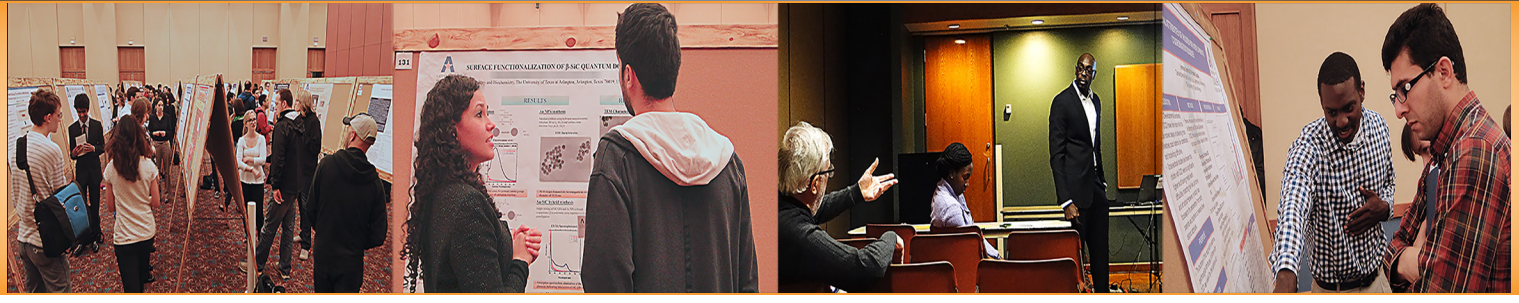
The 12th Annual Celebration of Excellence by Students

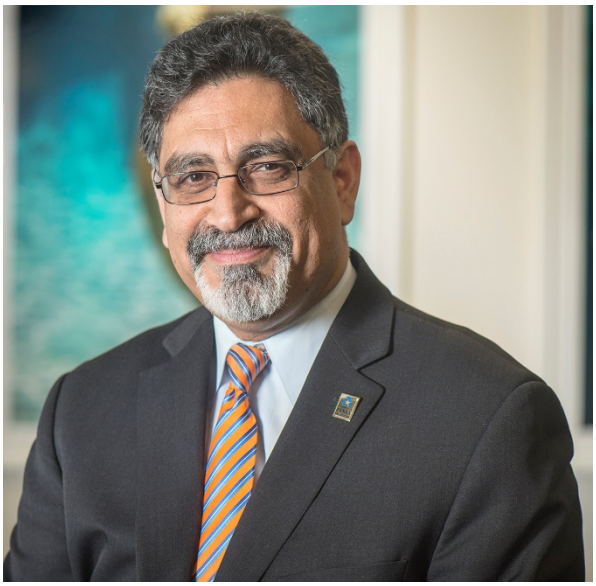
AcES

Symposium Booklet

March 23, 2016



ACES WELCOME
President Vistasp M. Karbhari



It is my pleasure to welcome you to the twelfth Annual Celebration of Excellence by Students (ACES) at the University of Texas at Arlington. Given UTA's position as an R-1 research university and one committed to ensuring that enquiry and discovery are integral to the educational experience of all students, I'm pleased that ACES highlights the research and creative accomplishments of both our undergraduate and graduate students. Today's world is not constrained by bounds of disciplinary domains and I'm pleased to note that interdisciplinarity is becoming more the norm than the exception at UTA. Our students are clearly distinguishing themselves through their scholarship and innovation transcending bounds that might have heretofore put limits on the pace and extent of impactful discovery. ACES is thus not just a celebration of research excellence but also a showcase for collaboration and commitment to a new and exciting future – one unconstrained by limits and bounded only by the extent of our student's imagination and commitment to excellence.

During today's event, students will be presenting their original work in oral and poster presentations and discussing hypotheses, theories and results with members of the audience. Their work will be judged by faculty, alumni and leaders of community, all of whom provide substantial feedback and encouragement to these budding leaders of tomorrow. I am confident that their work will not just be exceptional but inspiring – our future as a community has never been brighter and it is because of the intellectual curiosity, commitment to rigorous enquiry, and the never ending pursuit of excellence and positive impact that characterizes our students.

Our keynote speaker exhibited all these traits during her time as an undergraduate and graduate student at UTA and has since distinguished herself as a leading microbiologist and epidemiologist. Dr. Diana Cervantes currently serves as the Chief Epidemiologist at the North Texas Regional office of the Texas Department of State Health Services providing leadership in infectious diseases, outbreak response, epidemiology and surveillance to 49 counties in North Central Texas with a population of approximately 8 million. She has been at the forefront in responding to major outbreaks caused by infectious agents ranging from Salmonella to Ebola. She serves both as a tremendous role model and an example of the high level of achievement that distinguish our alumni and I'm pleased to welcome her back to her alma mater.

I would be remiss if I did not thank the ACES steering committee, the faculty mentors, the staff of the Graduate Studies Office, our judges and student moderators. Without their dedication and hard work

ACES would not be possible and I am deeply grateful for the effort they put in which ensures that our students' creativity and innovation can be highlighted and celebrated.

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. Vistasp Karbhari
President of University of Texas at Arlington
March 23, 2016

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 23, 2016

WELCOME!

On behalf of President Vistap Karbhari, Provost Linda K. Johnsrud, and Vice President for Research Duane Dimos, I am delighted to welcome you to UT Arlington's twelfth 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. You will find the hard work, skill and knowledge displayed by our students both exciting and compelling.

The keynote speaker for ACES 2016 is Dr. Diana Cervantes an alumna of UT Arlington who graduated with a bachelors (1999) and master's degree (2002) in Biology. As an undergraduate, she was a member of the Honors College, in addition to the Golden Key and Alpha Chi national honor societies. She was also a McNair Scholar who investigated pathogenic mutations in an equine virus. During her time here, Dr. Cervantes clearly developed a "passion for microbes" which continues to shape and guide her career to this day. After her experiences at UT Arlington, Dr. Cervantes' interests carried her into the realm of epidemiology and the University of North Texas Health Science center where she earned both a master's degree (2006) and a doctorate in public health (2013). The ACES Steering Committee is grateful and excited that Dr. Cervantes is willing to share her work and experiences with us today.

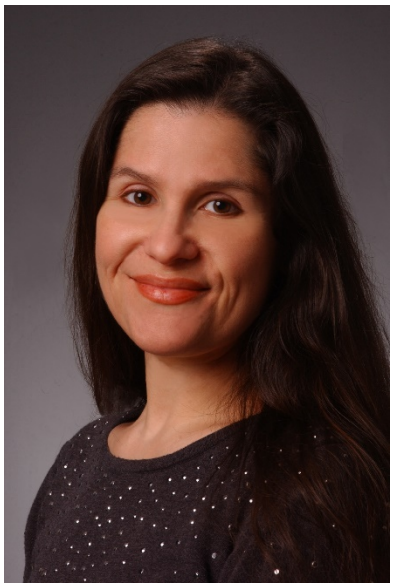
As Chair of the ACES Steering Committee, I want to express gratitude to the faculty mentors, both on and off campus, who have enriched the educational experiences of our students and have helped prepare the ACES participants for today's symposium. The time and attention you devote to your students in 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 all the members of the ACES Steering Committee for the work they have done over the past year to assure that ACES is prepared to showcase the accomplishments of our students. I will also take this opportunity to recognize and thank the outstanding contributions 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 spent long hours making sure the twelfth 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 23, 2016

Keynote Speaker



Dr. Diana Cervantes is the Chief Epidemiologist at the North Texas Regional office of the Texas Department of State Health Services. In her current capacity she serves 49 counties in North Central Texas with a population of approximately 8 million providing leadership in infectious diseases, outbreak response, epidemiology and surveillance. She has been at the forefront in responding to major outbreaks caused by infectious agents ranging from Salmonella to Ebola.

