum that was >10% in magnitude than the highest peak. The sequence at which the peaks occurred was used as a secondary identifier for that sound. A database was formed with signatures from all subjects. The system was tested by having subjects speak and their identification done by comparing the voice with the database. Example applications include owner's voice replacing car keys, replacing traditional name signatures in financial transactions with vocal signatures, etc. The features can also be used to monitor vocal chords disorders noninvasively. There are many possible areas where this research can be implemented for security, safety and healthcare applications.

San Jacinto, 9:20 AM

Micropore based Biological Sensors for Biomarker Detection

Presenter: Raja Khanzada, Bioengineering Undergraduate

Mentor: Samir Iqbal

Group Members: Waqas Ali, Young-Tae Kim, Samir M. Iqbal

Abstract:

Cancers figure among the leading causes of morbidity and mortality worldwide, with approximately 14 million new cases and 8.2 million cancer related deaths in 2012. The number of new cases is expected to rise by about 70% over the next two decades. Scientists have been trying to develop systems that can diagnose cancer without undergoing any surgery or extensive laboratory testing. Development of micropore based molecule sensors is a major step towards this goal. We processed non-small cell lung cancer cells H1155 and A549 through a micropore of 15 mm diameter. The of two types cells were successfully differentiated due to the differences in their mechanophysical properties. We observed 25% difference in average translocation time and 23% difference in average peak amplitudes of the pulses registered by these cells. The detection efficiency of the device was more than 70%. With this technique, patient samples and results can be analyzed in a very short time without need of pre-processing. Micropore based detection is a label free method to detect cancer cells on the basis of their chemical make-up and physical properties.

San Jacinto, 9:40 AM

Lilac: Architecture for Anonymous Lightweight Communication

Presenter: Hussain Mucklai, Computer Science Engineering Undergraduate

Mentor: Matthew Wright

Group Members: Revanth Pobala

Abstract:

Recent disclosures of global surveillance programs and numerous high profile online security breaches have raised doubts about the security of our communication online. Mere knowledge of a conversation's participants, without any of its content, can still be sensitive information for whistle blowers, journalists and others. To address these concerns, we are exploring the design and implementation of an anonymous chat system called Lilac which provides strong privacy and security, as well as being easy to use. To protect a user's identity Lilac routes messages through multiple intermediaries, rendering hackers unable to determine the origin or destination of a message as there exists no direct link between the two. To ensure ease of use, Lilac offers an attractive and responsive interface and is unique in that it only requires a web browser to operate. Hosting chat sessions requires instant data transfer and the encryption and routing which occurs within Lilac would be expected to add some latency. However, Lilac shows acceptable operation times, indicating that it could be used for a large number of clients.

This work is sponsored in part by the National Science Foundation under CAREER award CNS-0954133.

San Jacinto, 10:20 AM

Preservation of the Florida Reef Tract: Modeling Survivability

Presenter: Brittney Cox, Biology Undergraduate

Mentor: Hristo Kojouharov

Group Members: Christy Nguyen, Zengxing Pang

Abstract:

Coral reefs play a vital role in maintaining the balance of the ocean's ecosystems. In the past few decades, these habitats have sustained substantial damages from elevated temperatures, ocean acidification, and pollution. Consequently, the interactions between corals and their competing species have become imbalanced. As a result, coral coverage has experienced immense declines, allowing the competitors to become more dominant in the reefs. To contribute to resolving this ongoing issue, we are modeling changes in the populations of stony corals and their major competitors near Florida: macroalgae and gorgonian corals. Gorgonian corals have become more abundant, which endangers the biodiversity that is natural to the reef ecosystems. We conducted analysis on our model by solving for equilibria values and determining their stabilities. Doing so, we can estimate the biological conditions required for each population to become dominant, especially the currently disadvantaged stony corals.

This work was supported by the National Science Foundation

San Jacinto, 10:40 AM

Improving High Energy Particle Time-of-Flight Detectors by Optimizing Quartz Crystal Configuration

Presenter: John Crouch, Physics Undergraduate

Mentor: Andrew Brandt

Group Members: Anthony Rich, Jace Grandinetti

Abstract:

Cherenkov radiation is electromagnetic radiation that occurs when a particle travels at a velocity greater than that of light for a given medium. We travelled to Fermi National Accelerator Laboratory (FNAL) in Batavia, Illinois where quartz bars were placed in a beam of high-energy protons to achieve the Cherenkov effect. The quartz is mechanically coupled to a photomultiplier tube (PMT), which converts photons to electrical signals that can be read by an oscilloscope. Our goal is to optimize the geometry of the quartz bar configuration to maximize and collimate the light collected by the PMT. To this end we tested three different quartz configurations, first in computer simulation, then at FNAL. Each configuration is a variation on a system of two bars joined at right angles to form an L-shape. We were able to show significant improvement over previous designs that used straight quartz bars. Our ultimate goal is to use such a quartz/PMT device to improve precision time of flight (TOF) measurements of the ATLAS Forward Proton (AFP) project at the Large Hadron Collider (LHC) in Geneva, Switzerland.

This work was supported in part by the United States Department of Energy

San Jacinto, 11:00 AM

Mapping peritoneal tumors labeled with radio isotopes F18 and Cu64 through the use of a gas electron multiplier detector

Presenter: Joshua Medford, Physics Undergraduate

Mentor: Jin Mingwu

Abstract:

Peritoneal carcinomatosis (PC) is one of medicine's most malignant cancers with a very low 5 year survival rate due to the fact that it has a very high recurrence rate. Even after highly toxic chemotherapy dosages and cytoreductive surgery, residual tumors cause patients to relapse and eventually die. It has been shown that tumors display a much higher uptake of glucose and copper and therefore F-18 and Cu-64 could be used as reliable radiolabeled biomarkers. In this study, we pursue that the use of a gas electron multiplier (GEM) detector for more accurate, precise, and complete mapping of all malignant PC tumors loaded with these radiotracers. GEM detectors are composed of Kapton foil, copper foil and filled with a gaseous ratio of 80:20 Argon and CO₂. Whenever charged particles from beta decays of F-18 and Cu-64 pass through the GEM detector, they ionize the gas molecules that then create electron avalanches and generate a detectable signal with position read-out; the location of the radiation source that represents the tumor can be identified. Both Monte Carlo simulation of beta particles (from F-18 and Cu-64) transportation in a GEM and a 2cm x 2cm GEM detector detecting a radiation source that resembles the said biomarkers are conducted to show the principles of this new application of GEM for PC treatment. It is envisioned that the effective imaging of residual PC tumors can lead to their complete destruction and significantly lower the fatality.

San Jacinto, 11:20 AM

The Moral Foundations of Social Cognition

Presenter: Melissa Daniels, Psychology Undergraduate

Mentor: William Ickes

Group Members: Jarryd Willis

Abstract:

This study examined differences in Democrats' and Republicans' competence and warmth ratings of various social groups, and the moral intuitions that may underlie these differences. Participants completed the moral foundations questionnaire and (using Stereotype Content Model methodology) completed ratings of seven groups (Cuddy, Fiske, & Glick, 2007; Graham, Haidt, & Nosek, 2009). The data revealed differences in competence and warmth ratings both across and within parties. Moreover, we found that endorsement of the sanctity foundation predicted Republicans' group ratings whereas fairness predicted Democrats' group ratings. Our findings suggest that the moral intuitions underlying policy preferences also shape perceptions of groups tethered to those policies.

This work was supported by I-Engage

San Jacinto, 1:00 PM

Quantifying Protein Concentration in Urine through Mass Spectrometry Techniques

Presenter: Yashaswini Nagarajan, Chemistry and Biochemistry Undergraduate

Mentor: Kevin A. Schug

Group Members: Yu-Sheng Sung, Evelyn Wang

Abstract:

Urine has valuable information about a person's health; protein in urine can indicate diseases such as Sickle Cell anemia and kidney infection. However, the urinalysis conducted in clinics can only detect protein greater than 20 mg/dL. Lower detection limit can aid early diagnosis with a higher treatment success especially in oncology. It is hard to quantify protein at low levels because of the complex nature of urine. A new mass spectrometry (MS) method helps isolate the proteins by allowing the proteins to bind to a screen while potentially washing out the other molecules in the urine. To focus our study, the protein standard, ubiquitin, was injected into our urine sample. Statistical analysis was used to find the limit of detection and quantification. When our data were compared with the current urinalysis limit, the MS was able to detect protein at a concentration 2 million times lower than the current method. The success of this project will advance the oncological and the medical field's repertoire of diagnostic and treatment techniques for patients with diseases that involve protein in urine.

San Jacinto, 1:20 PM

Novel Antibiotics Using Vitamin B1 Derivatives

Presenter: Nicky Hales, Chemistry and Biochemistry Undergraduate

Mentor: Frank W. Foss

Group Members: Diego Lopez

Abstract:

The increasing demand for finding new antibiotics is dependent on discovering new ways to attack resilient microbes. Vitamin pathways that are unique to bacteria are an opportunistic area for discovering novel drug development. HMP kinase is a major enzyme involved in the process of manufacturing vitamin B1. Most living organisms are able to obtain B1 directly from dietary intake; however, bacteria require cellular machinery that can synthesize this essential vitamin de novo. HMP kinase is an obligatory facilitator for this process to occur and subsequently for infectious bacterial survival. Our efforts aim for the synthesis of modified HMP analogs that are different enough from the naturally occurring substrate so that it will inhibit the vitamin B1 pathway, but similar enough to be able to hoax the bacteria into integrating our synthetic compound into their cellular machinery. Over 50 HMP analogs have been made in the efforts of hindering this innate pathway. Although few of these compounds offer interesting activity, more variations of HMP analogs will aid in the development of new antibiotics.

San Jacinto, 1:40 PM

Protein Quantitation using Transmission-Mode Desorption Electrospray Ionization-Mass Spectrometry

Presenter: Yu-Sheng (Sam) Sung, Chemistry and Biochemistry Undergraduate

Mentor: Kevin A. Schug

Group Members: Yashaswini Nagarajan, Evelyn H. Wang

Abstract:

Sensitive methods for protein quantification are valuable in the medical field. High levels of protein in human urine are often indicators of fatal diseases, including preeclampsia and proteinuria which indicates liver failure. Early discovery of these indicators could potentially aid in finding effective treatments for the patient and prevent the development of these diseases. The goal of this research is to quantify a model protein, ubiquitin, using transmission mode–desorption electrospray ionization–mass spectrometry (TM-DESI) to establish proof-of-concept for future applications. Water samples spiked with varying concentrations of ubiquitin were analyzed by TM-DESI-MS to obtain a linear range. Results indicate this range for quantitative analysis of ubiquitin to be from 10-200 $\mu\text{g}/\text{mL}$ with a limit of detection as low as 1 $\mu\text{g}/\text{mL}$. A calibration curve obtained from water would then be used to quantify protein indicators of fatal diseases in urine. Compared with contemporary methods such as the 24-hour spot urine and the dip stick test, TM-DESI-MS provides more sensitive, specific and accurate information for protein quantification.

San Jacinto, 2:00 PM

Cobijitas: From the Eyes of an Orphan Child to a UTA Student

Presenter: Dirsha Luevano, Business Undergraduate

Mentor: Alicia Rueda-Acedo

Abstract:

As an orphaned child there might be many times when you question the meaning of life and how you can keep your spirit and dreams from crashing. On Christmas Day of 2014, I had the pleasure to meet 46 children that live in an orphanage called "Creacion y Vida", located in a small community in the state of Aguascalientes, Mexico. I brought them the gathered items, a blanket and school supplies organized by UTA students. Several studies show the positive impact that community engagement and volunteering have in students' personal and professional goals (Wilson and Musick). As a student of International Business, I understand the importance of education for the economical progress of an under developed country like Mexico. On the other hand, it is also essential for college students to have experiences of some type of community engagement, locally, regionally, nationally or internationally (Tydlaska). Helping children like the ones at the orphanage "Creación y Vida" is a great way to create a different perspective of the world and inspire students to find solutions to these social matters. The same group of UTA students and myself are working to provide Internet connection and computers to these kids. Our goal is to offer them online English classes. In my presentation, I will explore the importance of community/volunteering services at college level and how a student-led program like this can serve as a model for other UTA students interested in doing volunteer services abroad. Cobijitas 2014: <http://youtu.be/T3-h7Q>

San Saba, 8:00 AM

Documenting Traditional Ecological Knowledge (TEK) in the Cherokee Language

Presenter: Vicki Cana, Linguistics Graduate

Mentor: Colleen Fitzgerald

Group Members: Samantha Cornelius

Abstract:

Cherokee is an endangered Iroquoian language spoken in Oklahoma. Both the language itself and traditional ecological knowledge (TEK) is being lost. The goal of this study is to document the knowledge and cultural practices the Cherokee have about their natural environment in the Cherokee language for future sustainability. / I will present the results of a collaborative project between UTA Linguistics students and Cherokee Nation to create a set of videos documenting knowledgeable speakers' TEK in the Cherokee language. With input from fluent speakers, we transcribed and translated the content of three hours of video recorded in Tahlequah, OK. We also processed and edited the videos into shorter segments, adding subtitles in Cherokee phonetic script and English. / Creating shorter videos makes them useful for multiple purposes within the Cherokee community. They can be used on Cherokee Nation's You Tube Channel, and in the Cherokee immersion program, or for wider audiences. Other positive outcomes are the creation of TEK curriculum, training for field linguists and valuable experience in language documentation with an ecological focus.

This work was supported by a grant from the / UTA University Sustainability Committee

San Saba, 8:20 AM

Language Development: Developing Communities

Presenter: Kent Rasmussen, Linguistics Graduate

Mentor: Colleen Fitzgerald

Abstract:

The Democratic Republic of the Congo (DRC) is last both in general human / development (UNHCR 2013) and in the welfare of women and children (Geoghegan / 2013). The country has 212 local minority languages (Lewis et al 2014), about half / with no writing system or written materials. / My study shows that writing systems can be developed through collaboration / with a languages' speakers, for local and international interests. / This study draws on a workshop with speakers of the Ndaka and Mbo languages / (DRC), where together we analyzed their consonants and vowels. Results include the / creation of their first printed literacy materials, as well as analysis that shows each / language to have several interesting consonants (e.g., b and kp), nine vowels, vowel / harmony and tone (contrastive pitch). / The significance in this work comes in three ways: interesting data for our / understanding of both vowel systems and consonant-tone interaction, an example of / grassroots literacy in these communities, and a demonstration that scientific and social / needs can be effectively combined to provide international and local benefits. /

This research is supported in part by the College of Liberal Arts Global Research Fellowship, the Jerold A. Edmondson Research Endowment in Linguistics Grant, and SIL International. /

San Saba, 8:40 AM

“Fully informed or completely informed?”: Maximizer associations in American English

Presenter: Ji Yea Kim, Linguistics Graduate

Mentor: Laurel Smith Stvan

Abstract:

Even though there is no clear-cut meaning difference between "fully" and "completely", speakers are much more likely to say "fully informed" than "completely informed". This shows that some words have stronger associations with particular adjoining words. Adverbs like "fully" and "completely" are called maximizers because they reinforce the meaning of the words they bond with. The present study investigates the patterns of eight frequent maximizers (e.g., absolutely, completely, dead, entirely, fully, perfectly, totally, and utterly) in associating with adjectives in American English. / / 312 pairs of “adverb + adjective” phrases were analyzed from the Corpus of Contemporary American English (Davies 2008), an online collection of real utterances. Three main types of associations were found: positive (e.g., perfectly respectable), negative (e.g., totally unprepared), and more importantly, neutral meanings (e.g., dead flat). Percentages of each association were calculated for the eight maximizers, revealing a distribution among the three types that is not equal; maximizers are used more in negative contexts than in positive contexts. Furthermore, although only the dichotomy between positive and negative associations is discussed in previous research on British English (Zhang 2013), the present study reveals that neutral associations also occur. This provides a new insight, because maximizers are traditionally discussed as indicating extremes. Adverb associations in American English have been less well studied than those in British English (Kennedy 2003). This study’s findings suggest that extending the focus to adverb associations in American English can offer a more accurate and nuanced semantic description of this word class.

San Saba, 9:00 AM

Hashtags as a sign of hesitation: Patterns of pronouns with #whyIstayed and #whyIleft

Presenter: Darcey Browning, Linguistics Graduate

Mentor: Laurel Stvan

Abstract:

Analyzing 190 tweets with #whyIstayed or #whyIleft, I examine hashtag position/pronoun use to determine a linguistic role of hashtags. When “he” is subject, tweets usually appear with beginning hashtags: “#whyIleft he hit our 4 year old”. / In 54 tweets with “he”, 81% begin in hashtags, whereas 19% end in hashtags. This differs from patterns with “I”: hashtags begin 55% of 128 tweets with “I”. This “he” pattern occurs more often than by chance, and more often than the “I” pattern. / The tweet's content is a factor: “he” frequently occurs with agency: “he shamed”; “he'd kill”; “he choked”. However, “I” mostly appears without agency: “I thought”; “I believed”; “I felt”. / In beginning with hashtags, writers delay relating traumatic events, i.e. where “he” affects them. / While not all beginning hashtags function alike, I posit that early hashtag position offers a delay device akin to vowel lengthening of discourse marker “so”, to mark “hesitation or reflection” before self-disclosure (Buysse 2012). Using hashtag data from the domestic abuse awareness campaign, I was able to look specifically at how people discuss a topic while distancing themselves, which is harder to isolate in other types of text.

San Saba, 9:20 AM

Generative Fathering: Performing Fatherhood

Presenter: Laura Copeland, Linguistics Graduate

Mentor: Heather Jacobson

Abstract:

Do researchers talk about fatherhood in value based language that imposes an agenda on fatherhood? Do frameworks intended for viewing fatherhood construct, and therefore confine, fatherhood? Is there a framework for viewing what fathers actually do to influence the lives of their children? David Dollahite's framework for viewing fatherhood, the generative fathering framework, yields an image of 'good' fatherhood. This paper analyzes several case studies in an attempt to determine if Dollahite's generative fathering framework socially constructs notions of fatherhood. Intimate father-child relationships and close bonds are seen as vital parts of the generative fathering framework. However, this paper finds that fathers lacking certain resources are not valued within Dollahite's generative fathering framework. Further, Dollahite's generative fathering framework portrays poor and working class fathers as inadequate and deviant. As a result, what these fathers actually do to influence the lives of their children alienates them from participating as an equal member in the configuration of the American family.

San Saba, 9:40 AM

Alabama Phrasebook: Using Technology to Create Language Teaching Tools

Presenter: Daniel Amy, Linguistics Graduate

Mentor: Colleen Fitzgerald

Abstract:

Alabama is an endangered Muskogean language spoken only in Texas. As English use increases, younger generations do not learn Alabama, resulting in fewer native speakers. One problem is few materials exist to teach the language. This study presents a teaching tool created during a linguistics research methods class working with an Alabama speaker. / Using data collected from interactions with the Alabama speaker, I developed a bilingual phrasebook, available in print (with accompanying audio CD) and electronically (viewable in a web browser)- to allow users to hear a phrases in Alabama. / The Alabama-Coushatta Tribe has used this book in language/culture camps, disseminating it among community members, evidence that materials like phrasebooks are strongly valued by this Native American community. The study shows how community-based research can provide significant data for linguists and build flexible teaching tools that communities can use to revitalize endangered languages.

San Saba, 10:20 AM

Painting as a Method of Historical Research

Presenter: Stephanie Sulik, History Graduate

Mentor: Darryl Lauster

Group Members: Christopher Morris

Abstract:

I am a student in the doctorate program in transatlantic history. I graduated from Coppin State University in Baltimore, MD with a Bachelor of Arts degree in history and a minor in art. Prior to that, I was awarded one of ten National Gold Key Portfolio Awards in the Scholastic Art and Writing Awards and studied for one year at the Maryland Institute College of Art. It is very important for me to continue to pursue my interests in both history and art. I have found them to be extremely interconnected and consider painting a method of my research, and I anticipate incorporating my paintings into my graduate research as well. With support from my department and the College of Liberal Arts, my tangible goal for this semester is to have my studio area functioning and begin one large painting. The motivation behind this project is to propose painting as a method of, in my case, historical research. I want to present at the Annual Celebration of Excellence by Students to encourage other students and researchers to pursue interdisciplinary approaches and not neglect sides of themselves that seem to have no place in academia.

San Saba, 10:40 AM

An Essential Ingredient: Imperial Conflict under Three Decades of the Molasses Act

Presenter: Jacob Jones, History Graduate

Mentor: David Narrett

Abstract:

The history of the American Revolution has often been written as a conflict rising out of the policies of imperial restructuring following the Seven Years' War. Authors have focused almost exclusively on the series of acts, such as the Sugar and Stamp Acts, which followed the Treaty of Paris in 1763. However, my research has shown that the source of conflict reaches back several decades. Examination of Parliamentary debates and pamphlet literature has revealed that the Molasses Act of 1733 sought to destroy the New England rum industry in favor of the more profitable sugar industry of the British Caribbean. These debates reveal that the British government had already begun to question and challenge the place of the North American colonies within the empire. The act was disguised both as a tax and a governmental support of the waning British sugar industry, but was clearly an attack on the rising economy of North American colonies. This work refocuses the source of conflict between British North Americans and the imperial government and reveals the importance of the thirty-year experience with the Molasses Act in American history.

San Saba, 11:00 AM

Her Name Was Harriet Brewster de Vizcarrondo: A Transatlantic Bridge of Abolitionism

Presenter: Michael Deliz, History Graduate

Mentor: John Garrigus

Abstract:

Navigating the constraints of late-nineteenth century Spanish gender roles, one American woman, created a transnational and transatlantic bridge to bring slavery to an end in the Spanish Empire. Beginning with the establishment of La Sociedad Abolicionista in her living room in Madrid, Harriet Brewster de Vizcarrondo maintained for two decades a covert conduit for antislavery propaganda and foreign financial transfers that supported the activities of the otherwise male-dominated Sociedad. Utilizing the archived documents of the British & Foreign Antislavery Society, as well as the collected papers of William Lloyd Garrison and other American abolitionists, my research reveals Mrs. Vizcarrondo's otherwise unheralded role and her expert negotiation of Spanish society's gendered behavioral expectations to obfuscate her transnational dealings, travels, and correspondence as innocent and nonthreatening social relations in the face of strident Spanish traditionalism.

San Saba, 11:20 AM

“Icons in the Shadow of the Crescent: Veneration of Byzantine Christian Icons in Muslim Controlled Syria, c.700-900A.D.”

Presenter: Adam Guerrero, History Graduate

Mentor: Kathryne Beebe

Abstract:

During the period of iconoclasm, predominantly within the Byzantine Empire, there were many individuals who openly defied the iconoclast movement in an attempt to maintain their orthodox identity, but were Christians within the Empire the only ones seeking to maintain their traditional Melkite Orthodox identity? Though there were some who argued against the iconoclast movement within the Byzantine Empire, however the strongest critics of the iconoclast movement voiced their opposition outside the reach of imperial authority. John of Damascus (d.749) and Theodore Abu Qurrah (d.823) were both Christians who openly defended the veneration of Byzantine icons while living in Muslim-controlled Syria. There is a consensus among scholars that both of these individuals were iconophiles who took an unwavering stance against those who sought to end icon veneration, but the scholarship fails to look at their works as reinforcing a Byzantine Orthodox identity in unison with Christians within the Empire. In this work I will first attempt to discuss the nature of icon veneration to the people of the Orthodox faith, and how this practice reinforced a sense of communal identity. Next I will compare the works of the Byzantine iconophiles with the treatises of John of Damascus and Theodore Abu Qurrah to demonstrate that both authors writings have similar components that defend the position of icon veneration. Finally, this paper will establish that, in their defense of icon veneration, there was an attempt by these authors to maintain a sense of identity and unity with their Byzantine Christian brethren.

San Saba, 1:00 PM

PuO₂ (111) Surface Study using hybrid DFT

Presenter: Shafaq Amdani Moten, physics Graduate

Mentor: Muhammad Huda

Abstract:

Long term storage of nuclear waste, which include plutonium oxides since they exist in fuels as fission products, have far-reaching environmental concerns. Due to their toxicity and radioactivity, these are very challenging systems to study experimentally. Therefore, theoretical studies can supplement the experimental efforts to understand the interactions of the actinide oxides with the environment, and to find an eco-friendly way of managing nuclear waste. From a theoretical perspective, atomic and molecular scale modeling can be used to gain insights into such interactions. A necessary first step in understanding surface interaction is to thoroughly investigate the properties of clean surfaces of Pu-oxides. Past studies and our calculations have shown that the (111) surface is more stable than the other high-symmetric surfaces. We therefore did ab-initio modeling of the PuO₂ (111) surface with hybrid density functional theory using WIEN2K code. The periodic slabs of PuO₂ (111) surface is studied to probe the potential effects of slab size on predicted surface properties. Ferromagnetic (FM) and anti-ferromagnetic (AFM) configurations are considered with and without spin-orbit coupling for the 1x1 slab and only AFM configuration with and without spin-orbit coupling are considered for the 2x2 slab. The properties at each layer thickness for up to 6 layers are reported with the surface energies of the slabs in the 0.7 – 0.8J/m² range and the average work function in the 5.2 – 5.3eV range. The band gap and pDOS plot show PuO₂ surface retains the bulk's Mott insulator property.

San Saba, 1:20 PM

The effects of corporate governance on REITs' credit ratings

Presenter: Trang T Thai, Business Graduate

Mentor: Ramya Aroul

Abstract:

Real Estate Investment Trusts recently experienced huge post subprime crisis improvements in governance. The management-ownership separation in public companies generally creates a mechanism where managers may make decisions in their own interest at shareholders' cost, and stronger corporate governance is one way to mitigate the problem. REITs' ranking in governance now is significantly better than most non-REIT industries, and positively affects shareholder value. Our paper examines how REIT bondholders also benefit from the pressure REIT shareholders put on the managers. This is the first paper to look at the 3-party agency problems in REITs, using a full dataset from 4 largest credit rating agencies: S&P, Moody's, Fitch, and DBRS, and REIT corporate governance from Institutional Shareholder Services. We use order logistic model to test non-monotonic probabilities. After controlling for REIT's characteristics such as size and profitability, we expect REITs to enjoy higher credit ratings for higher board independence, lower CEO power, higher directors' expertise, higher non-CEO ownership, and if there is a formal governance policy.

San Saba, 1:40 PM

Creating Better Non-Profit Solutions for the Latino Community /

Presenter: Jack Philips, Urban and Public Administration Graduate

Mentor: Karabi Bezboruah

Abstract:

The Latino community in the United States is the fastest growing and second largest ethnic group just under whites. According to the 2010 US Census, the Latino population is 50.5 million, which comprises 16% of the total population of the country (Ennis, Vargas & Albert, 2011). The Latino community is still faced with a disproportionate amount of poverty and education issues when compared to their white counterparts. The rate of poverty nationally for all Latinos hovers around 22% (Macartney, Bishaw & Fontenot, 2013). The non-profit community is an essential and valuable resource in the US for aiding disadvantaged populations. Latinos in the US are often overlooked in the areas of research and service delivery due to problems that are unique to the community. The question then is how can non-profit services be enhanced for providing assistance focused on the Latino community while accounting for their unique circumstances?

San Saba, 2:00 PM

A Landscape-Based Analysis of Climate Change: The Case of Dallas

Presenter: Sima Namin, Urban Planning and Public Policy Graduate

Mentor: Enid Arvidson

Abstract:

For decades, landscape-based approaches have been used to categorize and translate ecological data into useful information, visualize the spatial patterns and processes of landscapes, and ultimately quantify the eco-characteristics of each landscape in order to understand the interactions between ecological characteristics and human activities. Some of the attributes of landscapes are especially popular in land-use planning models that base their ecological modeling on landscape ecology. Moreover, one of the most important aspects of studying climate change is landscape dynamics and changes. Accordingly, considering the temporal dimensions of such changes can potentially lead to a more sophisticated understanding of the patterns of landscape change and the processes that cause it. This paper presents the results of part of the quantitative analysis of my dissertation and provides an analysis of the patterns of landscape change, its pace, and possible future trends in the Dallas metropolitan area. For more than a decade, Dallas has been among the top ten fastest growing metropolitan areas in the U.S.A. Therefore, I argue that the results of this study, which can be considered a critical case study, can be useful in other cases across the country. / After pointing out the ecological structure of the area, I use the results to extract a map of landscape change. Finally, indicators of spatial landscape characteristics, such as patches, mosaics, and stability of landscapes, are evaluated. These indicators are also known as landscape ecology metrics (e.g. Forman & Godron, 1986) and in this research I use some of them to determine the ecological changes of urban landscapes. This approach, in the end, helps in constructing and visualizing the main landscape change patterns at a 1:5000 or 1:2500 scale.

San Saba, 2:20 PM

Affordable Housing in Dallas

Presenter: Jennifer Sloan, Public Administration Graduate

Mentor: Colleen Casey

Abstract:

Residential segregation by income is a growing problem here in the United States. When you look around your city, most often you notice that neighborhoods are grouped into housing typologies and segregated, primarily by income. The underlying assumption is that the poor live with the poor and the wealthy live with the wealthy. The poor areas of town are most often located in and around the areas of the city that are considered less desirable such as: warehouse districts, manufacturing districts and areas that are distanced from greenbelts and other public amenities. / One of the leading causes for residential segregation by income is the practice of exclusionary zoning regulations. Regulations such as minimum lot sizes, specific building materials, minimum set-backs, high impact fees, and zoning maps that restrict housing typologies or place limitations in different zones. The question is: how does residential segregation by income contribute to the affordable housing problem in Dallas, Texas? / This paper will use a mixed methods approach utilizing case study, mapping, and multivariate logistic regression. By mapping the zoning region over a period of time and analyzing housing values, property values, and owner income levels within those zones it will be determined that exclusionary land use policies are a major factor in the institution of residential segregation by income. The goal of this research is to understand the affordable housing problem in Dallas and suggest possible policy solutions. /

San Saba, 3:00 PM

Muslim Women's Autonomy Predicts Child Malnutrition in India: A Structural Equations Model

Presenter: Leona Peterson, Social Work Graduate

Mentor: Vijayan K. Pillai

Group Members: Alicia Hawley, Rosalind Evans

Abstract:

Child nutrition rates in India are among the lowest in the world. This paper explored the relationship between women's autonomy and child nutrition. It was hypothesized that in Muslim families where women have a high degree of autonomy, children would evidence higher levels of nutrition. Data from the 2006 National Family Health Survey (NFHS) was used. The sample included 4,556 families. Religious affiliation was controlled as it may have confounded interpretations of autonomy. Women's autonomy was measured by 5 indicator variables. Confirmatory factor analysis was conducted. Results suggest that the 5 indicators were a good measure of autonomy with good construct validity ($\chi^2 = 68.23$, $p = .00$, $KMO = .85$, $RMSEA = .05$, $CFI = .99$). A structural equation was modeled to determine if the construct autonomy successfully predicted child malnutrition. Results suggest that in India, Muslim women's autonomy does predict levels of child malnutrition ($\chi^2 = 770.22$, $p = .00$, $B = 52.57$, $p = .02$, $CFI = .92$). Findings have practice implications. Social workers must act to empower women and educate families on the benefits of women's autonomy.

San Saba, 3:20 PM

The Frequency of Underage Drinking

Presenter: Karen Abonza, Social Work Graduate

Mentor: Alexa Smith-Osborne

Group Members: Xu Ling, Anne Nordberg

Abstract:

Under-age drinking is one of the nation's leading cause of deaths in American adolescents. Adolescents participate in underage drinking across the United States, causing significant consequences to themselves, others, communities, and the state. The current study examines the effect of underage drinking, with family and peers. A systematic random sample was conducted among 100 participants in a clinical setting. The hypothesis was that underage drinking in adolescents occurred the most among families that encouraged alcohol versus peers. Parental and family factors may contribute to adolescents' engagement with drinking. To test the hypothesis I used a mathematical model that describes different aspects of interactions and dynamics through mathematics. This model was used to compare the percentages in the context of family and peer drinking. Contrary to my hypothesis, underage drinking is primarily caused by peer influences (6%) versus with family (2%). My research has shown that peer influence is a strong correlation, in which adolescents use alcohol to gain acknowledgment and maintain their status among peers. Data shows that moderate levels of drinking may enhance popularity among peers, but consumption above group norms could lead to social rejection. The present study will benefit the social work profession by providing additional research of the causes for underage drinking among adolescents. There is a need for implication on substance abuse preventions at schools and in communities.

San Saba, 3:40 PM

Is Facebook Ruining Your Love Life?

Presenter: Anna Prieto, Communication Graduate

Mentor: Tom Christie

Group Members: Amanda Morse

Abstract:

Social media has become an all-encompassing part of our lives. More specifically, Facebook has taken on a large role in the way we communicate with friends and family. But do we really know how Facebook is effecting our lives? Is our relationship with Facebook more intimate than with our significant other? / / This is a research project in progress. A pilot study had been conducted (a sample size of over 250 participants took an online survey) and IRB approval will be sought to conduct final study. With initial numbers in, it is evident that there is a correlation between amount of time spent on Facebook and relationship satisfaction. While much research has been done on social media and even more so regarding specifically Facebook, there is a lack of research focused on specifically on its effect on romantic relationship satisfaction. This study helps to bridge that gap of missing information.

San Saba, 4:00 PM

American Forces Network Okinawa: Impact, Influence, and Personal Stories From the First 50 Years

Presenter: LaDonna Aiken, Communication Graduate

Mentor: Andrew Clark

Group Members: Tom Christie, Erika Pribanic-Smith

Abstract:

The American Forces Network (AFN) began during World War II to boost the morale of troops serving overseas, and to that end, military broadcasters at AFN Okinawa have served as the link to home for troops stationed on the island since 1945. This historical overview captures a pivotal time in the history of broadcasting through the memories of military veterans, their families, and the Okinawan people. Interviews with listeners reveal they tuned in for the music, friendly voices, timely weather reports, and American perspective. Military veterans describe the experience of broadcasting as exciting and uniquely challenging, while government reports and archives document changes at the station. AFN Okinawa directly influenced the people and culture on the island, and left a lasting impact on those that listened in or worked at the station. By capturing these stories from the formative years of broadcasting with a military perspective, we gain a greater understanding of the human experience and what it was like to be a part of this world before the Internet changed the way we communicate and consume media.

This work was supported in part by a research award from the Office of the Dean for Liberal Arts.

San Saba, 4:20 PM

Signs of the Times: Sigma Signs in the 1950s And 1960s

Presenter: John Watson, Communication Graduate

Mentor: Sarah Rose

Abstract:

During the 1950s and 1960s Americans with disabilities were regularly denied college admission. Timothy Nugent and a handful of students with disabilities at the University of Illinois in Urbana Champaign laid the foundation for the developing movement towards disability rights to college education. This disabled student organization became known as Delta Sigma Omicron (DSO) and were very active in the community, physically, socially and academically during a time when people with disabilities were thought of as inactive, incapable, and pitiful. The organization recognized the importance of mass communicating their highly unique culture to challenge these negative stereotypes and promote positive disabled student community. In 1950 DSO printed the first edition of Sigma Signs, an annual publication detailing the organization's past year. The publication was distributed to every veterans hospital, orthopedic school, and rehabilitation clinic in the nation and even reached international audiences. I examined the Sigma Signs editions from their emergence in 1950 until 1969. I argue that when DSO members saw images of their own community and read articles in an internationally circulated publication about their peers and their organization's alumni, the content likely provided DSO with a greater sense of value and belonging to a unique counterculture. Writers, photographers, and editors were not afraid to publish articles about students with disabilities conveying a sense of humor and pride during a time when negative stereotypes were strongly attached to people with disabilities.

San Saba, 4:40 PM

The Power of Social Media Communication during the 2014 Arlington, Texas Storm

Presenter: Karen McAlister, Communication Graduate

Mentor: Thomas Christie

Group Members: Michael Magnus

Abstract:

Social media has become an increasingly popular method for posting written and visual content online. As a newer form of communication, research is only beginning to explain how sharing occurs and the most effective ways to send vital information, particularly in times of crisis. This increase has developed a demand for understanding how and why messages spread in times of crisis. In conducting this study, we examined the Facebook pages of 19 organizations in Arlington, Texas to analyze how their communication changed as the city experienced a destructive storm on October 2, 2014. Our findings suggest that many of the organizations refrained from posting original content about the storm and that there was no correlation between the size of the organization's social network and their ability to reach a larger audience. The results from our study can be used to develop effective communication strategies to capture public attention and convey vital information during times of crisis.

ACES 2015 Poster Presentations

(color-coded by College/School)

All poster presentations take place in the Bluebonnet Ballroom on the 1st floor of the E.H. Hereford University Center.