It was as an undergraduate at The University of Texas at Arlington that microbes became her passion. With the support and resources provided as a UTA McNair Scholars, Dr. Cervantes conducted research in parasitology and molecular virology graduating with an Honors BS in Biology (1999). She continued her research in viral diversity and evolution earning her MS in Biology at the University of Texas at Arlington (2002) while conducting research at The Texas A&M College of Veterinary Medicine.

In a desire to apply her knowledge and skills in molecular microbiology, Dr. Cervantes obtained a position as a public health microbiologist establishing one of the first public health laboratories in Texas to perform environmental sampling and molecular detection of high consequence agents including anthrax and plague. Her active role in the innovative use of molecular detection for mosquito surveillance during the introduction of West Nile Virus in Texas earned the Public Health Model Practices Award for her health department by the National Association of City and County Health Organizations.

Dr. Cervantes then earned a Masters in Public Health with a concentration in Epidemiology from The University of North Texas Health Science Center (2006). She transitioned from the laboratory to “shoe leather” epidemiology working outbreak response at the local, statewide and national levels.

To further advance her public health knowledge and training, Dr. Cervantes continued her education and earned her Doctorate of Public Health with a concentration in Epidemiology from the University of North Texas Health Science Center (2013), researching *Helicobacter pylori* and its transmission in childhood.

With 15 years experience in public health practice as both a microbiologist and epidemiologist, balancing practice and research is a priority for Dr. Cervantes. Advancing public health practice is the driving force behind her research which focuses on disease transmission modeling and prediction for public health application.

In addition, Dr. Cervantes serves as an adjunct assistant professor in the Department of Biostatistics and Epidemiology at the University of North Texas Health Science Center. She enjoys imparting her public health experience to both undergraduate and graduate students in an effort to inspire enthusiastic and prepared scientists to become part of the public health workforce.

In 2015 due to her role in the North Texas Ebola Response, Dr. Cervantes was awarded the “Hot Stuff” award by the North Central Texas Council of Governments.

ACES THE UNIVERSITY OF TEXAS AT ARLINGTON
THE ANNUAL CELEBRATION OF EXCELLENCE BY STUDENTS
March 23, 2016

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 College of Architecture, Planning and Public Affairs; College of Business; College of Education; College of Engineering; College of Liberal Arts; College of Science; and the College of Nursing and Health Innovation.

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ACES Symposium Schedule

At-a-Glance

7:30am	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
8:30am until 12:10pm	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.
1:30pm until 5:00pm	Oral Presentations - Undergraduate and Graduate Students - 2nd 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

2016 ACES Morning Oral Presentations

	CONCHO	RED RIVER	PALO PINTO	PEDARNALES	NECHES	SAN SABA - Undergraduate	SAN JACINTO - Undergraduate
8:30 AM	Sima Namin (UPPP)	Kamyar Ahmadi-Majlan (PHYS)		Collin Funkhouser (BIOL)		Taylor Long (HUMA)	Caitlynn Reeves (CHEM)
8:50 AM	Ryan Terry (MANA)	Sarah Hussein (MAE)	Mohammad Abdallah (EE)	Mohammad Kabir Hossain (CHEM)	Michael Gillis (BIOL)	Nichole Sheridan (HIST)	Misty Martin (CHEM)
9:10 AM	William Hansard (HIST)	Blesson Isaac (MAE)	Sandeep Patil* (MAE)	Mohammad Fakrul Islam (CHEM)	Min Gao (EES)	Travis Larson (POLS)	Yu-Sheng Sung (CHEM)
9:30 AM	Robert Campbell (MATH)	Zi Wei (MSE)	Muhammad Usman Raza (EE)	Md Khan (BIOL)	Andrew Corbin (BIOL)	Kayleigh Miranda (MUSI)	Raja Raheel Khanzada (BE)
9:50 AM	Moses Okumu (SOCW)	Shahnavaz Eilbeigi (MAE)	Sai Santosh Sasank Peri (EE)	Daren Card (BIOL)	Contessa Ricci (BIOL)	Jennifer Cozad (ART)	
10:10 AM	**BREAK**	**BREAK**	**BREAK**	**BREAK**	**BREAK**	**BREAK**	**BREAK**
10:30 AM	Anthony Khoury (BE)	Jayesh Doolani (CSE)	Allegra Leghissa (CHEM)	Mikhail Titov (CSE)	Omid Asudeh (CSE)	Jessica Lilley (BIOL)	Jamie Schenk (CHEM)
10:50 AM	Sina Moeendarbari (MSE)	Sanika Sunil Gupta (CSE)	Jonathan Thacker (CHEM)	Sonali Marne (CSE)	Habibur Rahman (CSE)	Courtney Weston (CHEM)	Sophia Le (BIOL)
11:10 AM	Ashley Guy (MAE)	Kimberly Johnson (LING)	Cong Zhao (PHYS)	John Podolanko (CSE)	Md Farhadur Rahman (CSE)	Amanda Patrick (MATH)	Fernando Hernandez (BIOL)
11:30 AM	Oguz Yetkin (BE)	Samantha Cornelius (LING)	Brian Bui (PHYS)	Mohsen Imani (CSE)	Madhuri Debnath (CSE)	Thy Vo (BIOL)	Zane Winer (BIOL)
11:50 AM	Amirhossein Hakamivala (BE)	Jazmin Chinea Barreto (MODL)	Qingyu Zhu (PHYS)	Sampath Reddy Vengate (MAE)	Rajeshkumar Ganesh Kannapalli (CSE)		