Anthropology	Interdisciplinary Science
Architecture	Interdisciplinary Studies
Art & Art History	Linguistics
Biology	Material Science Engineering
Biomedical Engineering	Mathematics
Business	Mechanical and Aerospace Engineering
Chemistry	Modern Languages
Civil Engineering	Nursing
Computer Science Engineering	Philosophy
Education	Physics
Electrical Engineering	Political Science
English	Psychology
Geology	School of Urban and Public Affairs
History	Social Work
Industrial, Manufacturing, and Systems Engineering	Sociology

ACES 2015: Graduate Student Posters

Poster No.	Name	Poster Title	Major
1	Xin Heng	Two Bio-inspired Fog Collectors	Mechanical Engineering
2	Dustin Schwandt	An Analysis of Collaborative Value Creation: Lessons from the Field	Social Work
3	Colin Pennington	Physical Activity Contribution of a Modified Dancing Classrooms Program on Middle School Students Using Accelerometer Technology and Heart Rate Telemetry	Kinesiology
4	Tuan Nguyen	GROPG: A Graphical On-Phone Debugger	Computer Science and Engineering
5	Dorothea Ivey	The Existence of a Theoretical Base in Social Work Empirical Articles: An Analysis of Two Journals	Social Work
6	Dat Nguyen	Temperature- and pH-responsive Photoluminescent Nanoparticles for Lung Cancer Treatment	Bioengineering
7	Samantha Carter	Equatorial Pacific Export Production over the Middle Miocene Climate Transition	Environmental and Earth Science
8	Jinglei Wu	Lung extracellular matrix solution protects against hyperoxia-induced acute lung injury	Bioengineering
9	Jennifer Beyer	Sandstone injectites preserved in the Mowry Shale Formation at Sheep Mountain Anticline provide insights into natural hydraulic fracture containment	Environmental and Earth Science
10	Cancan Xu	Bioreduction-sensitive biodegradable elastomers for tissue engineering scaffolds.	Bioengineering
11	Ciel Elizalde	The Nucleation of Secondary Fractures from Natural Discontinuities and Related-Stress Perturbations at the Subsurface	Environmental and Earth Science

12	Oluwatosin Oluwadare	Gait Analysis on a Smart Floor for Health Monitoring	Computer Science and Engineering
-----------	----------------------	------------------------------------------------------	----------------------------------

ACES 2015: Graduate Student Posters

Poster No.	Name	Poster Title	Major
13	Melvin Ibane	Children with Developmental Coordination Disorder Demonstrate a Spatial Mismatch when Using Coincident Timing Ability with Tools	Kinesiology
14	Rosalind Evans	Homeless Youth and Resiliency: A Systematic Review	Social Work
15	Iris Alvarado	Mathematical Modeling of the Bone Remodeling Process	Mathematics
16	Pat Jangyodsuk	Hands detector in sign language videos.	Computer Science and Engineering
17	Jennifer Strand	Increase of Local Field Potential in the Ventral Posterior Medial Nucleus of the Thalamus by Activation of DREADD	Psychology
18	Mara Alvarez-Delgado	Culture: The filter through which education arises	Curriculum and Instruction
19	Roshni Iyer	Multi-Functional Core-Shell Nanoparticles for Targeted Lung Cancer Dual Therapy	Bioengineering
20	Udaya Sree Dakarapu	Studies on Catalytic reductive Horner-Wadsworth-Emmons Olefination using mixed silyl acetals and its applications	Chemistry and Biochemistry
21	Aneetta Kuriakose	Three dimensional in vitro lung tumor model for cancer drug screening	Bioengineering
22	Sara Ayyash	Late Eocene – Early Oligocene Paleoclimate and Paleoenvironment Recorded in the White River Formation in Eastern Wyoming	Environmental and Earth Science
23	Fatemeh Jelvehimoghaddam	Drug Study of the lung and renal cancer cells in microfluidic devices	Bioengineering
24	Kris Hohn	Discovering allies: Transphobia among the gay and lesbian community	Social Work
25	Primana Punnakitikashem	The Treatment of Peripheral Arterial Disease using Urethane Doped Polyester (UPE) Based Nanoparticle Scaffolds	Bioengineering

ACES 2015: Graduate Student Posters

Poster No.	Name	Poster Title	Major
26	Mercy Oyugi	Exploring the kinetic properties of the recombinant F420-Dependent Glucose-6-Phosphate Dehydrogenase from <i>Mycobacteria tuberculosis</i>	Chemistry and Biochemistry
27	Zoher Shabbir Lavangia	Ultra high temperature ceramics for survival of space crafts during atmospheric reentry. /	Mechanical and Aerospace Engineering
28	Parham Asgari	Reductive arene ortho-silanolization of aromatic esters with hydridosilyl acetals	Chemistry and Biochemistry
29	Prashant Hariharan	Injectable Biodegradable Wet Tissue Adhesives for Biomedical Applications	Bioengineering
30	Loan Bui	Brain Tumor Genetic Modification Yields Increased Resistance to Paclitaxel in Physical Confinement	Bioengineering
31	Peter LeBoulluec	Analysis of Light Weight, Yet Strong, Composite Wind Turbine Blades	Mechanical and Aerospace Engineering
32	Md Abu Hasan	Effect of Occlusal Loading Conditions on the Biomechanical Behavior of a Full-arch Implant Supported Overdenture Using Finite Element Analysis (FEA)	Mechanical and Aerospace Engineering
33	Brandie Green	The Capacity of Postpartum Depression Resources in Underserved Communities	Urban and Public Administration
34	Oguz Yetkin	Control of a Powered Prosthetic Device via a Pinch Gesture Interface	Bioengineering
35	Christopher Abrego	Development of a HRI Testbed for a Mechanical Finger/Hand	Mechanical and Aerospace Engineering
36	Rebekah Carlile	Combining Playwriting and Cognitive Neuroscience to Build Narrative Skills in Chronically Ill Students	Curriculum and Instruction
37	Md Zahangir Alam	Frequency of Leachate Recirculation of an ELR Landfill Using Resistivity Imaging	Civil and Environmental Engineering
38	Kimberly Johnson	Evaluating Community Based Language Research	Linguistics

ACES 2015: Graduate Student Posters

Poster No.	Name	Poster Title	Major
39	Chuchu Qin	Optical flow meter for volumetric flow rate measurement down to nL min ⁻¹	Chemistry and Biochemistry
40	George Toscano	A Novel Auto Water Surface Detection Algorithm Using Lidar Elevation and Intensity Data	Electrical Engineering
41	Partha Acharjee	Bare earth model generation from LiDAR data	Electrical Engineering

ACES 2015: Undergraduate Student Posters

Poster No.	Name	Poster Title	Major
100	Karah Kattenby	Boundaries, Borders and Limits	Art and Art History
101	Breeanne Soteris	The effects of midazolam on the nucleus accumbens in the context of pain	Psychology
102	Stephanie Gutierrez	Examining Descriptive Patterns and Differences in College Students' Beliefs about the Nature of Science, Scientific Reasoning Ability, Religiosity, Understanding of Evolution and Acceptance of the Theory of Evolution	Biology
103	Morgan Thurow	How Quick Do They Click? Initial Dyadic Interactions Between Gay Men and Straight Women	Psychology
104	Soha Aslam	Comparison between La0.2Y1.8O3 and NaI:Tl Scintillators for Radiation Detection	Physics
105	Angela Lewis	Carbonate accumulation in the equatorial Pacific during the middle Miocene	Environmental and Earth Science
106	Amanda Moorefield	Gender Differences in Self-efficacy and Exercise Experience among Undergraduate Students	Psychology
107	Brandi Stephens	Effects of Intergroup Contact in Prejudice Reduction	Psychology
108	Joaquín Machado	Escaping Mango Street	English
109	Alvin Yang	Effects of Group Composition on Individual Performance in a Spin Class	Psychology
110	Nadine Shihabeddin	Neuroprotective Effect of Fig Fruit on Hippocampal Cell Line Exposed to Ethanol	Chemistry and Biochemistry
111	Kaustubh Shinde	Wireless Power Transfer by Inductive Coupling for Low Power Electronics	Electrical Engineering
112	Amsal Roy	The Effects of the Immune System on Bacteriophage Therapy of Cholera	Biology

113	Stephanie Diaz	Worldview: Atheist Attitudes	Biology
-----	----------------	------------------------------	---------

ACES 2015: Undergraduate Student Posters

Poster No.	Name	Poster Title	Major
114	Joseph Balaban	Analysis of Home Air Filters Near Industrial Sites Using ImageJ and HS-GCMS	Chemistry and Biochemistry
115	Juan Lopez	Turkish Vowel Harmony	Linguistics
116	Gaurang Gupte	Improved Closed-Loop Algorithm for Automatic Detection and Suppression of Mechano-Nociceptive Neural Activity	Biology
117	Mouhamed Nashawi	Soluble factors in organ lysates induce changes in prostate cancer cell migration and gene expression	Mathematics
118	Sylvia Loh	Ascorbic acid-mediated inhibition of prostate cancer migration	Biology
119	Soroush Ghaffari	Effect of Genetic Breast Cancer Testing on the Relationship of Psychological Wellbeing and Sleep	Biology
120	Jeffrey Mays	A Wearable Recording System for I-Glutamate Neurotransmitter Sensing	Electrical Engineering
121	Dhvani Derasari	Manipulating Protein Charge States using a new Mass Spectrometry Technique	Chemistry and Biochemistry
122	Eric Katz	Tohono O'odham Dictionary Conversion	Linguistics
123	Adam Berlin	Toward the Synthesis of Bioactive Spiroketal Sesterterpenoids	Chemistry and Biochemistry
124	Anthony Rich	Optimizing Quartz Bar Light Guides for PMTs with the Geant4 Simulation Framework	Physics
125	Abraham Montano	Jesus Malverde: Saint, Thief or Legend?	Modern Languages
126	Devin Hornick	Syllabic Nasal in San Carlos Apache	Linguistics
127	Andy Dang	Similar genetic basis of hypopigmentation in pigeons and humans	Chemistry and Biochemistry
128	Ramin Firoozi	Polarization-Based Multiparametric	Electrical

		Discrimination of Resonant Photonic Biosensor	Engineering
129	Cristina Cabrera	9-1-1 Telecommunicators Traumatic Stress: resiliency based on personality traits, stress based on type of calls, coping mechanisms used to enhance resiliency.	Psychology
130	Alyssa Dequeant	Empire: The Effects of African Colonization on Contemporary Germany	Modern Languages

ACES 2015: Undergraduate Student Posters

Poster No.	Name	Poster Title	Major
131	Danya Castaneda	Synthesis of 5-Deazariboflavin (Fo) and derivatives	Biology
132	Nadajalah Bennett	Rebuilding Decisions in Central Oklahoma - A Communications Standpoint	Communication
133	Omar Bibi	Spectroscopic and Enzyme Characterization of Substrate-Bound Cysteine Dioxygenase by Copper Probing	Chemistry and Biochemistry
134	Grant Pham	Solar Tree: Low Cost Solar and Natural Gas Electricity Integrated with Home Heating and Cooling	Interdisciplinary Science
135	Mason Bartels	Identification of the Broad-horned Flour Beetle X-chromosome by Whole Genome Sequencing	Biology
136	Tonychris Nnaka	Drinking, hooking-up, and condom use: Is there a sexual double standard?	Nursing
137	Raj Mehta	Investigating the role of genomic deletions in piebald traits	Biology
138	Naomi Carlton	Catalysts and Consequences of Global Human Trafficking	Interdisciplinary Studies
139	Brandon Fulton	Synthesis of Allylic Acetates	Chemistry and Biochemistry

Poster Board: 1

Two Bio-inspired Fog Collectors

Presenter: Xin Heng, Mechanical and Aerospace Engineering Graduate

Mentor: Cheng Luo

Abstract:

Motivated by approaches used in a cactus and shorebird to collect water, respectively, we have developed two fog collectors. Inspired from the cactus, the first collector includes a large ZnO wire and an array of small ZnO wires that are branched on the large wire. All these wires have conical shapes, whose diameters gradually increase from the tip to the root of a wire. This diameter gradient induces a capillary force to transport the condensed drops from the tips to the roots of the wires. Moreover, inspired from the shorebird, the second collector has two non-parallel plates connected by a hinge on one side. When open, the plates provide a large surface area where beads of fog condense. When the plates close, the re-open, the droplets slide toward the hinge and into a collection tube. A single 10-inch by 4-inch prototype “swallowed” about a tablespoon of water in 36 minutes. Over two hours, it harvested 400-900 times more water than both natural and other artificial fog-collectors.

This work was supported in part through NSF-CMMI-1030659 grant.

Poster Board: 2

An Analysis of Collaborative Value Creation: Lessons from the Field

Presenter: Dustin Schwandt, Social Work Graduate

Mentor: Karabi Bezboruah

Abstract:

Interviews have been conducted of a Dallas based nonprofit that has implemented several collaborative projects to meet client needs. The primary goals are to identify how the agency has been successful in developing collaborations and if those activities can be generalized; contribute to the theory building general literature on collaboration and partnerships for nonprofit organizations; and gain a better understanding of the topic to develop quantifiable measures for subsequent research projects. The authors intend to determine what factors contribute to this success including, but not limited to, organization, staff, relationships, clients, environment, and/or subsector. This project will be especially informative for those who are interested in the mechanics of effective partnerships who are in need of support and guidance in their own collaborative efforts such as "do good" volunteers, teachers developing service learning projects, and social workers working for nonprofits.

Poster Board: 3

Physical Activity Contribution of a Modified Dancing Classrooms Program on Middle School Students Using Accelerometer Technology and Heart Rate Telemetry

Presenter: Colin Pennington, Kinesiology Graduate

Mentor: Larry P. Nelson

Abstract:

The mission of Dancing Classrooms is to address social development characteristics by way of dance. Specific research questions were: What was the physical activity output of middle school students participating in the modified DC program, and what was the modified DC program's contribution to middle school students' total physical activity output? / Two schools were used; one receiving "classic" training, the other receiving "fitness-oriented" training. Accelerometers were used to measure physical activity contribution. A student-centered questionnaire was utilized. Analysis of variance was used to find gender differences. / Participants in the Modified curriculum spent just 5.01% in sedentary, 89.04% in light exercise, 5.05% in moderate exercise. Participants in the Traditional curriculum spent 53.08% of total time in sedentary, 45.51% in light exercise, 1.23% in moderate exercise. / Boys accrued more physical activity and at higher intensities compared with girls.

Poster Board: 4

GROPG: A Graphical On-Phone Debugger

Presenter: Tuan Nguyen, Computer Science and Engineering Graduate

Mentor: Christoph Csallner

Group Members: Nikolai Tillmann - Microsoft Research

Abstract:

Debugging mobile phone applications is hard, as current debugging techniques either require multiple computing devices or do not support graphical debugging. To address this problem we present GROPG, the first graphical on-phone debugger. We implement GROPG for Android and perform a preliminary evaluation on third-party applications. Our experiments suggest that GROPG can lower the overall debugging time of a comparable text-based on-phone debugger by up to 2/3.

This work is based upon work supported by the National Science Foundation under Grants No. 1017305 and 1117369.

Poster Board: 5

The Existence of a Theoretical Base in Social Work Empirical Articles: An Analysis of Two Journals

Presenter: Dorothea Ivey, Social Work Graduate

Mentor: Alexa Smith-Osborne

Group Members: Abigal Abbas, Marcus Crawford, Kris Hohn, Don Kelly, Vinita Tandukar, Paula Ude, Olga Verba

Abstract:

Social workers encounter daily decision-making that impacts the lives of others. It is essential that these decisions are supported with social work theory and research. This study assesses all journal articles from the Journal of the Society for Social Work and Research (JSSWR) and from Journal of Research on Social Work Practice (JRSWP) from 2010 to 2013. Theory provides social workers with a foundation for guiding practice and research. From a foundational perspective, theory should be used as the guiding mechanism for all social work activities. The purpose of the study is to examine the frequency and explicit use of theory in articles in JSSWR and JRSWP. Results indicate that most articles were empirical; however theory was present only about half the time. For the time frame studied, the majority of articles in these journals did not explicitly mention theory. Therefore, the impact of these findings is important because the social work profession relies on a theoretical.

Poster Board: 6

Temperature- and pH-responsive Photoluminescent Nanoparticles for Lung Cancer Treatment

Presenter: Dat Nguyen, Bioengineering Graduate

Mentor: Kytai Nguyen

Group Members: Jyothi Menon, Mingyuan Wei, Baohong Yuan, Jian Yang

Abstract:

Lung cancer remains one of the leading causes of cancer-related mortality in the US. Here we develop temperature- and pH-responsive photoluminescent nanoparticles as a smart drug delivery and imaging system to treat lung cancer. The nanoparticles were composed of BPLP and NIPAAm, two polymers that provide particles with fluorescence and temperature sensitivity. A pH-sensitive agent, SBC, and anti-cancer drug cisplatin were also loaded into particles. Results showed that these particles exhibited nano size and were stable in saline and cell culture media. Particles were also fluorescent when exposed under UV light, showing potential for real-time imaging. At 39°C the particles shrank in size to allow drug discharge. Cisplatin was released the most at pH 6 and 41°C, confirming thermo- and pH-responsiveness of particles. In vitro, healthy lung cells remained alive with non-cisplatin particles, while microscopic imaging confirmed particles uptake by lung cancer cells.

This work was supported by the National Heart, Lung, and Blood Institute of the National Institute of Health under the award grant number NHLBI UO1 HL-111146.

Poster Board: 7

Equatorial Pacific Export Production over the Middle Miocene Climate Transition

Presenter: Samantha Carter, Earth and Environmental Science Graduate

Mentor: Elizabeth Griffith

Abstract:

The Middle Miocene Climate Transition (MMCT), 13.8 million years ago, marks the point when Earth made its final transition into the modern icehouse world from greenhouse conditions. Across the MMCT, there is rapid cooling, a decrease of carbon dioxide (CO₂) levels, and expansion of the Antarctic ice sheet (Zachos et al., 2001; Foster et al., 2012). As present day CO₂ levels continue to rise, having a better understanding of carbon cycle dynamics and its affect on the climate system is even more crucial. / / The flux of carbon removed from the sea surface by biological productivity and moved into the deep-ocean, or export production, is important when relating the carbon cycle to climate change. Thus, a high resolution record of export production was produced spanning the MMCT. Export production fluctuates dramatically across this interval, with the biggest peaks coeval with the beginning of two glaciation events. The results are compared with previously published climatic records over the same time interval. This data will give us valuable insight into controls on the carbon cycle over intervals of rapidly changing climate. /

Poster Board: 8

Lung extracellular matrix solution protects against hyperoxia-induced acute lung injury

Presenter: Jinglei Wu, Bioengineering Graduate

Mentor: Yi Hong

Group Members: Qing Ding, Ahana Dutta, Roshni Iyer, Priya Ravikumar

Abstract:

Appropriately 190,000 cases of acute lung injury (ALI) occur in the United States annually, with a high in-hospital mortality of 40%. Oxidative stress is a major cause for ALI. Decellularized lung extracellular matrix (ECM) contains complex bioactive components mimicking the ECM of native lung, and has shown promises in lung regeneration. We hypothesized that decellularized lung ECM protects against hyperoxia-induced ALI. We processed decellularized porcine lung ECM into a solution to be delivered by instillation, and tested its anti-oxidation capability in a rodent model of hyperoxia-induced ALI. The obtained solution had an ECM concentration of 3.2 ± 0.2 mg/mL with an average particle size of 1517 ± 126 nm. The lung ECM treated rats had significantly reduced apoptosis, total anti-oxidant capacity and oxidative DNA damage compared to the placebo. The results provide proof-of-principle that supports the promise of lung-derived ECM for lung injury treatment.

Poster Board: 9

Sandstone injectites preserved in the Mowry Shale Formation at Sheep Mountain Anticline provide insights into natural hydraulic fracture containment

Presenter: Jennifer Beyer, Earth and Environmental Science Graduate

Mentor: W. Ashley Griffith

Abstract:

Clastic injectites are natural hydraulic fractures preserved as tabular bodies of sand cutting across less permeable rocks. Injectites are found in sedimentary basins around the world, and understanding their geometry and internal structure is essential for predicting fluid flow in petroleum reservoirs. However, injectites in reservoirs are difficult to image using geophysical techniques, thus it is necessary to study them where they are more accessible. I studied 18 sandstone injectites which intrude the Cretaceous Mowry Shale near Sheep Mountain Anticline (SMA). I characterized the 3D geometry, internal structure, and intrusion mechanics of these injectites using GPS, outcrop mapping, and structural analysis. My results indicate the injectites were sourced by the overlying Cretaceous Peay Sand. Sand intruded the underlying Mowry Shale along pre-existing joints prior to and during the early folding of SMA. Clastic injectites usually intrude upward toward areas of lower fluid pressure; however, I argue these injectites were injected downward, evidence of a stratified stress field resulting from the burial history of the rock units.

This work was funded by the American Chemical Society, Petroleum Research Fund Award #52300-UN18.

Poster Board: 10**Bioreduction-sensitive biodegradable elastomers for tissue engineering scaffolds.**

Presenter: Cancan Xu, Bioengineering Graduate

Mentor: Yi Hong

Group Members: Yihui Huang, Jinglei Wu

Abstract:

Reduction-sensitive linkage exists in the proteins of human body and can be cleaved under a mild reductive environment. Polymers containing reduction-sensitive linkages have been widely used for gene and drug delivery. However, it is rarely reported that reduction-sensitive polymers served as mechanically active scaffolds for tissue repair and regeneration. In this work, we synthesized a family of reduction-sensitive biodegradable polyurethane elastomers containing disulfide bonds (PU-SS). The developed polyurethanes were electrospun into nanofibrous scaffolds. The scaffolds exhibited robust mechanical properties and high elasticity. The PU-SS scaffold has a slow degradation rate in phosphate buffer solution, and its fast degradation rate can be triggered by adding reductive glutathione (GSH) solution. The scaffold degradation rate can also be tuned by altering disulfide amount in PU-SS polymer. The scaffolds showed good biocompatibility without cytotoxicity in vitro and in vivo. These smart scaffolds have potentials to be applied for soft tissue engineering and drug delivery.

Poster Board: 11

The Nucleation of Secondary Fractures from Natural Discontinuities and Related-Stress Perturbations at the Subsurface

Presenter: Ciel Elizalde, Earth and Environmental Science Graduate

Mentor: W. Ashley Griffith

Abstract:

Shales often form the roof rocks of coal mines in the Appalachian Basin. These mines provide exposures of fresh rock, otherwise only accessible via boreholes or weathered outcrops, and present an opportunity to observe in situ natural fractures. In eastern Ohio, small pre-mining faults are well exposed within the roof rock and near areas where sloping coal-shale contacts are steepest, causing ground instability. I hypothesize sloping bedding-contacts act as displacement discontinuities which alter the local stress state, leading to secondary faults. Using 3D survey data, I constrain the contact geometry to model slip along the discontinuity and calculate stress changes. Results show rocks are closer to failure near sloping contacts where faults are found. This study will help better understand subsurface stress changes caused by discontinuities and the formation of secondary fractures. In mining, recognizing stress changes due to bedding geometry can help prevent underground hazards.

This work was supported by a National Institute for Occupational Safety and Health (NIOSH) grant to William Ashley Griffith.

Poster Board: 12

Gait Analysis on a Smart Floor for Health Monitoring

Presenter: Oluwatosin Oluwadare, Computer Science and Engineering Graduate

Mentor: Manfred Huber

Group Members: Kathryn M. Daniel, Gergely Zaruba, Jessica Reece, Nicholas Burns

Abstract:

Gait analysis (GA) is the investigation of an individual pattern of walking. The goal of this project is to use floor mounted Pressure Sensors (FMPS) system capable of measuring a significant number of parameters relevant to gait to predict and detect anomalous behavior. The system consists of an array of pressure sensors mounted under floor tiles and computer hardware responsible for data collection. The method used in this project is unique in its way since most systems that perform similar functions are "on-body" based systems using shoe integrated sensors, body tags or are vision based. Our approach uses FMPS which are designed to collect data unobtrusively, and in any walking environment, over long periods of time without interfering with gait or inconveniencing the user. We call it the Smart Floor. We calibrated the data obtained from the FMPS for a user and those data were analyzed to extract information like center of pressure trajectory and weight from the user's gait. With this information we intend to provide a new way for GA, in order to predict fall risk and health issues and to improve elder care by constant monitoring.

Poster Board: 13

Children with Developmental Coordination Disorder Demonstrate a Spatial Mismatch when Using Coincident Timing Ability with Tools

Presenter: Melvin Ibanez, Kinesiology Graduate

Mentor: Priscila Cacola

Abstract:

Children with Developmental Coordination Disorder (DCD) often have difficulties with planning and generating a precise visuospatial representation of intended motor actions, however; little is known about their accuracy when planning motor actions with tools that extend reach space. This study examined the accuracy of children with DCD (n=25) when intercepting a moving target as compared to typically developing (TD) children (n=22) between 7-13 years of age. The experiment involved interception of a moving target via reach estimation from a first-person perspective under 5 conditions (hand, 10cm, 20cm, 30cm, 40cm). The target started away from the subject and travelled closer along a midline path by increments of 500ms. Participants responded when they believed the target had arrived at their reach estimation. Overall, participants overestimated their reach ability, with DCD children overestimating an average of 6.65cm more than TD children; the error was consistent across conditions. It appears that children with DCD have problems with spatially representing a motor action that requires the use of coincident timing, like catching.

Poster Board: 14

Homeless Youth and Resiliency: A Systematic Review

Presenter: Rosalind Evans, Social Work Graduate

Mentor: Courtney Cronley

Abstract:

Youth experiencing homelessness represent a small but growing segment of the homeless population, and many published studies on this population employ a deficits-based perspective. In an attempt to summarize the knowledge of this population from a strengths-based paradigm, we undertook a systematic review of published articles on the subject of resiliency among youth (ages 12-25) experiencing homelessness. We searched in eight databases under the terms, homeless, homelessness, youth, resilience, and resiliency. Of the 46 articles found, 29 fit the inclusion criteria and represented the following methodological themes: non-empirical (n=4, 13.8%), qualitative (n=8, 27.6%), survey (n=8, 27.6%), experimental (n=4, 13.8%), secondary data analysis (n=2, 6.9%), and mixed-method (n=3, 10.3%) methodologies. Results indicate that youth experiencing homelessness use informal social networks to survive on the street, and that spirituality, mental health, and creativity are associated with improved coping. We recommend expanding the experimental and intervention studies in order to develop an evidence-based set of practices around resiliency.

Poster Board: 15

Mathematical Modeling of the Bone Remodeling Process

Presenter: Iris Alvarado, Mathematics Graduate

Mentor: Hristo Kojouharov

Abstract:

Bone remodeling is an intricate process, which once completely understood, may be able to give insight on why bone diseases (e.g. Osteoporosis) exist, how they can be prevented, and what therapies may help overcome such diseases. Bone-forming osteoblast cells and bone-resorbing osteoclast cells are recruited and organized to continuously repair micro-defects that form in the skeleton in order to maintain its structure and function. Mathematical models can be significant in shedding light on how the process works, as well as problems that can arise and ways to solve these problems. Previous mathematical models of cell populations have been influential in discovering how biological factors affect the bone cells. However, there are currently very few cell-population models that include external mechanical stimulus and its effect on bone remodeling. In this work, various existing models have been studied, compared, and built upon by incorporating important biological factors (i.e. mechanical stimulus) as an attempt to make a more realistic model of the Bone Remodeling process.

Poster Board: 16**Hands detector in sign language videos.**

Presenter: Pat Jangyodsuk, Computer Science and Engineering Graduate

Mentor: Vassilis Athitsos

Abstract:

Recognizing a sign language on a given video using computers is always a difficult task, due to the noisy information such as frame background, clothing and unrelated facial expression. One of the major challenge in sign language recognition is capturing core information related to signs being performed which, in this case, are hands shape and hands movement patterns. Hands detection is always a well known hard problem as hands has many articulated shape variations making simple methods such as template matching does not work. In this work, we propose a new method to detect hands on a given color videos. The new idea is we extend the famous machine learning model, random forest, to be applicable to color videos. The results showed some substantial improvement over popular existing works.

Poster Board: 17

Increase of Local Field Potential in the Ventral Posterior Medial Nucleus of the Thalamus by Activation of DREADD

Presenter: Jennifer Strand, Psychology Graduate

Mentor: Yuan Bo Peng

Abstract:

The goal of this investigation is to find ways to reduce cellular activity in the VPM, a possible first step to reducing the experience of pain. Local Field Potential (LFP) is a process by which investigators record the amount of cellular activity at a specific neural site. The ventral posterior medial thalamic nuclei (VPM) is the structure in the brain that processes sensory information from the head and facial muscles. A painful stimuli was injected into the masseter tendon of a rat, modeling non-dental facial pain which affects up to 25% of the population. In the baseline condition, the VPM was not change. In the drug condition, the VPM was injected with virus AAV8. AAV8 modifies proteins in the brain to inhibit activity in that area. Areas where this protein is activated should have less cellular activity. We found that in the drug condition LFP activity was significantly increased from the baseline condition. While the finding is not in the expected direction, this is a substantial first step to finding novel ways to decrease cellular activity in response to pain.

This study was supported in part by Texas Norman Hackerman Advanced Research Program (003656-0071-2009), TXMRC, and NIH grant DE022129 from NIDCR.

Poster Board: 18**Culture: The filter through which education arises**

Presenter: Mara Alvarez-Delgado, Curriculum and Instruction Graduate

Mentor: Evguenia Malaia

Abstract:

The PISA 2012 Mathematics Literacy Assessment results report that the United States performed below average, even though the country spends more money per student than other countries that perform equally or higher (Organization for Economic Cooperation and Development, 2013). One of the contributing variables might be the heterogeneity of cultural values and behaviors that interact in deeply diverse classrooms across the US. The present study uses survey methodology to collect data on Hofstede's National Culture dimensions from teachers in the United States, China, Spain, and the U.S. territory of Puerto Rico. A priori power analysis indicates that we need 20 participants in each of the 4 groups to have 95% power for detecting a large-sized effect when employing the traditional .05 criterion of statistical significance. We expect to identify culture-specific components of educational systems that have the strongest impact on student achievement. This could lead to: the recalibration of mathematical student performance expectations, changes in curriculum design, and future studies that focus on culture-specific teaching strategies.

Poster Board: 19

Multi-Functional Core-Shell Nanoparticles for Targeted Lung Cancer Dual Therapy

Presenter: Roshni Iyer, Bioengineering Graduate

Mentor: Dr. Kytai T. Nguyen

Group Members: Jyothi Menon, Aneetta Kuriakose, Elizabeth Hernandez, Leah Gandee, Shanrong Zhang, Masaya Takahashi, Zhang Zhang, Debabrata Saha

Abstract:

Combining chemotherapy and radiation (RT) have shown promise in lung cancer treatment. To improve this, we have developed a novel multifunctional dual responsive nanoparticle (MDNP) made of poly lactic-co-glycolic acid-iron oxide core and a poly N-isopropylacrylamide-carboxymethyl chitosan shell with folic acid for targeting. These provide a sustained temperature and pH sensitive release of drugs, while SPIO is used for imaging and hyperthermia therapy. The core contains NU7441 a radiosensitizer while the shell contains gemcitabine hydrochloride a chemotherapeutic drug. The MDNPs were 289 nm and exhibited drug releases at 43C and pH 5, respectively using spectrophotometry and DLS. MTS assay revealed that the nanoparticles were cytocompatible to 1 mg/ml. Prussian blue staining shows more iron in tumor sections treated with folic acid-MDNPs indicating a higher uptake. Our particles allowed in-vivo visualization by MRI and good therapeutic efficacy by slowing down tumor growth in combination with RT in nude athymic mice. Thus, MDNPs can be used as carriers to provide targeted chemo and radiotherapy for lung cancer treatment.

Poster Board: 20

Studies on Catalytic reductive Horner-Wadsworth-Emmons Olefination using mixed silyl acetals and its applications

Presenter: Udaya Sree Dakarapu, Chemistry and Biochemistry Graduate

Mentor: Dr. Junha Jeon

Group Members: Gabriela Trog, Parham Asgari, Apparao Bokka, Yuanda Hua, Hiep H. Nguyen and Nawal Raman

Abstract:

Georg Wittig developed a process for the formation of carbon-carbon bond. For his work he won Noble prize in Chemistry in the year 1979. This reaction is one of the most powerful reactions used in carbon-carbon bond formation. However there are limitations associated with this process. One of the modifications of Wittig reaction is Horner-Wadsworth-Emmons reaction. We have been developing a one-pot tandem Ir-catalyzed reductive Horner-Wadsworth-Emmons olefination and understanding its fundamental reaction mechanism. In addition, this technology is operationally convenient compared to the existing technology in Horner_Wadsworth-Emmons Chemistry. This new method facilitates the preparation of drugs in a cost-efficient fashion.

Poster Board: 21

Three dimensional in vitro lung tumor model for cancer drug screening

Presenter: Aneetta Kuriakose, Bioengineering Graduate

Mentor: Kytai Nguyen

Group Members: Jyothi U. Menon

Abstract:

Many promising drug candidates fail during drug development process, due to unforeseen side effects and limited drug efficacy. This attrition rate in drug discovery occurs mainly due to lack of reliable lab bench models in preclinical settings that can truly mimic the complex three dimensional (3D) nature of diseased tissues. Screening drug using reliable lab bench models is important as these models can reduce the expensive costs associated with animal studies in clinical settings. Therefore, in this study we developed porous, polymeric microparticles ($\sim 50\mu\text{m}$) as a substrate for cancer cell attachment and their growth into a 3D lung tumor model. Our model encompasses similar characteristics as real tumor in terms of cell-cell or cell-environment interactions, and therefore could be used as a tool to predict the in vivo efficiency of anti-cancer drugs. Initially, we characterized the physical properties of particles in terms of its size, porosity, degradability, and then optimized the parameters (cell density, culture time) to obtain the tumor spheroid. Then using our tumor model, we screened the efficacy of different anti-cancer agents and observed variations in tumor cell responses with respect to conventional 2D cell culture. Future work will have to validate these results by comparing them with other in vivo models that are currently utilized.

Poster Board: 22

Late Eocene – Early Oligocene Paleoclimate and Paleoenvironment Recorded in the White River Formation in Eastern Wyoming

Presenter: Sara Ayyash, Earth and Environmental Science Graduate

Mentor: Majie Fan

Group Members: Elizabeth Griffith

Abstract:

Earth's climate underwent a dramatic cooling during the late Eocene-Oligocene transition (EOT, ~33.5 million years ago). This event is relatively well studied in marine geological records, but a consensus on the terrestrial responses has not been reached. The White River Formation near Douglas, WY is a well-dated stratigraphic section covering the transition. The Formation consists predominantly of interbedded tuffaceous mudstones, siltstones, and sandstones that were deposited by river and wind processes. We characterized the carbonate cement and studied the stable and clumped isotope compositions in order to reconstruct the paleoenvironment and paleoclimate during the EOT. All results show that the carbonate cements are low-magnesium calcite, with high intergranular volumes, indicating the carbonates were formed soon after deposition. Clumped isotope results show a temperature drop of ~3. Remaining isotope values suggest no obvious change in humidity or aridity across the EOT. Data presented in this study improve understanding of the response of terrestrial paleoenvironment and paleoclimate during the EOT in western North America.

Poster Board: 23

Drug Study of the lung and renal cancer cells in microfluidic devices

Presenter: Fatemeh Jelvehimoghaddam, Bioengineering Graduate

Mentor: Young-Tae Kim

Group Members: Loan Bui

Abstract:

Drug Study of the lung and renal cancer cells in microfluidic devices / Fatemeh Jelvehimoghaddam, Loan Bui, and Young –tea Kim / Despite the current medical options available to patients, cancer still remains one of the most leading cause of death. By using standard lithography techniques to make PDMS-based microchannel devices, narrow and wide microchannel were fabricated for studying 3 different cell types of lung cancer and 1 cell type of renal cancer. This microfluidic device had a narrow and wide channel and after seeding cell, the cells were monitor to get to the channels, then 6 different concentration of the Paclitaxel as an anti cancer drug model were introduced to the cancer cells and the cell were monitored by taking picture in two interval of 3 and 8 hours after introducing the drug. This experiment demonstrated that effect of the anticancer drug in confined and wide channel of the microfluidic device is not similar to what really had been shown in the other types of the antidrug testing. These channels in the microfluidic device attempt to provide similar in vivo environment of the effect of the anticancer drug on cell

Poster Board: 24

Discovering allies: Transphobia among the gay and lesbian community

Presenter: Kris Hohn, Social Work Graduate

Mentor: Julie Nagoshi

Abstract:

The transgender experience of questioning of gender identity along with body transformations set them apart from the LGB community. While the LGB community advertises accepting spaces for sexual minorities, research has limitedly looked within the LGB community to understand transphobia. Interviews explored transphobic attitudes of 11 gay/lesbian participants. Proximity, exchanges, grounded gender identity, receptivity, and power play emerged as themes. Although the participants verbalized little transphobic attitudes, they described few experiences with transgender individuals. Low physical proximity is contrary to past research about exposure leading to lower prejudices. The more grounded the participant's gender identity, the less they reported questioning their own gender identity when confronted with transgender people. Participants exhibited high levels of openness and understanding how transgender individuals struggle. The level of education of the participants and their "cultural proximity" to the transgender community, engage intriguing questions about the development of transgender allies. Future research can utilize the LGB community to explore non-transphobic attitudes.