2016 ACES Afternoon Oral Presentations

	CONCHO	RED RIVER	PALO PINTO	PEDARNALES	SAN SABA - Undergraduate	SAN JACINTO
1:30 PM	Giulia Irene Maria Pasquesi (BIOL)	Pawan Thapa (CHEM)	Michael Burgess (ENGL)	Horacio Enrique Barragan Peyrani (CHEM)	Kinsley Munoz (EDUC)	Kandra Jones (PSYC)
1:50 PM	Hae-In Lee (BIOL)	Alison Wicker (CHEM)	Jordan Ivie (ENGL)	Chuchu Qin (CHEM)	Hannah McKee (ENGL)	Virginia Morris (HIST)
2:10 PM	Shawn Ridlen (CHEM)	Yehia Baghdady (CHEM)	Raley Taliaferro (ENGL)	Richard Adams (BIOL)	Marcos Arellano Mendez (MODL)	Jennifer Schoen (HIST)
2:30 PM	Lauren Fuess (BIOL)	Evelyn Wang (CHEM)	Alicia Garza (MODL)	Jayanta Kishor Chakrabarty (CHEM)	Jacy Pedersen (MUSI)	Aiesha Calhoun (PSYC)
2:50 PM	**BREAK**	**BREAK**	**BREAK**	**BREAK**	**BREAK**	**BREAK**
3:10 PM	Sebastian Fuentes (HIST)	Karen McAlister (COMM)	Akinde Kadjo (CHEM)	Darshan Patel (CHEM)	Mikayla Hixon (ENGL)	Esther Kentish (COMM)
3:30 PM	Darcey Browning (LING)	Justin Webb (HIST)	Audra Andrew (BIOL)	Emmanuel Varona (CHEM)	Felicia Brice (ENGL)	Sara Watson (ANTH)
3:50 PM	Catherine Baggett (SOCW)	Charles Grand (HIST)	Ling Bai (CHEM)	John Nimmo (CHEM)	Allison Piercy (ENGL)	Margaret Park (BIOL)
4:10 PM	Anh Nguyen (SOCW)	Dorothea Ivey (SOCW)	Nicole Hales (BIOL)	Mercy Oyugi (CHEM)	Tracey Peacock (THEA)	Michelle Grier (EES)

Oral Presentations Arranged by Themes

Room	Time	Theme
Concho	8:30 to 9:50	Quality of Life/Pedagogy Studies
Red River	10:30 to 11:50	Language and/or Cognition Studies
Palo Pinto	1:30 to 2:30	Analyzing Different Genres of Texts
Red River	3:10 to 4:10	African American Studies
Concho	3:10 to 4:10	Sexuality and Sexual Abuse Studies

	Business
	CAPPA
	Engineering
	Liberal Arts
	Science
	Social Work
	Undergraduate
	Sustainability

Graduate Poster Presentations

Poster Number	Name	Major
1	Nicholas King	CSE
2	Conan Godfrey	BIOL
3	Audrey Snowden	PSYC
4	Naeemul Hassan	CSE
5	A.D.A Shahinuzzaman	CHEM
6	Partha Acharjee	EE
7	Athena Seaton	UPPP
8	Richard Goldberg	EES
9	Dananjaya Kalu Appulage	CHEM
10	Akshi Thakkar	BE
11	Roshni Iyer	BE
12	Ilia Ponomarev	CHEM
13	Md Ahsan Habib	EE
14	Shuxin Li	BE
15	Nicolas Lopez	ECON
16	Susana Aguirre-Medel	CHEM
17	Isaac LaBauve	ECON
18	Arezoo Memarian	CE
19	Maryam Zabihi	CE
20	Abhishek Chatterjee	MAE
21	Sara Hermansen	KINE

22	Md Hasmat Ullah	CHEM
23	Daniel Kirkwood	EES
24	Juliet Huynh	LING
25	Gregory Monson	CHEM
26	Vijendra Kumar Bhogadi	CSE
27	Eric Salas	PSYC
28	Bernadette Ombayo	SOCW
29	Abu Afzal Mohammad Shakar	CHEM
30	Sabrina Ahmad	CHEM
31	Ashley Dacy	BE
32	Saeed Reza Ramezanpour Nargesi	CE
33	Jeyle Ortiz Rodriguez	SOCW
34	Atreyi Dasmahapatra	CHEM
35	Yihui Huang	BE
36	Jamel Slaughter	SOCW
37	Cory Newell	PSYC
38	Hongguang Xi	MATH
39	Sat Byul Seo	MATH
40	Jees Augustine	CSE

Undergraduate Poster Presentations

Poster Number	Name	Major
100	Ariel O'Brien	COS
101	Ryan Stevens	BIOL
102	Afsoon Gazor	PSYC
103	Taryn Flink	BIOL
104	Tam Nguyen	CHEM
105	Kien Nham	PHYS
106	Adam Williams	KINE
107	Michael Perez	PSYC
108	Karen Boerner	BIOL
109	Melissa Orr	CHEM
110	Hope Montgomery	CHEM
111	Eliezer Alvarado	BE
112	Whani Kim	PSYC
113	Syed Ajaz	BIOL
114	Rebecca Clesse	SOCI/ANTH
115	Amanda Plein	BIOL
116	Nadine Shihabeddin	CHEM
117	Frances Lewis	BIOL
118	Arunika Oyshi	BIOL
119	Yashaswini Nagarajan	CHEM
120	Kyrell Dixon	CHEM

121	Andres Urias	BIOL
122	Bren Ledbetter	BIOL
123	Jovana Valdez	SOCW
124	Elizabeth Brown	EES
125	Brett Hadfield	CHEM
126	Phuong Anh Do	PHYS

Concho, 8:30AM

A Walkability Analysis: The Case of South Dallas /

Presenter: Sima Namin, Urban Planning Graduate Student

Mentor: Enid Arvidson

Abstract:

Dallas ranked 25th out of the 30 big cities included in the 2014 study â€œFoot Traffic Ahead: Ranking Walkable Urbanism in America's Largest Metros. However, in recent years, walkability has gained more attention in sprawling Texas (e.g. Clifton, 2012). Many scholars have emphasized the role of walkability in the quality of life index (e.g. Partnership for a Walkable America, 2015). Furthermore, walkability can contribute to reduced air pollution and greenhouse gas emissions generated by vehicles (e.g. American Planning Association, 2007; Texas Commission on Environmental Quality, 2011). In terms of methodology there is no conventional approach for such studies. However, GIS applications have become more popular in studies including spatial analysis or spatial-statistical analysis. I examine the state of walkability in south Dallas from an environmental justice perspective, with a particular focus on food deserts. Dallas County, Texas, presents one of the largest food deserts in the U.S. (USDA, 2009) and most of these food deserts can be found in south Dallas (Regan & Rice, 2012). In this research I aim to quantify, classify, and visualize walkability in South Dallas. In order to quantify walkability, I employ a walkability index, which basically is a walk score for each area. The results will be overlayed on a map of current food deserts in south Dallas based on the classifications of USDA.

Concho, 8:50AM

Star Struck: An Examination of Signals that Contribute to Star Employee Compensation Premiums

Presenter: Ryan Terry, Management Graduate Student

Mentor: Jeffrey E. McGee

Abstract:

For some industries, the greatest competition is not for market share, but rather for employees, as acquiring top talent is becoming increasingly critical for organizations to get ahead. Sometimes referred to as a talent war, organizations beg, borrow, or steal to attract the very best talent "referred to as stars" in an attempt to gain competitive advantage. But are these tactics paying off? While time will eventually reveal whether such actions were appropriate, I believe that company executives overvalue star performers who frequently fail to deliver as expected. It is suggested that organizations may be overpaying star employees as a result of misinterpreting signals within the external labor market. With data from Major League Baseball, findings indicate that organizations are likely to overpay an individual based on their past performance, visibility, experience, and desirability. This situation is arguably not limited to MLB since organizations across a variety of other industries likely face a similar dilemma when attempting to attract top talent. Paying a premium for stars based solely on these commonly used observable signals is quite problematic. While these signals do help reduce uncertainly inherent in the employee selection process, they are insufficient in predicting a star's future contribution to an organization; thus, their use should be minimized in compensation decisions. I contend that the competition for top talent, a key resource for organizations, gives rise to the allure of stars but warn organizations to avoid becoming star stuck.