Poster Board: 25

The Treatment of Peripheral Arterial Disease using Urethane Doped Polyester (UPE) Based Nanoparticle Scaffolds

Presenter: Primana Punnakitikashem, Bioengineering Graduate

Mentor: Kytai Nguyen

Group Members: Dheeraj Thakore, Richard Tran, Jian Yang

Abstract:

Peripheral Arterial Disease (PAD) is a condition where a plaque builds up in the arteries carrying blood to the limbs, affecting an alarmingly increasing population in the United States. Without proper treatments, they might lose their limbs, resulting in an increase of the morbidity/mortality rate overall. Here, we propose to develop a Urethane-doped Polyester (UPE) based nanoparticle scaffold system loaded with vascular endothelial growth factors (VEGF) and incorporated with biomolecules such as targeting motifs and/or endothelial progenitor cells (EPCs)' capturing ligands as an alternative PAD therapy. / In this work, various families of UPE polymers by varying different feeding ratios of pre-poly(octamethylene citrate) (pre-POC) and 1,6-butanediisocyanate (HDI) were synthesized to create UPE polymer families covering a wide range of degradation and functionality properties. UPE 1.2 and UPE 1.8 based nanoparticles (NPs) were formulated using a standard emulsion technique. Release studies of therapeutic reagents (e.g. VEGF) were performed over a period of 21 days. In addition, NPs were tested for their toxicity effects on healthy human cells like Human Aortic Endothelial cells (HAECs) and Human Endothelial Progenitor Cells (HEPCs) using live/death assays. The hemocompatibility of the particles was also studied via blood clot and hemolysis analysis. / The size range of both UPE1.2 and UPE 1.8 NPs was found to be around 200nm in average diameter. These NPs had a zeta potential of -25 ± 4 mV, suggesting that they were stable. The UPE based NPs also depicted a relatively stable behavior in media containing serum over a period of five days. VEGF was released in a sustained manner from UPE based NPs over a period of 21 days. The UPE NPs were non-toxic up to a concentration of 500ug/ml for both HAEC and HEPC cells. Also, the hemocompatibility testing showed that our particles did not alter the clotting cascade and were hemocompatible.

Poster Board: 26

Exploring the kinetic properties of the recombinant F420-Dependent Glucose-6-Phosphate Dehydrogenase from *Mycobacteria tuberculosis*

Presenter: Mercy Oyugi, Chemistry and Biochemistry Graduate

Mentor: Kayunta Johnson-Winters

Abstract:

Tuberculosis (TB) is one of the world's deadliest and most infectious diseases, due to the continuous emergence of Multidrug-Resistant Tuberculosis (MDR-TB) and Extensively Drug-Resistant Tuberculosis (XDR-TB). The World Health Organization (WHO) estimates that TB is currently affecting about one third of the world's population. *Mycobacterium tuberculosis* (Mtb) is the pathogenic bacterium that causes TB. The ever evolving resistance of Mtb to common TB drugs has created a great need to explore and discover other avenues by which the bacteria can be targeted so as to lower TB infections. Our study, therefore, focuses on F420-Cofactor Dependent Glucose-6-Phosphate Dehydrogenase (FGD), an enzyme crucial for survival of Mtb. FGD is involved in the glucose metabolism pathway where it catalyzes the conversion of glucose-6-phosphate to 6-phosphogluconolactone. Our ultimate goal is to understand the mechanism by which the FGD reaction occurs, using mutagenesis, binding assays, and kinetic methods. The work presented here focuses on the expression, purification and kinetic analysis of wild-type FGD and two FGD variants. The FGD H40A variant was created based on the proposed mechanism which suggests that Histidine₄₀ (H40) acts as the active site base which facilitates the first step of the FGD reaction. The Glutamate₁₀₉ (E109) residue within FGD has been proposed to be involved in the last step of FGD catalysis, so we created the E109A mutant to probe this hypothesis. Here, we will discuss the results of the binding and kinetic analysis of wild-type FGD and the two FGD variants.

This work was supported by the National Science Foundation (NSF) / The University of Texas at Arlington Research Enhancement Program (UTA-REP)

Poster Board: 27

Ultra high temperature ceramics for survival of space crafts during atmospheric reentry.

Presenter: Zoher Shabbir Lavangia, Mechanical and Aerospace Engineering Graduate

Mentor: Adnan Ashfaq

Abstract:

During their return trip to earth, spacecrafts need to endure temperatures of up to 3000 °F and the additional mechanical loads. Only a handful of materials such as Silicon carbide, Hafnium Diboride (HfB₂) and Zirconium Diboride (ZrB₂) that can sustain such extreme temperatures. Using computational methods we are developing novel SiC reinforced borides for enhancing toughness properties of ceramics. The addition of SiC results in the formation of borosilicate glass which fills the cracks as a result of loads acting on the material. Studies have been carried out to optimize the layout of the UHTC with nano-scale addition of SiC to maximize the toughening mechanism. This study will help in developing a surface coating applied over the Thermal Protection System (TPS) on spacecraft's.

Poster Board: 28

Reductive arene ortho-silanolization of aromatic esters with hydridosilyl acetals

Presenter: Parham Asgari, Chemistry and Biochemistry Graduate

Mentor: Junha Jeon

Group Members: Yuanda Hua, Udaya Sree Dakarapu

Abstract:

In recent years silicon chemistry has become one of the compelling fields of study in chemistry. The resemblance of silicon to carbon has motivated researchers to investigate possibility of replacement of carbon with silicon, particularly in biologically active molecules. Having said that, silicon is considered as a benign compound therefore it stands out among other elements of 4th group (like lead and tin). Although the bond strength of carbon-silicon is considered relatively strong and results in formation of stable compounds, there are seldom natural molecules consisting of silicon-carbon bonds. Discovery and development of organosilane polymers has led to versatile usage of silicones in the everyday commodities. In the past few decades, investigations for biologically active organosilanes, have come across, a variety of compounds, effective in the treatment of hypertension, AIDS thrombosis, and cancer

Silanols or silicon alcohols have interesting bioactivity, regarding their possible ability as antimicrobial agent. It could be a reasonable implication, since they resemble alcohols and phenols. In addition to that, silanols are considered more environment friendly, because they degrade to benign silica, water and carbon dioxide.

This work describes the design and application of a novel method for synthesizing bio active silanols from commercial available esters, via Two sequential transition metal catalytic reactions.

This research was supported by start-up funds provided by the University of Texas Arlington, UTA Research Enhancement Program, and the American Chemical Society Petroleum Research Fund (PRF# 54831-DNI1).

Poster Board: 29

Injectable Biodegradable Wet Tissue Adhesives for Biomedical Applications

Presenter: Prashant Hariharan, Bioengineering Graduate

Mentor: Kytai T. Nguyen

Group Members: Yi Hong, Philippe Zimmern, Nikhil Pandey

Abstract:

Bioadhesives are synthetic or natural polymer based materials that adhere to biological tissues. They have broad biomedical applications such as wound healing, hemostatic agents, drug delivery, bone and soft tissue engineering. The most widely used bioadhesives are fibrin, cyanoacrylate and albumin-glutaraldehyde based; however, their shortcomings include weak adhesion strength, and rapid degradation. In this project we developed an alginate based biomimetic, mussel-inspired hydrogel material to function as a resorbable wet tissue adhesive. Dopamine was conjugated onto the alginate and then the alginate-dopamine was crosslinked using sodium periodate (SP) to form an adhesive hydrogel. FTIR confirmed dopamine conjugation onto the alginate and a spectrophotometry quantified a dopamine content of $28.7 \pm 2.5\%$. The adhesive strength was assessed using mechanical tensile testing on porcine skin-muscle interfaces adhered with the adhesives at different polymer and crosslinker concentrations. It revealed maximum lap shear strength of 16.7 ± 2.6 kPa at a polymer concentration of 75% w/v and a (SP) concentration of 22.5%. We further investigated the ability of nanoparticles to enhance wet tissue adhesion by blending silica nanoparticles with the adhesive hydrogel. A nano-composite system was created with maximum lap shear strength of 33.4 ± 5.2 kPa. Future studies involve characterizing the material degradation, investigating the cytocompatibility of this nanocomposite in vitro and testing the adhesive effectiveness in an animal model.

Poster Board: 30

Brain Tumor Genetic Modification Yields Increased Resistance to Paclitaxel in Physical Confinement

Presenter: Loan Bui, Bioengineering Graduate

Mentor: Young-tae Kim

Group Members: Alissa Hendricks, Jamie Wright

Abstract:

Cancer is one of the leading causes of death worldwide. Treatments of cancers remain inefficient due to the fact that tumor cells are highly resistant to chemotherapy especially malignant and metastatic cancers. One of the reasons is that most in vitro conditions for studying cancer and developing drug are dissimilar to the human body. Microfluidics is the study of small volumes of liquid in confined microchannels. It is important for cancer research because the engineered microchannels not only allow researchers to follow specific moving cancer cells and monitor their behavior but also generate three dimensional bio-microenvironment for the cancer cells to migrate which is very close to the condition in the human body. In our current study, we utilized microfluidic devices to examine the survival rate of different cancer cell lines: human primary cancers from the patients (glioblastoma multiforme, GBM, and neuroblastoma), engineered brain cancers (D54 and D54-EGFRvIII), and genetically modified mouse astrocytes (wild type, p53^{-/-}, p53^{-/-}-PTEN^{-/-}, p53^{-/-}-PTEN^{-/-}-Braf). We discovered two factors directly affecting the cell survival: 1) physical confinement provided from the microchannels and 2) level of malignant mutation of the cells. If the genetic modification resulted in higher malignancy, it notably increased the cellular survival and drug resistance in narrow confined microchannels. For example, the survival rate of high-level mutated p53^{-/-}-PTEN^{-/-}-Braf mouse astrocytes (0.92) was considerably higher than low-level mutated p53^{-/-} and p53^{-/-}-PTEN^{-/-} astrocytes (0.51 and 0.44), but similar to grade IV malignant brain cancer GBM (0.84). Moreover, the addition of oncogene (e.g. Braf) or malignant mutation (e.g. over expression of cellular receptor EGFRvIII) to the cells significantly increased their drug resistance in confinement. The study explains why many anticancer drugs fail to eradicate metastasis as well as suggests key targets for novel drugs based on cancerous genotypes and their specific survival phenotypes during confined migration.

Poster Board: 31

Analysis of Light Weight, Yet Strong, Composite Wind Turbine Blades

Presenter: Peter LeBoulluec, Mechanical and Aerospace Engineering Graduate

Mentor: Wen Chan

Group Members: Ashfaq Adnan

Abstract:

Annual wind power generation capacity in the US has increased from 3 gigawatts in 2000 to 61 gigawatts in 2010 and has the potential to fulfill 20% of U.S. electricity needs (305 gigawatts) by 2030. To make wind power more efficient, the Wind Turbine industry is turning to the use of composite material for select structural parts to take advantage of its low weight and customizable laminate properties. However, most analyses use finite element techniques to determine stresses which can be time consuming and costly when trying to find an optimized design especially for composite materials. In this research, an analytical model is made to quickly predict the stress states in sections of composite turbine blades. Composite laminate theory is used to develop the model. The model will predict the centroid and shear center of the blade section which are then used to find the stress and strain of individual layers in the composite laminate. Results are compared to a finite element model using ANSYS. The analytical model is robust enough to consider different turbine blade cross sectional shapes (airfoils), various composite laminates, and various geometries and load conditions. Thus, by quickly determining the stress state of composite turbine blades to help improve their design, wind turbines can become more efficient, reliable, and economical.

Poster Board: 32

Effect of Occlusal Loading Conditions on the Biomechanical Behavior of a Full-arch Implant Supported Overdenture Using Finite Element Analysis (FEA)

Presenter: Md Abu Hasan, Mechanical and Aerospace Engineering Graduate

Mentor: Panos S. Shiakolas

Group Members: Salman N Khan

Abstract:

Comparison of occlusal loading conditions on the biomechanical behavior of full arch dental prostheses are limited in the literature. This study investigates the effect of various loading conditions on the stress distribution of a full-arch implant supported overdenture using finite element analysis (FEA). Loading was applied on the fossae, pits and cusps of the lower teeth at vertical and oblique ($\pm 45^\circ$) angles in order to represent clinical occlusion during mastication and clenching. The result demonstrates that the stress distribution on the denture, implants and bone-implant interface are greatly affected by the loading position and direction. For the same magnitude load applied at an angle of $+45^\circ$ to the long implant axis at the outer cusps saw a maximum von-Mises stress of 860 MPa in the implant neck, whereas maximum stress for the load applied at -45° to the inner cusps and vertical to the central pits were 477 MPa and 456 MPa in the same location. Similar differences were also observed in the stress resultants of cortical bone surrounding the implant. The findings could be of importance to the clinical dentistry for the design of dental implants and occlusal schemes as the study demonstrates both qualitative and quantitative variation of stress distributions on the bone-implant interface under various occlusal contacts. Besides, the study could serve as a reference to the margin of accuracy concerning the stress analysis one may compromise if loading conditions are oversimplified in FEA modeling.

Poster Board: 33

The Capacity of Postpartum Depression Resources in Underserved Communities

Presenter: Brandie Green, Urban and Public Administration Graduate

Mentor: Karabi Bezboruah

Abstract:

Postpartum depression (PPD) continues to be a major public health issue. Although there are screening methods and treatments that are available to address this mental illness, the rates of detection are still low leading to a number of women that suffer from PPD, yet go untreated. Two populations that have proven to be at a higher risk of PPD are those from underserved communities and minority populations. / The primary purpose of this study is to assess the presence and the adequacy of the resources that are available to detect and treat PPD for women in underserved communities such as support groups, psychiatric services, referral services, access to medication, case workers, and additional post-natal follow-up care. The theory of institutional racism and its presence in the healthcare settings will also be taken into account as well as the influence of healthography, or the study of a geographical location or built environment in relation to the health and/or well-being of a population. / In order to assess the resources that are available, a qualitative study will be conducted that compares the data from an underserved community to an affluent one. Two surveys will be disseminated. The first one will be conducted on health care professionals in clinics, doctor's offices, and hospitals. This survey includes questions on the screening test used, cultural competency, follow-up measures, etc. Another survey will be administered to mothers that have been pregnant within the last year and are patients at one of the healthcare facilities. This survey includes questions about their knowledge of PPD, their experience with screening or the lack of screening, etc. / The results of this research may lead to improved policies for mental health screenings with state funded insurance or screening mandates for PPD that would be beneficial for all women, but especially minorities in underserved communities. /

Poster Board: 34

Control of a Powered Prosthetic Device via a Pinch Gesture Interface

Presenter: Oguz Yetkin, Bioengineering Graduate

Mentor: Dan Popa

Group Members: Joe Sanford

Abstract:

Pinch gesture based user input systems have been demonstrated in Virtual Environments [Zelevnik et al.]. Wrist-worn, gloveless hand gesture tracking systems also exist [Kim et al.] We believe a low encumbrance gesture based wearable system for selecting grasp patterns may provide a viable alternative to EMG and other prosthetic control modalities. / / We present a novel system to control a powered prosthetic device (the TouchBionics RoboLimb) using a gesture tracking system worn on the sound hand in order to select different grasp patterns. We have created a gesture tracking system comprised of conductive thimbles worn on each finger to control the RoboLimb device. / We have performed timing tests on the selection and execution of three grasp patterns using 1) Our gesture system 2) The iPhone app provided by TouchBionics 3) Using an intra-socket force tracker developed in our group. / / Our preliminary results indicate that one of three grasp patterns can be selected and executed within 2.374 (+-0.31) seconds with 100% accuracy (n=25). The user was also able to perform basic object manipulation tasks. We have determined the speed of the iPhone based gesture selector to be between 3.84 to 6.54 seconds depending on how accessible the phone is to the user. When used with our intra-socket pressure based system, the gesture took (5.098+- 1.51) seconds on average. / / References / Jr, J. J. L., and Zelevnik, R. C. FLEX AND PINCH : A CASE STUDY OF WHOLE HAND INPUT DESIGN FOR VIRTUAL ENVIRONMENT INTERACTION / Kim, D., Hilliges, O., Izadi, S., Butler, A. D., Chen, J., Oikonomidis, I., and Olivier, P. Digits : Freehand 3D Interactions Anywhere Using a Wrist-Worn Gloveless Sensor. In Proceedings of the 25th Annual ACM Symposium on User Interface Software and Technology (New York, NY, USA, 2012), UIST '12, ACM, pp. 167–176. /

Poster Board: 35

Development of a HRI Testbed for a Mechanical Finger/Hand

Presenter: Christopher Abrego, Mechanical and Aerospace Engineering Graduate

Mentor: Dr. Panos Shiakolas

Abstract:

Human robot interaction (HRI) has become a growing area of study due to the increasing application of robots in work environments and daily life. This synergy between humans and robots have expanded human endeavors and motivated neoteric and prospective areas of robotics research. Among these growing areas of research is haptic data acquisition interpretation. In the case of telemanipulation, where a human operator remotely performs an operation via robot assistance, the human operator has a better performance environmental and perceptive information is available. This information can be translated to haptic information vital for the operation. / / The objective of this research is to develop a testbed where researchers and students can experience different interaction modes with a robotic finger/hand. The acquisition as well as the post processing of environmental data, such as force, pressure and position allow the user to envisage decision making algorithms. The advantage of using anthropomorphic manipulators, in this case a robotic hand, is due to our ability to project our perceptions which in turn facilitate manipulation engagements. The platform, which integrates hardware and software, has been developed to facilitate reconfiguration and implementation of new modalities. The user interacts using LabVIEW software interface which acquires in real-time the state of the hardware as well as acquires sensory data. / / The finger testbed is composed of a finger equipped with force resistive sensors while the hand testbed expands on the previous testbed to allow further manipulation. Presently, the HRI testbeds have closed and open loop interaction modes for exploration. Among the interaction modes there is direct manipulation, force threshold interaction, voice commands, and variable force close. Furthermore, research in subjective and objective data would need to be collected to evaluate how this platform performs in exposing students and researchers to HRI platforms.