Concho, 9:10AM

Guardian Genius of Democracy: The Educational Crusades of Mirabeau B. Lamar

Presenter: William Hansard, History Graduate Student

Mentor: Andrew Milson

Abstract:

Mirabeau Lamar, 2nd President of the Republic of Texas, is an infamous character in Texas history, known primarily as an unsuccessful president whose furious hatred of Native Americans was almost unmatched. However, he is conversely known throughout the state as The Father of Texas Education, and Texan children grow up seeing his name and famous quotes on many public education facilities. But famous words are not enough to justify such an important title, especially when Lamar is so strongly hated and for good reason. The goal of this paper was to determine whether or not Lamar, despite his flaws, deserved this title, and if so, for what reasons. The paper examines Lamar's personal history with public education as well as the educational policies enacted by his administration in various contexts, including public views on education in the Republic of Texas, the many political and economic struggles faced by the Republic, as well as the broader common school movement taking place in the US and UK in the 1830s. The paper is heavily based on the integration of primary sources in particular political speeches by Lamar as well as respected secondary sources in particular the Handbook of Texas that help to place his words and actions in a broader context. It ultimately finds that the title is a fair one, and although his motives were suspect, his policies were a step in the right direction.

Concho, 9:30AM

Mathematical Problem Solving and Success in Gateway Mathematics Courses

Presenter: Robert Campbell, Mathematics Graduate Student

Mentor: James Epperson

Group Members: Dr. Kathryn Rhoads

Abstract:

Examining factors for increasing success in gateway mathematics courses has produced substantial research related to the knowledge and skills students need for success in Algebra and subsequent undergraduate mathematics courses. However, success rates for science, technology, engineering, and mathematics (STEM) majors in these gateway courses remain low. When all other factors are equal, our hypothesis for these failings is a lack of understanding in mathematical problem solving (MPS) or inability to use MPS strategies appropriately. To address this, we developed a series of Likert scale items to assess undergraduate students MPS practices and understandings. Using college algebra and calculus student responses to these items and a series of individual interviews, we examine the use of MPS as it relates to performance on mathematics tasks and course grades. Despite difficulties in algebra there appear to be no significant changes to a students use of MPS related to weaknesses in algebra. The ability to isolate the misconceptions of algebra from a students MPS capacity offers us a chance to look into the success of students in undergraduate courses, specifically College Algebra and Calculus, and the relationship between their MPS capacity and advancement in the STEM curriculum. We will discuss the scores from the first implementation of the items in which calculus students scored significantly higher in certain categories than their college algebra counterparts. Further, the student interviews provide an opportunity to see the relationship between student responses and the apparent MPS practices of the students.

Concho, 9:50AM

Financial resources and its impact on student engagement

Presenter: Moses Okumu, School of Social Work Graduate Student

Mentor: Eusebius Small

Abstract:

Introduction: Although school interventions have focused on student attrition and low academic performance, few studies have investigated the role of financial hardships on student engagement. The current study examines the relationship between financial hardships and student engagement in sub-Saharan Africa. Methods: Data were derived from a pilot project testing the impact of financial assistance on learning outcomes in Ghana. The study used structural equation modeling to examine the direct and indirect relationship between financial hardship and behavioral engagement in school, controlling for gender. Results: Of the 130 students, half were female. The overall model had good fit: ï‡2 = 97.89, df = 82, RMSEA = .04 (90% CI = .00 - .07), CFI = .97, TLI = .96. Results indicated that students' perception of their households financial hardship was positively associated with their behavioral engagement in classwork (Î² = .63, SE = .03, p < .001) as well as their level of uncertainty about finishing school (Î² = .28, SE = .02, p < .001). Uncertainty was negatively associated with behavioral engagement (Î² = -.63, SE = .11, p < .001). Discussion and Conclusion: Results show how young people's concern about personal and family finances encourages school success. Also, financial hardship can negatively affect students' engagement when mediated by future student orientation. To ensure that concerns about the funding of future education do not detract students from their current engagement in school, scholarships, financial aid and student loan programs should be enhanced for students from low-income families.

Concho, 10:30AM

The Hip-Spine Effect: A Cadaveric Study of Ischiofemoral Impingement in Hip Extension Effecting Loads in Lumbar Facet Joints

Presenter: Anthony Khoury, Bioengineering Graduate Student

Mentor: Cheng-Jen Chuong

Group Members: Juan Gomez Hoyos, M.D / Ricardo Schroder, PT / Ian Palmer, PhD / Hal Martin, DO

Abstract:

Purpose. The purpose of this cadaveric study was to assess the relationship between ischiofemoral impingement model and lumbar facet joint load in hip extension. Methods. Twelve hips in 6 fresh T1-to-toes cadaveric specimens were tested. A complete pre-testing imaging evaluation was performed using CT scan of the spine, pelvis and lower limb. Cadavers were positioned in lateral decubitus and fixed to a dissection table. Both legs were placed on a frame in a simulated walking position. Through a posterior lumbar spine approach L3-4 and L4-5 facet joints were dissected bilaterally. Additionally, through a posterolateral approach to the hip, the space between ischium and lesser trochanter was dissected and measured. Ultrasensitive, and previously validated, piezoresistive force sensors were placed in lumbar facet joints of L3-4 and L4-5. Lumbar facet loads during hip extension were measured in native hip conditions and after simulating ischiofemoral impingement by performing lesser trochanter osteotomy and lengthening. Four paired ttests were performed comparing normal and simulated ischiofemoral impingement on the L3-L4 and L4-L5 facet joint loads. Alpha was set at 0.05. Results. A statistically significant influence of the limited hip extension on lumbar facet joints load was found in L3-4 and L4-5 at 10 degrees hip extension, and L3-4 at 20 degrees hip extension. Average of percentage change considering all testing conditions was 30.81%. Conclusion. Limited terminal hip extension due to simulated ischiofemoral impingement significantly increases L3-4 and L4-5 lumbar facet joint load by 30.81% on average when comparing with non-ischiofemoral impingement native hips.

Concho, 10:50AM

External Radiotherapy of Breast Cancer Using Hollow Gold Nanoparticles as Novel Radiosensitizing Agents: an In Vivo Study

Presenter: Sina Moeendarbari, Materials Science and Engineering Graduate Student

Mentor: Yaowu Hao

Group Members: Aditi Mulgaonkar, Gedaa Hassan, Weihua Mao, Xiankai Sun

Abstract:

Breast cancer radiation therapy has lately become crucial for post breast surgery treatment of metastatic tumors in the loco-regional area. However, the required high radiation doses to treat micro-metastases may result in potential adverse side effects to healthy tissues. Gold nanoparticles (AuNPs), owing to their high atomic number and biocompatibility, have been recently suggested as promising radiosensitizing agents. The purpose of this study is to assess the effect of novel hollow AuNPs on the radiation response of MDA-MB-231 breast cancer tumor xenografts. The in vivo study was performed by intratumoral injection of HAuNPs or saline to 5 â€“ 6 sites of each tumor followed by radiation therapy in 4 treatment groups (n = 7): HAuNP + Radiation (A), saline + Radiation (B), HAuNPs only (C), saline only (D). Each tumor mass in the mice was irradiated with a 10 Gy single fraction dose using a small animal irradiator. It was observed that the tumor growth rate was higher in groups C and D mice than in groups A and B as measured by caliper and further validated by MRI scans. Survival curve analysis demonstrated that a significant tumor growth inhibition occurred in group A as compared to other treatments ($p < 0.05$). Thus, a synergistic effect was observed in the survival rate of mice treated with both HAuNPs and radiation therapy compared to radiation therapy alone. This study demonstrates an effective method to enhance radiation therapy and thus the overall survival rate in breast cancer treatment.

Concho, 11:10AM

Multiscale Model of the Ebola Virus Glycoprotein Receptor

Presenter: Ashley Guy, Mechanical Engineering Graduate Student

Mentor: Alan Bowling

Group Members: Abhishek Chatterjee

Abstract:

This work investigates the application of a multiscale method to the modeling of proteins in dynamical simulations. High-resolution protein simulations are defined at the nanoscale and integrated at the femtoscale. These nanoscale simulations infamously require significant computational resources to generate even modest time evolutions due to bottlenecks in the forward dynamics: point-wise potential calculations and evaluation of the equations of motion. The goal of the work is to reduce the computation time associated with the solving the equations of motion. The multiscale method scales the terms in the equations of motion and brings those terms into the same order of magnitude. The use of this method greatly reduces the forward dynamics computational burden without significant deviation in results. This method has previously been applied to dynamic simulations of motor proteins and estrogen molecules. The model used in this work is the Ebola virus glycoprotein. This virally encoded glycoprotein is bound in the virion envelope and has been shown to play a pivotal role in the mechanism of infection. Simulations of the interaction of this protein with host cell receptors could greatly aid on-going research for effective treatments. The glycoprotein model has full atomic resolution and is assembled piece-wise from a user-input sequence of amino acids. Active forces include electrostatic and Lennard-Jones interaction potentials and viscous fluidic damping. This work is the first application of the multiscale method to a high-resolution protein model and a simulation using a numerical, non-symbolic solution.

Concho, 11:30AM

A Novel Prosthetic Interface based on Hand and Gesture Tracking

Presenter: Oguz Yetkin, Bioengineering Graduate Student

Mentor: Dan O. Popa

Group Members: Kristi Wallace, J Paul Carpenter, Nitzajaret Elizondo, Isioma Kasi-Okonye, Simranjit Ahluwalia

Abstract:

In the US there are around 2 million amputees, with 185,000 new amputations occurring annually. Recently developed robotic prosthetic devices hold great promise and have multiple degrees of freedom (DOFs) such as individually controllable fingers and thumb opposition. Although DOFs can theoretically be controlled separately, current devices do not allow this. Instead, control is achieved through electromyography (EMG) electrodes placed on the residual limb. This approach limits the devices in two ways 1) only one command is possible at a time (e.g., open vs close) 2) amputees who are unable to generate EMG signals due to the nature of their injuries can't use these devices. We have developed and evaluated two novel prosthetic interfaces allowing simultaneous control of multiple digits on a TouchBionics robo-limb prosthetic device using lightweight devices worn on the intact hand. We performed dexterous manipulation tests on three healthy volunteers using our devices and compared the results with a smartphone based control system from TouchBionics, as well as one amputee volunteer using her own EMG controlled device from the same manufacturer. In a single handed manipulation test (Box and Blocks), we found our interface to be significantly faster than the iPhone based interface (3.60 ± 0.13 vs 2.44 ± 0.35 seconds, $p<0.001$). In a two-handed manipulation test (Blanket Folding), we found our system to be significantly faster than the EMG system used by the amputee (49.69 ± 21.65 vs. 76.38 ± 17.4 seconds, $p = 0.042$).

Concho, 11:50AM

Artificial Lymph Node Construct for Cancer Diagnosis and Therapy

Presenter: Amirhossein Hakamivala, Bioengineering Graduate Student

Mentor: Liping Tang

Group Members: Ashwin Nair, YiHui Huang, Qinglan Yang, Liping Tang

Abstract:

Despite all the progress made in diagnosis and therapy, cancer still remains the leading killer disease. What makes cancer lethal is its metastasis to healthy organs. Hence it is believed that arresting metastasis could lead to improved clinical outcomes for therapy. For many years, lymph nodes in cancer-bearing hosts have been considered the major organ for the dissemination of the tumor cells. Thus, artificial lymph node construct with the ability to mimic the structure and functionality of the human lymphatic tissues would be an excellent tool for studying metastasis of different cancers. In this study, we have taken the first step towards the development of a tissue engineering construct to simulate lymph node activities and evaluate its potential for trapping metastasis cancer cells. To achieve this, three-dimensional poly-l-lactic-co-glycolic acid polymer constructs with high-interconnected pores were developed to mimic human lymphatic tissue. The structure, porosity and mechanical properties of the construct were characterized and optimized to match that of the natural lymph node. Mice lymphocytes were seeded onto the construct and cell viability and proliferation were evaluated to show high biocompatibility and functionality of the construct. Furthermore, artificial lymph node conditioned media was evaluated for cancer cell migration revealing the potential of these constructs for trapping cancer cells. The present study has demonstrated that the a tissue engineered construct can serve as a new research tool to mimic human lymph node in order to study metastasis cancer cells and it might provide a new way for cancer therapy and diagnosis.

Concho, 1:30PM

Sample sequencing 66 Squamate genomes reveals extensive evolutionary dynamics of genomics repeat element landscapes

Presenter: Giulia Irene Maria Pasquesi, Biology Graduate Student

Mentor: Todd Castoe

Group Members: R.H. Adams, D.C. Card, A.L. Andrew, D.R. Schield, B. Perry

Abstract:

Vertebrate evolution has resulted in little variation in gene number, despite of an estimated 350-fold variation in genome size range. Such diversity is mostly explained by the non-coding fraction of the genome, specifically by repetitive elements (RE) that are capable of propagating in the host genome through copy number expansion. Squamate reptiles represent a new model system for the study of genome evolution, because in face of small variation in genome size, they display high variability in the repeat element (RE) landscape. I analyzed a total of 66 squamate species for the microsatellite and transposable element (TE) content, using data from whole genomes and random shotgun libraries. My results support previous analyses through an increased sample size, and indicate a significant divergence in the genomic repeat content and structure. Indeed, the percent of annotated REs spans almost a 30% variation, from 25.75% to 66.78%. Furthermore, I was able to identify evolutionary trends involving extreme variation in the expansion and contractions of specific TE families and microsatellite elements across different families, with taxa exhibiting a 100-fold expansion of specific elements. This remarkable variation contradicts the currently accepted paradigm that the greatest variation in the genomic repeat content exists between major clades (e.g., between mammals and birds), and not within single lineages. Our results indicate that both transposable elements and microsatellites contribute to high repeat landscape variation among squamate reptiles, and offer insight into the evolutionary forces that may lie behind it despite the stability in genome sizes.