Poster Board: 36

Combining Playwriting and Cognitive Neuroscience to Build Narrative Skills in Chronically Ill Students

Presenter: Rebekah Carlile, Curriculum and Instruction Graduate

Mentor: Marc Schwartz

Abstract:

A growing body of research suggests that the educational needs of chronically-ill children are not well-served, and that new programs for delivery are needed. This pilot study sought to determine whether a collaborative playwriting experience, when framed by current thinking in cognitive neuroscience, can be an effective curricular vehicle for teaching narrative writing and speaking to children whose physical and cognitive stamina for school attendance is limited. Cook Children's Hospital in Fort Worth, Texas, helped identify 4 chronically-ill children aged 8 to 10 years who came to the hospital for 9 hours of group story building where each child ultimately drafted his own short play. Students were assessed for spoken narrative language, written narrative language, and their confidence for writing stories both before and after the program. Posttest results were statistically significant for creating and understanding stories told orally, as well as for including specific grammatical components, such as subordinating conjunctions and elaborated noun phrases. Analysis of self-efficacy for writing revealed increased confidence for using dialogue and solving problems in stories, and for writing complete stories. Results for written narrative language were inconclusive. Proficiency in narrative language offers the chronically ill student a skill set that has been associated with broad academic impact. Additionally, schools across the United States commonly include narrative goals and objectives in their core curricula. This study supports the potential of such a program and warrants its more rigorous research, especially in light of the tremendous need in this population of students.

Poster Board: 37

Frequency of Leachate Recirculation of an ELR Landfill Using Resistivity Imaging

Presenter: Md Zahangir Alam, Civil and Environmental Engineering Graduate

Mentor: Sahadat Hossain

Abstract:

Enhanced leachate recirculation (ELR) landfill operation is associated with the addition of leachate to increase waste decomposition and gas generation. For the economic integrity and environmental safety, the addition of leachate needs to study over time. The frequency of leachate recirculation is one of the prime concerns to operate ELR landfill effectively. However, no study has been conducted so far on the frequency of leachate recirculation in an ELR landfill. Therefore, the objective of the current study was to determine frequency of leachate addition of an ELR landfill using electrical Resistivity Imaging (RI) method. The research was conducted in the City of Denton MSW landfill during May 2009 to May 2012. RI tests were performed along three zones to obtain base line resistivity profiles. Additionally, RI tests were conducted at an interval of one day, one week, and two weeks after the leachate recirculation. Moisture contents were also estimated around the leachate recirculation pipes from the field RI results. The estimated results indicated that the initial moisture content for the base line was 31.5% before any leachate injection/recirculation adjacent to the recirculation pipe and the moisture contents after one day, one week and two weeks of leachate recirculation were found 49.5%, 40.5%, and 31.3% respectively. Therefore, based on the results the moisture content decreased with time and rebounds back to its pre-existing state approximately after two weeks of leachate recirculation.

This work was supported by the City of Denton Landfill.

Poster Board: 38

Evaluating Community Based Language Research

Presenter: Kimberly Johnson, Linguistics Graduate

Mentor: Colleen Fitzgerald

Abstract:

Linguistic fieldwork on Native North American languages representing 15% of the world's endangered languages is both urgent and delicate. With many models of language research available, scholars must find the most efficient. This poster presents the advantages and difficulties of implementing a participatory research model in linguistic work. A Community Based Language Research (CBLR) model focuses on a mutual partnership between linguists and language communities in order to produce knowledge together and for the benefit of both parties (Czaykowska-Higgins 2009; Rice 2006).

In addition to reviewing literature, I draw on my own experiences at revitalization workshops for indigenous languages of Oklahoma to evaluate the benefits of CBLR to linguists and communities. CBLR's "intense community focus" is compared with more traditional research models' focus on researcher and subject (Fitzgerald and Hinson 2013). The study finds that while this model requires more investment on the researcher's part, it prioritizes communities' goals and results in more detailed and specific linguistic analysis. The quality of research and the community involvement leading to long-term revitalization efforts make CBLR not only the most ethical but also the most effective model.

Poster Board: 39

Optical flow meter for volumetric flow rate measurement down to nL min⁻¹

Presenter: Chuchu Qin, Chemistry and Biochemistry Graduate

Mentor: Purnendu (Sandy) K. Dasgupta

Abstract:

Optical flow meter for volumetric flow rate measurement down to nL min⁻¹ / / Chuchu Qin / Department of Chemistry and Biochemistry / UT Arlington / / The goal of this project is to design and characterize an optical flow meter for measuring and calibration of ultra-low liquid flows down to nL min⁻¹ level. The experiment setup relies on two highly sensitive flow sensors to monitor the displacement of fluorocarbon slugs as a function of time. Fluorocarbon slugs are introduced into the flow as flow markers due to its low refractive indices and low solubility in common lab-use solvents. A lab-made T-junction is used for the injection of fluorocarbon flow markers. The target flow rate range is dependent on the inner diameter of flow tube and the T-junction. / Currently, high linearity of calibration for flow rate vs. 1/Time at 200 to 500 μ L min⁻¹ has been achieved (Figure 1). The linearity indicates a constant slope, reflects the volume between two flow sensors is not changing, which is correspondence with the setup. The STDs of 1/time at each tested flow rate is smaller than 0.0006 (except one is 0.0012). Flow rate=1068.3*(1/Time)+6.3258, R²=0.99989. Experimental setup needs further adjustment on T-junction and flow tube for lower flow rate measurement. / Due to its high cost-efficiency; simplicity; small size, the flow meter is of high significance in the nowadays trend of miniaturization of flow-based analytical instrumentations. /

Poster Board: 40

A Novel Auto Water Surface Detection Algorithm Using Lidar Elevation and Intensity Data

Presenter: George Toscano, Electrical Engineering Graduate

Mentor: Professor Venkat Devarajan

Group Members: Partha Acharjee

Abstract:

Hydro break lines delineate water bodies (lakes, rivers, ponds, reservoirs, streams etc.) from land area. In rural areas, hydro breaklines are necessary to create LiDAR (Light Detection and Ranging) derivatives such as Triangulated Irregular Networks (TINs), contours, digital elevation models (DEMs) etc. Hydro flattening - a process that ensures that surface of lake and reservoirs are flat and rivers are flat from shore to shore - follows the detection and delineation of water bodies. Manual hydro break line generation is time consuming and expensive, especially when there are large number of lakes, rivers and their tributaries in a dataset of interest. Accuracy and processing time depend on the number of vertices marked for delineation of water bodies. Automation with minimal human intervention is therefore desired for this operation. A raster-based advanced algorithm is proposed here to detect water bodies automatically using both LiDAR elevation and intensity data. Two distinguishing characteristics are proposed to detect water bodies: a) the surface of water body is a flat area and the elevation of it is lower than that of the surrounding area, and b) the spectral reflectance of water is very small in the near infrared range compared with vegetation and other topographic features. Beyond these two broad strategies, some additional techniques are proposed to be used to fine-tune the detection process. After detecting water bodies, breaklines can be generated. A comparison of automatically generated breaklines with their semi-automated /manual counterparts will be done and the results will be discussed. The auto hydro breakline generation method will be applied in at least two different areas to prove its robustness. /

This work is supported by Natural Resources Conservation Service

Poster Board: 41

Bare earth model generation from LiDAR data

Presenter: Partha Acharjee, Electrical Engineering Graduate

Mentor: Dr Venkat Devarajan

Group Members: George Toscano

Abstract:

Detecting building structure is a demanding LiDAR application for building modeling and bare earth model generation. In this work, we proposed a novel building classification algorithm from LiDAR point cloud which provides reliable results even in complex urban scenes. For this purpose, we proposed a novel edge detection method for LiDAR, named min-max angle filtering. This angle filtering algorithm differentiates all potential edges. A subsequent connected component analysis detects all connected edge points which come from same object. Then, separate convex-hull is prepared to contain each object which facilitates extensive analysis on each object individually. Detected convex-hulls contain at least one object and pixels outside the convex-hulls represent potential ground points. Based on these potential ground points, a bare earth digital elevation model is generated using cubic spline interpolation, which provides a rough idea about the ground elevation beneath all objects. Now, we analyze each object separately and calculate mean elevation of each planar surface. The surface with negligible elevation change are considered as a planar surface if it is bounded by edge lines. All surfaces from an object are numbered separately which can be used for building modeling. Then, all edge points are linked with a planar surface based on the elevation with neighbor surface points. It is shown that this proposed workflow is fast and reliable even for complex building structure in dense urban scene. Number of return count will be integrated in this workflow to get all vegetation points. Combined, these steps provide us an efficient algorithm to generate a bare earth model.

This work is sponsored by The Natural Resources Conservation Service (NRCS)

Poster Board: 100

Boundaries, Borders and Limits.

Presenter: Karah Kattenby, Art and Art History Undergraduate

Mentor: Marilyn Jolly

Abstract:

The series of paintings is watercolor on paper with the line work made up of drawings on the rear side of the paper and tediously hand pierced through with a push pin. The work explores shapes and forms to illustrate boundaries or barriers and the line work expresses the paths that approach, end, and meander at the borders before finally crossing over at which point the limits no longer exist.

Poster Board: 101

The effects of midazolam on the nucleus accumbens in the context of pain

Presenter: Breeanne Soteris, Psychology Undergraduate

Mentor: Yuan Peng

Abstract:

The nucleus accumbens (NAc) is a part of the brain well known for its role in processing reward and aversion. The purpose of this research was to investigate the activity of the nucleus accumbens in response to pain while under the GABA-agonist midazolam. It was hypothesized that midazolam would attenuate the pain response. Electrodes were implanted into the left NAc core in twenty female Sprague-Dawley rats. Subjects were given a 5mg/kg intraperitoneal injection of midazolam (n=12) or saline (n=8). A subcutaneous injection of 1.5% formalin was then administered into the right or left hind paw. Contrary to the hypothesis, local field potential analyses revealed that midazolam significantly intensified the response of the NAc to pain on the right side of the body, for frequencies in the delta, theta, alpha and beta bands. This suggests that the NAc processes pain in a contralateral fashion. This could potentially be used to develop treatments that manipulate NAc activity.

Poster Board: 102

Examining Descriptive Patterns and Differences in College Students' Beliefs about the Nature of Science, Scientific Reasoning Ability, Religiosity, Understanding of Evolution and Acceptance of the Theory of Evolution /

Presenter: Stephanie Gutierrez, Biology Undergraduate

Mentor: Ann Cavallo

Abstract:

Understanding evolution provides students with an underlying framework to the discipline of biology that is essential in understanding scientific concepts, yet most researchers and educators find public understanding of evolution, in general, to be significantly deficient. The purposes of this study were to 1) examine patterns and differences, 2) explore interrelationships, and 3) determine the best predictive model among students' views about the nature of science, scientific reasoning ability, religiosity, and understanding of evolution to determine their impact on students' acceptance of evolution. The results of this study found patterns in students' views about the nature of science based on ethnicity, scientific reasoning ability based on gender, as well as correlations between reasoning ability and understanding of evolution and views of nature of science and acceptance of evolution among others.

Poster Board: 103

How Quick Do They Click? Initial Dyadic Interactions Between Gay Men and Straight Women

Presenter: Morgan Thurow, Psychology Undergraduate

Mentor: William Ickes

Group members: Eric M. Russell

Abstract:

Past literature has suggested that a unique bond exists between gay men and straight women. We hypothesized that gay male-straight female dyads would exhibit unique patterns of behavior that are not evident in interactions between straight women and straight men. Twenty-eight women and 28 men (14 gay) were recruited to create a gay male-straight female (GS) dyad and a straight male-straight female (SS) dyad. Each dyad participated in two interactions while being video-recorded, and then each participant completed measures assessing the quality of their interaction. Our results revealed that GS dyads exhibited a different pattern of interaction compared to SS dyads. GS dyads were more oriented toward their partners and showed more nonverbal communication. Further, GS dyads reported greater trust, comfort discussing mating-related topics, and an increased likelihood to befriend one another. These results provide evidence that sexual orientation has an influence on initial interactions.

Poster Board: 104

Comparison between La_{0.2}Y_{1.8}O₃ and NaI:TI Scintillators for Radiation Detection

Presenter: Soha Aslam, Physics Undergraduate

Mentor: Wei Chen

Abstract:

Scintillators are the materials that exhibit luminescence properties upon irradiation by high energy particles, such as X-rays or gamma-rays. The most common types of scintillators are organic and inorganic scintillators; both having various advantages and disadvantages. Organic scintillators are low cost, durable and have high sensitivity; however, their low density limits its applications in gamma-ray spectroscopy. Inorganic single crystal scintillators such as NaI and CsI are excellent in their detection efficiency and luminescence properties; however, they are expensive, and difficult to grow in desired shape and size. Nanoparticles have attracted interest in various fields of research due to their high quantum yield and size dependent emission. Scintillators have a wide array of applications: they are used by the Department of Homeland Security for the detection of potential terrorist activities, or medical applications for radiation dosage detection, or even x-ray scanners for airport security. Here, we will study nanocomposite scintillator La_{0.2}Y_{1.8}O₃, and compare it to the commercially available NaI:TI scintillator. Our results indicate that nanoparticle scintillators have demonstrated promising results for radiation detection due to their excellent luminescence efficiency and energy resolution.

This work was supported by Department of Homeland Security.

Poster Board: 105

Carbonate accumulation in the equatorial Pacific during the middle Miocene

Presenter: Angela Lewis, Earth and Environmental Science Undergraduate

Mentor: Elizabeth Griffith

Group members: Samantha Carter

Abstract:

A high resolution record of total calcium carbonate (CaCO_3) accumulation rate (CAR) taken from over 200 samples from a deep sea sediment core, IODP site U1337, located in the equatorial Pacific Ocean over 14.1–13.5 million years ago (Ma). U1337 was at a modern water depth of 4.4 km and a paleo water-depth of about 4 km from 24.4–8 Ma (Palike et al., 2012). Carbonaceous shells produced in the surface ocean are composed of CaCO_3 which starts to dissolve below a depth called the lysocline until the calcium carbonate compensation depth (CCD) where no CaCO_3 accumulates in the sediment. The CCD at U1337 was about 4.7 km which is above the CCD. U1337 CAR was compared to Site U1338 with biogenic silica accumulation rates (BSAR) and calcite weight percents calculated from high resolution XRF data (Holbourn et al., 2014). From 13.8–13.6 Ma CAR increased at U1337 except when BSAR spiked at U1338, which might be due to a population shift. Reconstructing the past is important for understanding future changes.

Poster Board: 106

Gender Differences in Self-efficacy and Exercise Experience among Undergraduate Students

Presenter: Amanda Moorefield, Psychology Undergraduate

Mentor: Angela Dougall

Group members: Colin Jenney

Abstract:

As Americans struggle to obtain regular exercise, understanding gender differences and other psychological factors has become crucial. This study sought to characterize gender differences for exercise experience, gym use, performance and exercise self-efficacy. Subjects took part in a group cycling class in which their activity levels were recorded. Males had greater exercise experience and were more active during cycling than females, but were equally experienced with group exercise classes. Although males tend to have more natural ability to exercise, this cannot fully explain our findings. Females have less exercise experience overall and attend the gym less, despite having similar levels of self-efficacy. Other gender differences in exercise outcomes may be due to gender stereotypes. The results suggest that undergraduate females may be a vulnerable population in regard to obtaining regular physical activity. Future studies should focus on gender stereotypes and exercise outcomes.

Poster Board: 107

Effects of Intergroup Contact in Prejudice Reduction

Presenter: Brandi Stephens, Psychology Undergraduate

Mentor: Jared Kenworthy

Group members: Lauren Coursey

Abstract:

This study examined the effects of intergroup contact involving three categorical discussion topics to reduce prejudice. The participants were UTA students identifying themselves as religious, as participants messaged through Skype with a confederate disguised as an Atheist. Three topics were introduced to the dyads in random order. The first prompt allowed for the participants to disclose only their individual differences, the second prompt focused on participation in their religions, whereas the third prompt allowed for them to come up with groups that both shared. It was found that if the quality of the third prompt was rated as enjoyable, attitudes towards Atheists became more positive. These results are important to Psychology because when outgroup members discuss a common similarity between each other, instead of the differences, they view each other as more enjoyable. This can bring us one step closer to prejudice reduction when interacting with one another during initial encounters.

Poster Board: 108

Escaping Mango Street

Presenter: Joaquín Machado, English Undergraduate

Mentor: Barbara Chiarello

Abstract:

The House on Mango Street depicts a community plagued with misogyny, interpellating a majority of the women who inhabit this neighborhood. However, in this story we see the work of two major discourses; one that imposes the enabling of gender roles and the other imposed by the community itself through the recycling of traditional immigrant ideals. These discourses, when combined, perpetuate an unjust patriarchal binary that leads to the masculinization of gender roles, where the “superior” males create and animate the roles for women based on their own opinions of what a woman should do. This binary forces women, from an early age, to attempt and fit into a predetermined mold in order to be deemed marriageable. Using text from the book, journal articles, feminist theory, as well as race and post-colonial studies, I support my claim that the House on Mango Street serves as a commentary on the subjugation of women in the U.S, and as such, functions as a call-to-action for all women.

Poster Board: 109

Effects of Group Composition on Individual Performance in a Spin Class

Presenter: Alvin Yang, Psychology Undergraduate

Mentor: Angela Dougall

Group members: Colin Jenney, Dr. Judy Wilson

Abstract:

The effectiveness of group exercise classes in helping people of all ages reach health goals has been supported. However, less is known about how group dynamics impact the performance of individual exercisers in these classes. This study aimed to determine whether group gender composition had an effect on an individual's performance. Undergraduate students (N = 73) engaged in a 30-minute spin class in mixed groups of 6 participants led by a trained researcher. Heart rate and activity (accelerometer counts) were recorded throughout the class, and enjoyment was measured at the end. In partial support of expectations, female participants in female-dominated groups outperformed females in male-dominated groups. Contrary to expectations, no group differences were found for percentage of heart rate maximum achieved or enjoyment. These data indicate that female exercisers in male-dominated exercise classes may be less active than those in female-dominated groups. Future studies should further examine the cognitive and motivational factors of those in exercise classes so that we may maximize enjoyment, performance, and health benefits.

Poster Board: 110

Neuroprotective Effect of Fig Fruit on Hippocampal Cell Line Exposed to Ethanol

Presenter: Nadine Shihabeddin, Chemistry and Biochemistry Undergraduate

Mentor: Subhrangsu Mandal

Group members: Arunoday Bhan, Paromita Deb

Abstract:

Fig fruit (*Ficus carica* L.) is a common part of the Mediterranean diet, and it is known to act as an antioxidant after consumption. To understand the potential of the fig fruit's ability to relieve oxidative stress and to assess its neuroprotective effect, hippocampal cell line (HT-22) were exposed to ethanol and to fig extracts simultaneously. The toxicity of the hippocampal cells was reduced significantly with the addition of the fig extract, and significantly higher cell viability was detected as compared to the ethanol treated control cells with no fig extract. These data suggest that fig can act as a neuroprotective agent with potential against oxidative- stress cell induced death, potentially leading to aid in neurological disorders that undergo oxidative stress.