Concho, 1:50PM

Unusual biological nitrogen fixation involved in nodulation (Nod) factor-independent symbiosis

Presenter: Hae-In Lee, Biology Graduate Student

Mentor: Woo-Suk Chang

Abstract:

Nitrogen is one of the major elements required for metabolisms of living organisms. Most organisms are not able to directly utilize atmospheric nitrogen, but rely on reduced nitrogen, which is produced through biological nitrogen fixation (BNF) by specialized bacteria called rhizobia. Rhizobia can establish a symbiotic relationship with legume plants resulting in the formation of nitrogen-fixing nodules. In this symbiosis, most rhizobial symbionts possess the genes involved in biosynthesis of nodulation (Nod) factor to initiate the symbiotic interaction with their host. However, Bradyrhizobium sp. BTAi1, the symbiont of a tropical legume Aeschynomene indica, has no such genes although it can form nitrogen-fixing nodules on the stems and roots of its host. To reveal a mechanism of this unique Nod factor (NF)-independent nodulation, we have attempted to find key genes involved in this symbiosis using RNA-Seq, which is a high throughput technique to sequence multiple genes expressed in a given condition. After treating BTAi1 cells with root exudates of A. indica, a total of 158 genes were significantly differentially expressed; 41 up-regulated and 117 down-regulated. A gene encoding CobW protein required for cobalamin biosynthesis was the most highly expressed (3.16 fold induction) and nitrous oxide reductase gene cluster, nosRZDFYLX, was also up-regulated by the root exudates treatment. This finding suggests that cobalamin and nitrous oxide reductase might be key players involved in the Nod factor-independent symbiosis. This study will provide an insight into this unusual nitrogen fixation process and extend our knowledge towards BNF and its benefit on agricultural practices.

Concho, 2:10PM

Investigation of metal-ethylene bonding to extend the shelf life of commercial plants

Presenter: Shawn Ridlen, Chemistry and Biochemistry Graduate Student

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. Several model complexes have been made and examined for their ability to bind to ethylene. These compounds show that if the electronic properties of the complex are changed, the interaction between of ethylene and the metal also changes. These complexes help to get a broader range of binding strength for modeling the how MCP binds in plants and also provides additional data for ethylene binding complexes missing from the literature. This new data and its relation and importance to extending plant life will be presented.

Concho, 2:30PM

No Free Lunch: Symbiodinium modulate coral immune response via the transforming growth factor-beta signaling pathway

Presenter: Lauren Fuess, Biology Graduate Student

Mentor: Laura Mydlarz

Group Members: Jorge Pinzon, Contessa Ricci, Ernesto Weil

Abstract:

Coral reefs are some of the most diverse ecosystems on the planet and provide countless services such as providing protection for coastlines. However, these ecosystems are in rapid decline, largely due to disease-related losses of hard corals, which provide the structure of reefs. Hard corals are dependent upon symbiotic dinoflagellate algae known as Symbiodinium for most of their nutritional needs. Studies suggest that in order to establish and maintain a symbiotic relationship with corals, Symbiodinium actively suppress a host coral's immune response via the transforming growth factor-beta (TGF-beta) pathway. Using previously obtained data from immune challenged corals, we investigated whether the TGF-beta pathway could be linked to immune suppression in corals of the species Orbicella faveolata. Analysis of a combination of gene expression and protein activity data revealed that several immune genes were downregulated during immune challenge. Furthermore, some of these downregulated genes were positively correlated to immune protein activity. These downregulated genes, which likely are positive regulators of immunity, were also positively correlated to host expression of TGF-beta transcripts. Furthermore, all immune genes which increased following immune challenge were negatively correlated to TGF-beta. This suggests that TGF-beta is potentially a negative regulator of immunity in corals, likely as a consequence of its involvement in the coral-algal symbiotic relationship. Additionally, expression of TGF-beta is likely linked to dysfunctional patterns of gene regulation during coral immune response. Further investigation of this pathway will provide insight into the consequences of the host-Symbiodinium relationship as it pertains to disease susceptibility of corals.

Concho, 3:10PM

Unemployable Fantasy Makers: Adult film performers, HIV, and Consumer Culture

Presenter: Sebastian Fuentes, History Graduate Student

Mentor: Sarah Rose

Abstract:

"I long to watch porn that mirrors my reality…as a poz, fit, healthy and very sexually active gay man…" This and similar consumer comments about Treasure Island Media's condom-less gay pornography underscore the rarely examined relationship between adult film consumers and fantasy makers – or actors. Except within the gay adult film genre, the adult film industry routinely treats newly infected HIV-positive performers as "disabled," and therefore discardable, commodities. These fantasy makers are denied access to future work opportunities; lack of unionization and HIV stigma has also made pursuing workers' compensation impossible. Yet by commodifying HIV pride and nostalgic sexual desires, gay adult film pornographers have been able to employ HIV-positive male performers otherwise considered "disabled" and unemployable in straight adult films. Going beyond existing pornography scholarship, this paper brings fantasy makers to the forefront by investigating working conditions, as well as how workers, advocates, and producers have responded to efforts to limit STD infections, in particular HIV. Since 2000, the industry has experienced more than a dozen HIV scares. Tracing industry employment law and HIV scares, this paper argues that concepts of commodified fantasies and producers' assumptions about consumers' identities directly shape the ways the industry manages performers' health, acquired disabilities, and prospects for employment. Pornographers have contended that condom visibility limits their ability to produce escapist entertainment products. Accordingly, the industry has responded with reactive measures that have effectively barred HIV-positive workers from employment, even as purportedly "damaged" fantasy makers prove highly marketable in certain sectors.

Concho, 3:30PM

Patterns of delay discourse markers in tweets and interviews conveying survivor stories

Presenter: Darcey Browning, Linguistics Graduate Student

Mentor: Laurel Stvan

Abstract:

I examine how early hashtag placement acts as a delay device in tweets conveying survivor stories; furthermore, I show the same patterns occur with discourse markers in face-to-face survivor interviews.While speakers naturally hesitate (Erard 2008), more hesitation is used when discussing sensitive information; delaying devices frequently appear in emotional narratives (Romano 2014). Since tweets are often conversational, delay devices should occur in emotional narrative tweets; however, the Twitter character limitations complicate how delays are realized. Analyzing 177 tweets from the 2014 #whyIstayed/#whyIleft campaign, I examine hashtag position and content to determine a linguistic role of hashtags. These hashtag patterns are supported by examining delays in survivor interviews. There are significantly more early hashtags in the survivor tweet corpus ($p<.001$) compared to a general corpus of 1000 tweets. I postulate early hashtags are delay devices appearing before sensitive information, when speakers lack power (1) or abusers have power (2), in abuse-revealing tweets. (1) #whyistayed I thought he would kill me(2) #whyileft he hit our 4 year old and shook her till she vomitedI found similar correlations of power with hesitation AND in survivor interviews. While many tokens of AND assist with discourse organization (Schiffrin 1987), some are delay devices. Hesitation AND was found in similar contexts to hesitation hashtags: (3) and um [â€¦] he uhh pulled his pants down [â€¦] and um I was raped While not all early hashtags and tokens of AND are hesitations, speakers employ delays to distance themselves when discussing personal, traumatizing survivor stories.

Concho, 3:50PM

Protective Sex: The Relationship Between Sexuality and Resilience

Presenter: Catherine Baggett, School of Social Work Graduate Student

Mentor: Craig Nagoshi

Abstract:

Since the 1960s, society has demonstrated an increased acceptance of sexuality as part of the human experience. However, despite increased societal acceptance of sexuality, sexuality remains taboo in our society and sexual behavior, especially in young women, is often discouraged or shamed. Objectification Theory posits that by judging a woman only by her sexual worth, as is evident in American society, women are put at an increased risk for sexual violence as well as disorders such as anxiety, depression, and eating disorders. Though sexuality has been used to control women, several studies have shown that healthy sexuality is associated with improved psychological well-being. The aim of the present study is to demonstrate that healthy sexuality can be a protective factor in resilience, thus improving mental health outcomes for those who have experienced hardship and trauma. To demonstrate this, traumatic experiences will serve as the independent variable, with psychological adjustment being the dependent variable. Sexuality and resilience will be moderators. Questionnaires measuring trauma, resilience, healthy sexuality (defined through sexual awareness, sexual functioning and sex guilt), and psychological adjustment will be administered to 400 undergraduate men and women. Hierarchical multiple regression analyses will be conducted for separate measures of psychological adjustment. Analyses will also be run separately for each of the moderating variables. The author hypothesizes that healthy sexuality will positively influence resilience, thus improving psychological adjustment. Results from this study would have implications for considering sexuality during therapy, especially in feminist practice.

Concho, 4:10PM

Cyber abuse and college students: New risk factors in intimate partner violence /

Presenter: Anh P Nguyen, School of Social Work Graduate Student

Mentor: Craig Nagoshi

Group Members: S Elizabeth Wick, MSW / Craig Nagoshi, Professor / Randy Basham, Professor

Abstract:

A sample of 298 college students completed an online survey of their experiences of being victimized by and engaging in perpetration of cyber-harassment of romantic partners. The findings partially supported the application of Routine Activities Theory to understanding the factors predictive of cyber-harassment in that victimization, particularly for women, was associated with greater general risk taking propensity and reported online exposure and disclosure. There was also a significant interaction found where the effect of risk propensity on cyber-victimization was magnified for those high in online exposure. For both men and women, greater risk propensity, online disclosure, and perceived likelihood of legal problems for engaging in cyber-harassment were associated with greater reports of engaging in such harassment. Another significant interaction resulted from the effects of risk propensity on engaging in cyber-harassment being particularly strong for those on the low and high extremes of online disclosure.

Neches, 8:50am

The eco-evolutionary consequences of an invasive predator

Presenter: Michael Gillis, Biology Graduate Student

Mentor: Matthew Walsh

Abstract:

Ecosystems around the world are rapidly deteriorating as a result of ongoing environmental changes that have been caused primarily by humans. There is strong agreement among researchers that anthropogenic disturbances (i.e. climate change, invasive species, etc.) have caused declines in biodiversity, economic losses, and pose serious concern for the well-being of people and societies across the globe.Efforts to stop anthropogenic inputs have been insufficient, prompting a renewed focus on the ability of natural systems to adapt in the absence of abrupt societal change. Recent advances in the field of evolutionary ecology have shown that the traits of organisms can change rapidly by evolution and other mechanisms, thereby facilitating population persistence while simultaneously modifying the environments in which they reside. This raises the possibility that adaptive responses by populations to environmental stess can generate a wide range of ecosystem-level outcomes, making it important to track such phenomena as they propagate across levels of biological organization.This talk will detail the tracking of one such event, which began in 2009 after four lakes in the Southern part of Wisconsin were invaded by a predatory invertebrate commonly known as the spiny water flea (Bythotrephes longimanus). By analyzing long-term ecological data, collected before and after the invasion of Bythotrephes, I have detected significant changes in the abundance and body size of its prey (Daphnia spp.). I will describe what is known about the effects of Bythotrephes in these lakes and how this might broadly inform our understanding of ecosystem resilience.

Neches, 9:10AM

Early Paleogene depositional environment and sediment provenance in the Washakie Basin, Southwestern Wyoming, USA

Presenter: Min Gao, Earth and Environmental Sciences Graduate Student

Mentor: Majie Fan

Abstract:

The Washakie Basin is one of the major petroleum producing basins in the central Rocky Mountains. It was formed during two active mountains building events (Sevier and Laramide) at 75-45 million years ago. Characterization of the petroleum-containing sedimentary rocks in the basin is not only important to guide future hydrocarbon exploration, but also to the understanding of the mountain building processes in the central Rocky Mountains. We document the characteristics of a ~1200 m thick stratigraphic section that was deposited during 65-50 million years ago to understand the surface processes formed these rocks. Such characteristics include sedimentary texture and structures, and stacking patterns. The studied sedimentary rocks include two sequences. The lower sequence contains fine- to medium-grained sandstone, siltstone, and carbonaceous shale and coal that were deposited in the distal flood plain of a sandy meandering river. The upper sequence contains massive granule- to pebble- conglomerate and thick trough cross-stratified sandstone, and less amount of siltstone, mudstone, and paleosol that were deposited in a sandy braided river environment. Microscopic study of 20 sandstone samples collected throughout the section shows larger amount of feldspar in the upper sequence than the lower one. The results suggest a change in sediment provenance and environment at ~55 million years ago, which was likely caused by the uplift of the Uinta Mountains to the south of the basin.

Neches, 9:30AM

Population structure and gene flow in Texas cave and spring salamanders

Presenter: Andrew Corbin, Biology Graduate Student

Mentor: Paul T. Chippindale

Group Members: Phillip Hejduk, Andy Gluesenkamp, Todd Castoe

Abstract:

The Edwards Aquifer of central Texas is inhabited by numerous species of salamanders of the genus Eurycea, many of which are federally threatened or endangered. The group exhibits a wide range of morphologies associated with surface versus subterranean living, and understanding relationships and species boundaries in the group continues to be problematic despite decades of research. Of particular interest is the geographically proximal group that includes E. nana, E. pterophila, E. sosorum, and the extreme cave-dwellers E. rathbuni and E. waterlooensis. We generated a genome-wide dataset of tens of thousands of variable genetic loci for dozens of individuals using ddRADseq, which we compared to our extensive mitochondrial sequence dataset to examine gene flow and population structure. Our results indicate extreme mito-nuclear discordance in several populations and some species appear to have complex ancestry. Our results support the occurrence of multiple species in the region but indicate a historical and likely ongoing pattern of genetic exchange among distantly related species. This is consistent with emerging data on hydrologic flow patterns in the aquifer, suggesting a complicated history of isolation and reconnection. Results also indicate that some species may range more widely than believed, and support the presence of another undescribed subterranean species. Because many of these species are Federally Threatened or Endangered, the results will guide local, state and federal policies regarding development regulations and water management.