Poster Board: 111

Wireless Power Transfer by Inductive Coupling for Low Power Electronics

Presenter: Kaustubh Shinde, Electrical Engineering Undergraduate

Mentor: J.-C. Chiao

Group members: Minh Quoc Nguyen, Smitha Rao

Abstract:

With the advent of wireless technologies such as cell phones, tablets and laptops, wireless power transfer has come to the forefront in recent times. This research aims to optimize the efficiency of wireless power transfer by using an innovative method called inductive coupling. In this method, the set up is divided into 3 components; transmitter, repeater and receiver circuit. The transmitter circuit used is a series RLC class-E amplifier circuit which is connected to a function generator and dc power supply. The repeater guides the power from the transmitter through to the receiver. The receiver is a series RLC circuit connected to an oscilloscope to measure the output voltage. In our set up, we used 1 transmitter, 1 repeater and 4 receivers to successfully transfer power over a distance of 30cm with up to 55% efficiency at 1 MHz frequency. This was enough to power 4 LED lights wirelessly. This research is of significance in ways that it leads a path to practical application of efficient wireless power transfer in everyday life with future steps including incorporation of renewable energy to generate wireless power.

This work was supported by TxMRC, Texas Instruments, Texas Health Resources and Intel.

Poster Board: 112

The Effects of the Immune System on Bacteriophage Therapy of Cholera

Presenter: Amsal Roy, Biology Undergraduate

Mentor: Hristo Kojouharov

Group members: Mouhamed Nashawi, Kristen Masha, Oladipo Oyediran

Abstract:

Cholera is an infection of the small intestine which results in diarrhea and vomiting, resulting in excessive water loss. Individuals who consume water contaminated with virulent strains of the *Vibrio cholera* bacterium become infected with this disease. Countries such as Bangladesh and Dhaka have frequent cholera outbreaks and in order to limit the severity of cholera outbreaks, phage treatment could be considered. In order to understand the immune response to the bacteriophage a mathematical model that combined the dynamics and interactions of the bacteria, bacteriophage and the immune system was analyzed. / Of the three equilibria found and analyzed, only one that included all populations thriving was a stable equilibrium. However this stable endemic equilibria was numerically intractable and had to be sought after with specific parameter values in mathematica or direct simulation results from MatLab. While a direct correlation between the production rate of the immune system components and the bacteriophage population was observed, further analysis is required in order to make stronger supported claims.

Poster Board: 113

Worldview: Atheist Attitudes

Presenter: Stephanie Diaz, Biology Undergraduate

Mentor: Jared Kenworthy

Abstract:

Many societies have prolonged histories of religious intolerance and prejudice between religious groups. In this study, I investigated some individual-level, personality predictors of prejudice, or negative attitudes, against atheists. These personality variables include Social Dominance Orientation and Religious Fundamentalism. One hundred four participants completed an online survey. I performed a Hierarchical Regression Analysis, and found that Religious Fundamentalism and Social Dominance Orientation were both significant, negative predictors of attitudes toward atheists. Specifically, as scores on Social Dominance Orientation increased, attitudes toward atheists became more negative. Likewise, as scores on Religious Fundamentalism increased, attitudes toward atheists became more negative. The personality variables that I have investigated in this study have consistently been associated with prejudice toward other social groups in prior research, but have not yet been examined in relation to attitudes toward atheists. In addition to being a novel scientific contribution, this study is important because of our society's current religious polarization and the increasing number of Americans who identify as atheists.

Poster Board: 114

Analysis of Home Air Filters Near Industrial Sites Using ImageJ and HS-GCMS

Presenter: Joseph Balaban, Chemistry and Biochemistry Undergraduate

Mentor: Kevin Schug

Group members: Doug D. Carlton

Abstract:

Air filters are readily available in households for sampling air quality; this approach may be useful in understanding the impact of local industrial activity on air quality. When analyzing home air filters, a smaller section is typically selected to represent the whole sample. Various sites on an air filter may differ in results based off the exposure. This inconsistency in locations could introduce sampling bias. Thus, it is important to select the proper area for analysis. The objective in this project is to standardize operating procedures dealing with intra- and interlaboratory sampling and to determine home air contamination of aromatics and aldehydes known as volatile organic compounds (VOC) from home air filters near industrial sites. A National Institute of Health analysis software ImageJ was used to eliminate sampling bias. The ImageJ optical density (OD) results were then compared to surveyed researchers to identify how much of a discrepancy exists. Through headspace-gas chromatography/mass spectrometry analysis, each selected section of each filter was found to have VOC concentrations that correlated with the ImageJ OD.

Poster Board: 115

Turkish Vowel Harmony

Presenter: Juan Lopez, Linguistics Undergraduate

Mentor: Colleen Fitzgerald

Abstract:

This study is about the Turkish language vowel harmony process. Vowel harmony (VH) is the process where a vowel's sound qualities (features) are modified (alternation) to match those of the previous vowel. Vowel features describe tongue and lip placement during articulation (i.e., [i] is high, front, unrounded and [o] is mid, back, rounded). The data for this study was extracted from a reference grammar (Göksel, et al, 2005). In root words, the VH process uses the back feature. In suffixes, the high and round features are incorporated. However, since the alternating vowels in suffixes depend on features from the previous vowel, they cannot be articulated until the suffix is attached to a word. The VH process is applied from left to right within and across words. Although not all vowels in Turkish alternate, they all contribute their features to the VH process. / The first implication of this study is a better understanding of Turkish and its VH process. The second implication is a better understanding of phonological iterative processes, and the lessons learned motivate future studies of harmonization processes in other languages.

Poster Board: 116

Improved Closed-Loop Algorithm for Automatic Detection and Suppression of Mechano-Nociceptive Neural Activity

Presenter: Gaurang Gupte, Biology Undergraduate

Mentor: J.-C. Chiao

Group members: Yuan B. Peng

Abstract:

Chronic pain affects 30-60 million Americans and has an annual economic cost of \$600 billion, which exceeds that of cancer, heart disease and diabetes combined. Better therapies are critically needed. Currently, Spinal Cord Stimulation (SCS) is a key alternative for chronic pain patients non-responsive to opioids, but suffers from posture dependency, paresthesia, and battery lifetime limitations due to continuous open-loop stimulation. Continuing on our previously developed wireless closed-loop stimulation system, our group addressed these issues in developing the closed-loop Weighed Recursive Filter (WRF) algorithm which triggers antinociceptive Periaqueducal Gray stimulation only when nociceptive signals are detected from Wide Dynamic Range neurons. Numerical simulations using artificial neural data constructed from real recordings and in vivo experiments on anesthetized rats both showed high accuracy and successful suppression of nociceptive signals. As the second closed-loop pain management system in the world, the WRF algorithm shows great promise as a breakthrough robust and non-addictive therapeutic option for chronic pain.

This work was supported by the Texas Norman Hackerman Advanced Research Program.

Poster Board: 117

Soluble factors in organ lysates induce changes in prostate cancer cell migration and gene expression

Presenter: Mouhamed Nashawi, Mathematics Undergraduate

Mentor: J.-C. Chiao

Group members: Lyndon K. Lee, Smitha Rao

Abstract:

About 90% of cancer deaths are due to metastatic cancers, cancers that migrate from one area of the body to another. Previous research shows that cancer displays a preference for metastasizing to certain organs, particularly the bone, but the molecular mechanisms are poorly understood. It is hypothesized that certain organs contain and secrete compounds that exert a chemotactic effect on cancer cells. We used a microfluidic platform to observe the migration of PC-3 prostate carcinoma cells in response to exposure to various organ lysates. PC-3 cells exhibited high migration to bone and brain lysates, and moderate migration was also observed for prostate and testes lysates. Immunocytochemistry revealed that vimentin, a biomarker found in more invasive cancers, was upregulated in migrating cells. These results suggest that factors present in different organs can elicit different migratory behaviors and alter gene expression to produce a more invasive cell phenotype. Finding characteristics about metastatic cancers has the potential to spur future research in the innovation of novel therapies or treatment options in metastatic cases.

Poster Board: 118

Ascorbic acid-mediated inhibition of prostate cancer migration

Presenter: Sylvia Loh, Biology Undergraduate

Mentor: J.-C. Chiao

Group members: Lyndon Lee, Steven Bean, Smitha Rao, Victor Lin

Abstract:

Prostate cancer is the leading cause of cancer death in American males after lung cancer. Ascorbic acid, also known as vitamin C, is a popular complementary and alternative medicine that has exhibited antitumor effects when intravenously administered. In this work, prostate cell migration in response to stimuli provided by ascorbic acid was studied using a microfluidic chamber. The microfluidic device was fabricated via soft lithography from poly-dimethylsiloxane (PDMS). PZ-HPV-7, a noncancerous human prostate epithelial cell line, and PC-3, a metastatic human prostate carcinoma cell line, were used to model a prostate environment. Treatment with a 5 μ M solution of ascorbic acid in standard growth medium was found to significantly reduce the migration of PC-3, but the migration of PZ-HPV-7 was not greatly affected. These findings suggest that pharmacologically relevant doses of ascorbic acid may play a preventative role in cancer progression and metastasis. With further research, current cancer treatments may incorporate vitamin C in order to increase the efficiency and selectivity of chemotherapy.

This work was supported in part by the Louis Stokes Minority for Alliance Participation (LSAMP) grant.

Poster Board: 119

Effect of Genetic Breast Cancer Testing on the Relationship of Psychological Wellbeing and Sleep

Presenter: Soroush Ghaffari, Biology Undergraduate

Mentor: Angela Liegey Dougall

Group members: Daniel Tebbe, Christopher Rhodes

Abstract:

Testing for a genetic risk for breast cancer has become an increasingly available resource, and patients may experience transient increases in distress after receiving positive results (Smith et al., 2008). Therefore, the purpose of this study was to examine the effects of stress and psychological wellbeing on sleep and whether these relationships were mediated by intrusive and avoidant symptoms. Participants were 126 women from a larger study and were considering genetic testing for BRCA1 and BRCA2. Self-reported sleep, perceived stress, wellbeing, and intrusive and avoidant symptoms were assessed at one week before testing and at three months after receiving results. Intrusions mediated the relationship between somatization and sleep, 95CI [.01,.28]. Avoidance mediated the relationship between stress, 95CI [.001,.02], as well as somatization, 95CI [.01,.31], and sleep. These results indicate that genetic testing for breast cancer may affect sleep through symptoms related to testing.

Poster Board: 120

A Wearable Recording System for l-Glutamate Neurotransmitter Sensing

Presenter: Jeffrey Mays, Electrical Engineering Undergraduate

Mentor: J.-C. Chiao

Group members: Cuong M. Nguyen, Smitha Rao

Abstract:

Neurological disorders such as Parkinson's disease and Alzheimer's disease are associated with neurotransmitter concentration imbalances in the mammalian central nervous system. To study these disorders, implantable sensors are an attractive option for monitoring the concentration of excitatory neurotransmitters such as l-glutamate.

However, there are technical challenges in existing implantable neurotransmitter sensors. The micro-scale dimension electrodes produce weak signal responses to already low l-glutamate concentrations. A signal acquisition system must amplify signals and filter these noises. Additionally these systems utilize dedicated coaxial wires for connection to the subject, restricting behavior and movement.

To address these challenges, a wireless recording system for in vivo l-glutamate monitoring was developed in this work. The design includes sensor electrodes, circuitry for sensor signal processing and a wireless data acquisition system. A self-referencing technique was implemented to improve selectivity to l-glutamate and eliminate noise. The wireless data acquisition utilized the Bluetooth low-energy protocol for data transmission to a portable computer or smart phone for recording.

In evaluating the design, recordings of l-glutamate levels from the wireless system were compared with recordings from a commercial data acquisition system. A close correlation between the wired and wireless systems was observed. Additionally, the self-referencing technique was shown to reduce interferences from other electroactive chemicals in the central nervous system by over 90 percent. The wireless communication capability of the wearable recording device demonstrates the feasibility of in vivo real time neurotransmitter sensing in freely behaving animals. The recording system verified in this work shows promise for advancing the understanding and treatment of neurological disorders.

This work was supported by Intel, TxMRC and THR Texas Health Resources.

Poster Board: 121

Manipulating Protein Charge States using a new Mass Spectrometry Technique

Presenter: Dhvani Derasari, Chemistry and Biochemistry Undergraduate

Mentor: Kevin Schug

Group members: Evelyn Wang

Abstract:

Proteins are valuable tool for clinical diagnostics. Protein charge state analysis enhances fragmentation and sequencing possibilities for proteins. Changing a protein charge state in a controlled fashion is often a difficult task for a conventional way of analysis. A novel configuration method to manipulate and thereby change and control the charged protein states is presented using the transmission mode desorption electrospray ionization (TM-DESI) mass spectrometry. Through the use of a polypropylene mesh screen, captured proteins were sprayed with established supercharging reagents (acetic acid, 3-nitrobenzyl alcohol, and sulfalone) through the use of a hypodermic needle, posing as the electrospray source. Through this configuration, manipulation of Cytochrome c charge state was significantly observed. The TM-DESI MS configuration is a promising technique to adequately manipulate protein charge states. Additionally, the ambient nature of the analysis design may help advance new tools for protein characterization in screening and imaging applications.

Poster Board: 122

Tohono O'odham Dictionary Conversion

Presenter: Eric Katz, Linguistics Undergraduate

Mentor: Colleen Fitzgerald

Abstract:

Tohono O'odham is a threatened Uto-Aztecan language spoken in parts of Arizona and Mexico estimated to have under 10,000 speakers. This project aims to organize dictionary entries from Madeleine Mathiot's Tohono O'odham printed dictionary into an electronic format that can be imported into SIL Fieldworks Language Explorer (FLEX). Organizing this data requires knowledge of the O'odham language to label and categorize the lexical information contained in the dictionary. O'odham word formation is complex. Understanding this complexity is necessary to combine currently disjointed entries under a single head word. I utilize regular expressions and manual searching to isolate this lexical information and apply a label to be imported into FLEX. Once in FLEX, it will be possible to linguistically deconstruct and analyze O'odham example sentences. Completion of this database will allow for further linguistic study of O'odham and allow for the creation of a more useable electronic dictionary to aid speakers and learners of O'odham.

Poster Board: 123

Toward the Synthesis of Bioactive Spiroketal Sesterterpenoids

Presenter: Adam Berlin, Chemistry and Biochemistry Undergraduate

Mentor: Junha Jeon

Abstract:

Spiroketal sesterterpenoid compounds are alluring targets for total synthesis, both for their unique structural characteristics and their remarkable biological activity, most notably the selective augmentation of intranuclear cyclic adenosine monophosphate (cAMP) levels. Research into the potential pharmacological impact of such molecules is hindered by a dearth of accessibility; these substances are found in minute quantities in nature, and existing syntheses yield only very small amounts. Our efforts have focused on the synthesis of a bicyclic pyran intermediate, which, after subsequent spiroketalization, could be expanded into a number of spiroketal sesterterpenoids, including those of the Gombaspiroketal, alotaketal, and phorbaketal families. Several interesting and unusual reactions are employed in producing the intermediate, specifically an intermolecular Oxa-Michael addition reaction of methyl hydroquinone to an alkyne was used to produce an alpha-beta unsaturated methyl ester, which is ultimately subjected to an enantioselective, organocatalyzed intramolecular oxidative dearomatization to produce the final bicyclic pyran moiety. Future work will be focused toward utilizing this intermediate to produce Gombaspiroketal A, as well as other spiroketal sesterterpenoids.

Poster Board: 124

Optimizing Quartz Bar Light Guides for PMTs with the Geant4 Simulation Framework

Presenter: Anthony Rich, Physics Undergraduate

Mentor: Andrew Brandt

Group members: John Crouch, Jace Grandinetti

Abstract:

The goal of our research group is to create better time of flight (TOF) particle detectors for projects such as the ATLAS Forward Proton (AFP) detector at the Large Hadron Collider (LHC). These detectors use the light of Cherenkov radiation from interacting protons in quartz light guide bars to relay this signal to our photomultiplier tubes (PMT), which then convert the light into usable electrical signals. We utilize the Geant4 simulation framework, used at the LHC, to simulate optimal quartz bar geometry and then virtually run particle beams through the detector in order to visualize expected behavior. This research specifically looked for computer optimization routines that would not only improve TOF detectors as a scientific tool, but also save on time and material cost to make various detector test configurations. By taking simulations featuring different bar lengths and angle cuts, we found common criteria in each that could be varied in order to optimize the signal from any of these type of quartz bars configurations. This not only gives us an automated tool for currently used detector configurations, but also a predictive tool for future configurations.

Poster Board: 125

Jesus Malverde: Saint, Thief or Legend?

Presenter: Abraham Montano, Modern Languages Undergraduate

Mentor: Christopher Conway

Abstract:

Also known as the “patron saint of drug dealers,” or “angel of the poor,” Jesus Malverde was possibly born in Culiacan, Sinaloa, at the end of the nineteenth century. This character, whose real existence has not been verified, currently has thousands of faithful, not only in Mexico but across the U.S. Southwest, where he is well known in the Mexican and Central American immigrant community. According to legend, Jesus Malverde was a character who robbed landowners and the rich to give to the needy in the years leading up to the Mexican Revolution. In May 3, 1909, authorities caught and killed him. Even though he has not been recognized by the Catholic Church, Jesus Malverde not only has his own chapel, located in his birthplace, but every year on May 3 his devotees celebrate him as a saint. Malverde has also appeared in US television series such as “Breaking Bad,” which is why the DEA and FBI see him as an enemy icon. My presentation will demonstrate that a character like Malverde encourages narcoculture, glorifying drug traffickers and making them role models. These conclusions are based on the study of folk songs (corridos), movies, narco novels and a popular Malverde “prayer.” Understanding the Malverde myth is important because it shows us the way drug dealers want the Mexican people to see them. It also shows how drug culture has penetrated Mexican popular culture.

Poster Board: 126

Syllabic Nasal in San Carlos Apache

Presenter: Devin Hornick, Linguistics Undergraduate

Mentor: Colleen Fitzgerald

Abstract:

San Carlos Apache (Athabascan) is an endangered Native American language spoken in East central Arizona. Some Apache syllables form around the nasal consonant [n]. Due to language decline and English dominance, the difference in English and Apache sound patterns impact learning and maintaining this language. The data comes from reference grammars and other work on Apache syllables. / / Apache syllables often use vowels but will sometimes use [n] which acts like a vowel, ideal because [n] produces more sound than other Apache consonants. When [n] occurs in this way, it is called a syllabic consonant. In English syllabic consonants occur in words like "able" (/eɪ.bl/) or "happen" (/hæ.pn/). In Apache syllabic [n] can start a word, as in "nchad" (/n.tʃat/, "you are crying"), and even co-occur with other sounds in the same syllable, as in "gonszēē" (/go.ns.zē:/, "I am called (it)"). How [n] acts is predictable and therefore governed by rules and constraints. This gives a clearer understanding of Apache and Athabascan syllables, aiding in learning. It also helps phonologists understand similar processes in other human languages.

Poster Board: 127

Similar genetic basis of hypopigmentation in pigeons and humans

Presenter: Andy Dang, Chemistry and Biochemistry Undergraduate

Mentor: John "Trey" W. Fondon, III

Group members: Johnny Reyes

Abstract:

Although often employed as examples of simple Mendelian traits in introductory genetics lessons, the genetic basis of variation in pigmentation is far more complex than these toy examples would suggest. Hypopigmentation traits in humans and other animals occur in a variety of forms and may affect a variety of tissues, often including pelage/plumage, eyes, ears, or other organs. Although the genes and mutations contributing to many of these traits have been determined, there are dozens of genetically distinct hypopigmentary conditions, many with serious health consequences, for which the genetic basis remains unknown. Melanogenesis pathways are highly conserved across tetrapods, and studies of domestic mammals and birds have been key to the identification of the genetic causes of many pigmentary conditions. Domestic pigeon breeds harbor a diverse assortment of hypopigmentary traits, including some that recapitulate medically important features of debilitating human conditions. Here we apply a candidate gene approach to identify the genetic basis of hypopigmentation in domestic pigeons, and find similar genetic causes in pigeons and humans. The identification of molecular genetic underpinnings of pigmentation defects in pigeons may ultimately aid in the understanding, prevention, and treatment of related human conditions.

Poster Board: 128

Polarization-Based Multiparametric Discrimination of Resonant Photonic Biosensor

Presenter: Ramin Firoozi, Electrical Engineering Undergraduate

Mentor: Robert Magnusson

Abstract:

A backfitting approach to analyze the sensitivity parameters of guided mode resonance (GMR) in GMR microarray plates is presented. The experimental data is obtained from the ResoSens bioassay system and consists of fundamental transverse electric (TE₀) and transverse magnetic (TM₀) resonance wavelengths. These resonances shift uniquely in response to the chemical bindings. ResoSens system is a label-free optical biosensor based on Guided mode Resonance technology. By performing inverse calculations, the backfitting codes solve for three unknown parameters and we can utilize the result to model the chemical bindings on the surface of the biosensor plates. The sensitivity parameters are the refractive index of the bio layer, the thickness of the bio layer and the background index change caused by thermal noise. Employing the inverse calculation results, we create a database that would be utilized to model the molecular reactions on sensor plates. The ability to detect chemical bindings has significant importance for applications in point of care diagnostics and drug discovery.

Poster Board: 129

9-1-1 Telecommunicators Traumatic Stress: resiliency based on personality traits, stress based on type of calls, coping mechanisms used to enhance resiliency.

Presenter: Cristina Cabrera, Psychology Undergraduate

Mentor: Jared Kenworthy

Abstract:

This research study consisted of comparing resiliency and personality traits amongst 9-1-1 Telecommunicators to get insight on which traits those still in this profession possess that keeps them going since there is such a high turn over rate and only 2% are able to go through training. Also assessed were coping mechanisms using the COPE inventory. The questions to the inventory were revised for Telecommunicators based on what their work environment is, within the COPE inventory two categories were inputted specifically for their work and life environment. Reactions based on type of calls were analyzed to see which calls created the highest amount of distress. A Post Traumatic Stress Disorder (PTSD) screening tool which was primarily used for police officers, firefighters and military personnel and inputted into the survey to screen for PTSD symptoms to show a comparison amongst the four professions in their levels of stress. A survey through survey monkey was sent to 2,350 9-1-1 Telecommunicators nationwide, 1,880 responded. The results showed that those who were most resilient possess the personality traits of conscientiousness, neuroticism, agreeableness, and openness which allowed them to pursue this profession. Coping mechanisms that were present showed that 9-1-1 Telecommunicators have poor ways of dealing with stress, they tend to be overweight, smoke, drink, and repress their emotions. The section in this survey regarding reactions based on type of calls showed that 9-1-1 Telecommunicators tend to be more distressed toward child injury/death, officer shootings, stroke, and heart attacks. The PTSD Screening tool shows that compared to police officers, firefighters, and military personnel shows no difference in the amount of stress they possess showing that you do not need to be at the scene to be affected. With these results we hope to implement a Mental Health program, mental health resources or better training to assist our 9-1-1 Telecommunicators.

This work was supported in part by the North Central Texas Council of Governments 9-1-1 Program

Poster Board: 130

Empire: The Effects of African Colonization on Contemporary Germany

Presenter: Alyssa Dequeant, Modern Languages Undergraduate

Mentor: Amy Titus

Abstract:

After the Berlin Conference of 1884 Germany began its colonization of Africa. Although short lived, the German Colonial Empire left lasting impressions and influenced German thought and actions from the 1920s to present day. Through the study of contemporary and historical texts from the era, it was discovered that the colonization led to Germany becoming the third largest colonial empire in Africa and a formidable force in Western Europe. The Empire created a heightened sense of German pride and nationalization. It was also found that the forfeiture of the colonies to Britain and France following World War I caused German expansionism to shift to Central and Eastern Europe, and perpetuated the myth of German guilt in the interwar years. These results describe how the settlement and later loss of Africa would add to resentment in Germany and a renewed sense of becoming an awe-inspiring power, leading into World War II. The atrocities committed by colonists through genocide and concentration camps may have had an impact on Nazi Germany's treatment of Jews during the war, as the colonization gave rise to an emphasis on racial superiority at home. In modern Germany there are still racial tensions left from the era, while German continues to be spoken by a significant minority in the former colony of Namibia. This study is significant as it relates the influence of colonization on 20th-century and contemporary Germany. Despite the statement of "Never Again," discrimination persists and continues to leave black Germans feeling like strangers and outcast in their own country.

Poster Board: 131

Synthesis of 5-Deazariboflavin (Fo) and derivatives

Presenter: Danya Castaneda, Biology Undergraduate

Mentor: Alejandro Bugarin

Group members: Xiaojun Huang

Abstract:

Fo and 5-deazariboflavin derivatives are helper molecules that function to speed up biological processes. Derivatives with electron deficient groups at their core (e.g., a nitro group), promote cell death by electron reduction. The synthesis of these derivatives has been investigated since the seventies. However, the major issue is that overall yields range from 19-36%, and are limited to few substrates. A critical step, involves the connecting of a carbohydrate with 6-cholouracil. This step usually has low yields and several impurities. Herein, We are optimizing the synthesis and purification method for the critical step. After first hand investigation, we observed that the color becomes lighter after applying thicker silica gel when purifying. Lighter color indicates the purity for this compound. We took proton and carbon NMRs to verify the purity. Success of this optimization, will lead to more successful and clean derivatives, thus increasing our yield. So far, we have synthesized several derivatives and the results will be presented. A better strategy for the preparation of 5-Deazariboflavin derivatives will reduce the cost of these bioreductive antitumor agents.

Poster Board: 132

Rebuilding Decisions in Central Oklahoma - A Communications Standpoint

Presenter: Nadajalah Bennett, Communication Undergraduate

Mentor: Rachel Stohr

Group members: Dr. Mark Shafer and Alek Krautmann - University of Oklahoma, Oklahoma Climatological Survey

Abstract:

After a large tornado struck the central Oklahoma communities of Newcastle, Oklahoma City, and Moore on May 20th, 2013, residents sought to mitigate damages and prepare for future emergencies. To understand the communication processes through which homeowners in Moore and Oklahoma City make sense of mitigation techniques and emergency preparedness a door---to---door survey was conducted to examine the ways in which homeowners obtained information on how to mitigate their homes when rebuilding after the storm. Communication was an essential factor in how homeowners learned of possible options including the interactions with surrounding businesses in the area. The survey inquired about damage done to homes, reasons homeowners implemented particular mitigation strategies, costs of implementing mitigation applications, and emergency preparedness strategies homeowners use to prepare for severe weather. Findings indicate that most homeowners were either considering or had already installed a storm shelter inside their home to help bring them a better sense of safety. Many homeowners were unaware of other mitigation techniques such as, installing hurricane clips on their roof, or applying plywood sheathing on their roofs to help withstand tornadic winds and severe weather.

Some homeowners reported that they did not implement mitigation strategies because they could not afford additional out of pocket costs. This projects serves as a starting point for which the improvement of communication of information from emergency management organizations and citizens needs to be improved so homeowners can have readily accessible information for how mitigate when severe weather is approaching.

This work was supported by the National Science Foundation under Grant No. AGS-1062932.

Poster Board: 133

Spectroscopic and Enzyme Characterization of Substrate-Bound Cysteine Dioxygenase by Copper Probing

Presenter: Omar Bibi, Chemistry and Biochemistry Undergraduate

Mentor: Bradley Pierce

Abstract:

Within the cell, critical chemical reactions relevant to survival are facilitated by biological catalysts termed enzymes. Those enzymes involved in sulfur-oxidation and transfer are increasingly being recognized as potential drug targets for the development of antimicrobials, therapies for cancer, and inflammatory disease. For instance, patients suffering from neurological disorders such as autism and Down syndrome have significantly lower plasma concentration of sulfur-containing biomolecules such as cysteine (CYS), homocysteine (HCY), glutathione (GSH), and S-adenosylmethionine (SAM). This observation suggests a correlation between impaired sulfur-oxidation and neurodegenerative disease. Herein, we examine structural rearrangements within one sulfur-oxidizing enzyme [cysteine dioxygenase (CDO)] upon binding to its native CYS substrate, the substance acted upon by this enzyme. This enzyme depends on molecular oxygen (O₂) to oxidize CYS thereby producing cysteine sulfinic acid (CSA). It has been observed that the reactivity of this enzyme with O₂ must be triggered by initially binding to its substrate and thus this represents a key step in the regulation of this enzyme. In this work, we use Cu(II) as a spectroscopic probe to observe structural rearrangements within the CDO active site upon Cys-binding using Electron Paramagnetic Resonance (EPR) spectroscopy. In combination with ongoing kinetic experiments, this work provides insight into the structural regulation of this key metabolic enzyme.

Poster Board: 134

Solar Tree: Low Cost Solar and Natural Gas Electricity Integrated with Home Heating and Cooling

Presenter: Grant Pham, Interdisciplinary Science Undergraduate

Mentor: Michelle Badon

Abstract:

Electricity production from coal today is polluting and contributes greatly to climate change. In addition, renewable energy is too costly and not dependable, due to the intermittency of solar and wind availability. Furthermore, home air conditioning system is inefficient due to lack of maintenance issues. This research was focused on S-CO₂ solar and natural gas generator that supplies cheap and renewable electricity together with home heating and home cooling that replaces traditional home cooling and heating, to improve up to 4 folds end-user energy efficiency. Computer aided design pictures were drawn and research was done on Solar Technology and Thermodynamic cycles. The Recompression Brayton S-CO₂ cycle and Trans-critical CO₂ inter-cooling cycle was chosen because of high efficiencies. The heat from the sun and/or from natural gas combustion is used to heat up highly compressed S-CO₂ to power a Piston Expander powering a Generator. Excess mechanical output of the Engine can be used to directly turn an air conditioning (AC) compressor of very large size for maximum efficiency in order to cool many adjacent houses during the summer. Waste heat from electrical generation and heat pump can be used to heat those houses in the winter and hot-water heating, thereby doubling the energy efficiency.

This work was supported in part by the Environmental Protection Agency (EPA).

Poster Board: 135

Identification of the Broad-horned Flour Beetle X-chromosome by Whole Genome Sequencing

Presenter: Mason Bartels, Biology Undergraduate

Mentor: Jeff P. Demuth

Abstract:

We sequenced the broad-horned flour beetle (*Gnathocerus cornutus*) genome to establish the homology of sex chromosomes across approximately 140 million years of beetle evolution. We used the MiSeq sequencing platform to generate the approximately 25 million 300 base pair, paired-end reads. We then used CLC genomics workbench software to assemble the reads into contigs and then map and compare our *G. cornutus* assembly, to the previously published *Tribolium castaneum* genome. Based on differential read depth (i.e. number of times each base was sequenced) in males we found 98 contigs that were candidates for X-linkage. Among these 98 contigs, 72, mapped to the *Tribolium castaneum* X chromosome. Perhaps more interesting we found 4 contigs that mapped to chromosome 5 of *Tribolium castaneum*. The 72 contigs that mapped to X and the 4 that mapped to chromosome 5 suggest that there has been a translocation between chromosome 5 and the X chromosome. Investigation into other species could reveal the direction of this translocation and potentially the selective pressures acting in *G. cornutus*, a species with sexually antagonistic morphology.

Poster Board: 136

Drinking, hooking-up, and condom use: Is there a sexual double standard?

Presenter: Tonychris Nnaka, Nursing Undergraduate

Mentor: Michael Young

Group members: Tina Penhollow, Florida Atlantic University

Abstract:

Purpose. To: (1) identify judgments college students make of others based on descriptions of heavy drinking, hooking-up and condom use behaviors, (2) determine whether participants' judgments differed based on the gender of the person described.

Methods. Participants (n=242) UTA students, single/under 25, completed a questionnaire that included one of eight randomly assigned vignettes (four vignette types, male or female model). The basic vignette included a positive description of a college student; no information about drinking or sexual behavior. The second vignette added information concerning drinking behavior. The third vignette added information about hooking-up and consistent condom use. The fourth vignette was like the third except condoms were rarely used. Participants indicated degree of agreement/disagreement with statements comprising three scales (positive character, likability, negative behavior), about the model depicted in the vignette.

Results. Analyses of female participant data showed significant main effects for vignette type for positive character and likability; the basic vignette receiving the most positive judgment. Analysis of male participant data showed significant main effects for vignette type for positive character; the basic vignette receiving the most positive judgment. There were no significant model x vignette interaction effects for either male or female participants.

Discussion/Conclusion. Neither male nor female participants evaluated the female model differently from the male model for engaging in the same behaviors, thus there was no evidence of a sexual double-standard. Drinking and hooking-up vignettes were evaluated less favorably than the basic vignette, indicating normative standards of the study participants were not supportive of these behaviors.

Poster Board: 137

Investigating the role of genomic deletions in piebald traits

Presenter: Raj Mehta, Biology Undergraduate

Mentor: John "Trey" W. Fondon, III

Group members: Shreyas Krishnan

Abstract:

The genetic and molecular underpinnings of inherited forms of human conditions involving progressive and congenital forms of piebaldism, such as vitiligo and white forelocks, are areas of intensive medical genetic research. While the genetic basis of many of these conditions are known, there are remain many for which the underlying genetic factors have yet to be identified due to the limitations of performing mapping studies in humans. Here we describe efforts to leverage the extraordinary diversity of domestic pigeons to attempt to discover the genetic origins of similar piebald traits in this powerful genetic model system. In this study, we examine the effects of large deletions in the proximity of pigmentation genes using genetic association and linkage tests. The combination of genetic association and linkage analysis of candidate loci enables efficient tests of putative gene-trait associations with small, highly informative pedigrees, permitting the rapid genetic dissection of complex pigimentary traits.

Poster Board: 138

Catalysts and Consequences of Global Human Trafficking

Presenter: Naomi Carlton, Interdisciplinary Studies Undergraduate

Mentor: Alicia Rueda-Acedo

Abstract:

As the illegal trade of individuals for sex and labor exploitation, global human trafficking is one of the most atrocious obliterations of human freedom and dignity in history. Today, millions of people around the world are being brutally forced to satisfy the greed of human traffickers and their customers. The first step to eradicating this massive violation of human rights is a solid understanding of it. However, using only one discipline to analyze this problem will produce, at best, a distorted view and a weak solution. In my presentation I will show that the causes and repercussions of human trafficking are so complex that researching them requires using various disciplines, three of which will be discussed.

To find the typical demographics of human traffickers and their victims, as well as the connections between human trafficking and globalization in worldwide society, it is vital to study the sociological aspects of this issue. Furthermore, in order to brainstorm for more effective anti-human trafficking legislation, political science is another necessary discipline involved. Finally, economics also plays a key role in this research, especially in the area of examining the socioeconomic profiles of human traffickers and their victims.

This interdisciplinary research reveals that victims need help out of the cycle of shame and abuse they suffer, while governments must shed their selfish focus on profits and strengthen their enforcement of anti-human trafficking legislation. Such an interdisciplinary understanding of this inhumane corruption can lead to a successful implementation of a comprehensive solution.

Poster Board: 139

Synthesis of Allylic Acetates

Presenter: Brandon Fulton, Chemistry and Biochemistry Undergraduate

Mentor: Alejandro Bugarin

Group members: Enrique Barragan, Xiaojun Huang

Abstract:

Investigating the mechanisms of chemical reactions is of primary interest to organic chemists. In order to elucidate these mechanisms, reactions must be investigated and analyzed systematically. In our study, we examine a two step synthesis of allylic acetates. In the first step, a double bond undergoes a simple bromination reaction in which two bromine atoms are added across the bond. The mechanism for this reaction is well studied and can be found in almost any introductory organic chemistry textbook. The second step of this synthesis involves the elimination of one of the bromine atoms and a substitution reaction in which the second bromine is swapped with an acetate ion. This reaction was discovered accidentally by a fellow undergraduate. Initially, the reaction required a large amount of reagents whose functions in the mechanism were unknown. To determine which reagents were necessary to the reaction, we ran the reaction multiple times with different combinations of the reagents. By analyzing which reagent combinations resulted in the desired product, we were able to reduce the amount of reagents to just two. The next step of our investigation was optimization. Optimization is the process of discovering what ratios of reagents are necessary to obtain the highest yield of product. These analytical techniques are together known as methodology, which is the systematic analysis of chemical reactions. In this presentation, I will focus on application of the scientific method and discuss how techniques such as methodology can be used to further reveal the wonders of nature.

What is ACES?

The Annual Celebration of Excellence by Students (ACES) Symposium is a university-wide symposium that showcases the best of UTA's undergraduate and graduate students' research and creativity.

About UT Arlington

The University of Texas at Arlington sets the standard for educational excellence in the thriving Dallas-Fort Worth area. With an enrollment approaching 33,500, it's the second largest institution in the UT System and the sixth largest in Texas. The University is rising in stature through its commitment to transforming the lives of students, pushing the boundaries of knowledge, and serving those around us.

- More than 180 rigorous degree programs
- Ten colleges and schools
- Research centers in all disciplines
- Ranked as a Research University/High Research Activity by the Carnegie Foundation for the Advancement of Teaching
- \$77.7 million in research funding in 2012/2013
- Students from every state and 123 countries – one of the most diverse student groups in the nation
- More than 300 campus organizations

Contact Us

ACES c/o The Office of Graduate Studies
701 S. Nedderman Drive
Box 19185
Arlington, TX 76015
817-272-5164
<http://www.uta.edu/aces/>