Neches, 9:50AM

Extracellular proteins during heat stress: what a coral's symbiotic algae are trying to say

Presenter: Contessa Ricci, Biology Graduate Student

Mentor: Laura Mydlarz

Group Members: Bren Ledbetter, Tam Nguyen, Saiful Chowdhury, Laura Mydlarz

Abstract:

Coral bleaching describes a pale appearance of coral often preceding death. It results from the loss of symbiotic intracellular, single-celled algae belonging to the genus Symbiodinium. These algae are essential for providing energy through photosynthate transfer, and bleaching is widely regarded as a breakdown in symbiosis. Sea surface temperature increase from global climate change have been a major force in driving up coral bleaching frequency world-wide. The underlying mechanisms during symbiosis breakdown remain elusive. Partner preferences determine symbiosis formation, and because this is initiated by cell-cell contact extracellular membrane proteins play important roles in recognition and retention of the symbiont. Using avidin purification with a hydrophilic biotin probe on intact algal cells, I have isolated and identified several membrane proteins within a Symbiodinium strain using nanospray LC-MS/MS. These proteins so far contain important extracellular domains such as extracellular chaperones and transport domains paired with extracellular biogenesis domains. Upon analysis of experimental samples, I will characterize and quantify proteomic changes occurring in Symbiodinium during a 48-hour heat stress.

Neches, 10:30AM

Authentication Scheme Suggesting Tool

Presenter: Omid Asudeh, Computer Science Engineering Graduate Student

Mentor: Matthew Wright

Abstract:

After decades of studies on authentication methods, several schemes, from biometric and graphical passwords to hardware tokens were proposed to replace traditional passwords. However, none of these methods could effectively tackle traditional passwords in all three dimensions of usability, deployability, and security. System-assigned passwords are more secure but less memorable, most of the graphical authentication methods has a long login time, and biometrics and token-based schemes are not deployable. The quest for authenticating systems grows every day and users want a scheme that fits their needs. However, users usually do not have enough knowledge and time to choose a method that is the nearest available approach to their ideal authentication scheme. Therefore, the lack of a tool that is able to suggest an appropriate scheme fitting the users' needs can be seen more than before. While security products have been prolific, researchers have barely explored how an organization chooses a solution that fits its needs. In this study, we plan to design a tool that will help decision makers decide on the best authentication scheme for their system needs. The inputs are a list of requirements and the importance from the user's view. The tool will then use a ranking function to assign a score to each scheme based on the inputs, and then it returns the top-ranked security products.

Neches, 10:50AM

Feature Based Task Recommendation in Crowdsourcing with Implicit Observations

Presenter: Habibur Rahman, Computer Science Engineering Graduate Student

Mentor: Gautam Das

Abstract:

Crowdsourcing platforms, such as Amazon's Mechanical Turk or Crowdï¬,ower, have recently gained immense popularity due to their elegant framework, where a task requester can get work done by numerous virtual workers for very low compensation. One common problem in these platforms is that workers have to suffer huge latency to ï¬nd suitable tasks, which creates unhappiness and eventually leads to the abandonment of the platform. To that end, task recommendation problems are proposed in the crowdsourcing context, where the objective is to recommend a set of tasks to each worker such that these tasks are best suited for the workers. However, to the best of our knowledge, there does not exist any related work that focuses on the task recommendation problem by considering the explicit characteristics of the tasks themselves, we refer to this as explicit task features. We assume that we are given a set of workers, a set of tasks, interactions (such as the number of times a worker has completed a particular task),and the presence of explicit features of each task (such as, task location). We intend to recommend tasks to the workers by exploiting the implicit interactions, and the presence or absence of explicit features in the tasks. We formalize the problem as an optimization problem, propose two alternative problem formulations and respective solutions that exploit implicit feedback,explicit features,as well as similarity between the tasks.

Neches, 11:10AM

Aggregate Estimations over Location Based Services

Presenter: Md Farhadur Rahman, Computer Science Engineering Graduate Student

Mentor: Gautam Das

Group Members: Weimo Liu, Saravanan Thirumuruganathan, Dr. Nan Zhang

Abstract:

Location Based Services (LBS) have become very popular in recent years. They range from standalone serveries such Google Maps to embedded ones such as “nearby restaurants” feature of Foursquare, a popular LBS app that helps users to review restaurants. Huge amount of information such as Point-Of-Interest (POI) locations, review ratings, user geo-distributions is store behind the user interface of these LBS. Hence, they can be a great source of information for many third-party users to perform various data mining tasks. For example, a cafe chain startup would like to know the number of Starbucks restaurants in a certain geographical region; a demographics researcher may wish to know the gender ratio of users of social networks in China etc. However, the restrictive nature of the query interface of these LBS makes the data mining tasks very hard. Specifically, for a given input location LBS apps return only k nearest POI in the database, where k is a small constant. In addition, most if not all LBS enforce a limit on the number of queries one can issue per time period. This makes task of crawling impossible. In this project we consider the problem of obtaining approximate estimates of SUM and COUNT aggregates by only querying such LBS apps. We distinguish between interfaces that return location information of the returned and that don’t. For both types of interfaces, we develop aggregate estimation algorithms that are based on novel techniques for precisely computing or approximately estimating the Voronoi cell of POI.

Neches, 11:30AM

PLTRS: A Preference-Aware, Location-Aware and Time-Aware POI Recommender System in Location Based Social Networks

Presenter: Madhuri Debnath, Computer Science Engineering Graduate Student

Mentor: Ramez Elmasri

Group Members: Praveen Kumar Tripathi

Abstract:

There have been vast advances and rapid growth in Location based social networking (LBSN) services over the recent years. Point of Interest (POI) recommendation is one of the most important application in LBSN services. POI recommendation provides users personalized location recommendation. It helps users to explore new locations and filter uninteresting places that do not match with their interests. Multiple factors influence users to choose a POI, such as user's categorical preferences, temporal activities and location preferences as well as popularity of a POI. In this work, we define a unified framework that takes all these factors into consideration. This method aims to provide users with a list of recommendation of POIs within a geo-spatial range that should match with their temporal activities and categorical preferences. We evaluate our system with a real-world dataset collected from Foursquare. The extensive experimental results with evaluation show that our method combining multiple factors (temporal, spatial, popularity, preferences) provide users better and effective recommendation than other baseline approaches.

Neches, 11:50AM

The TagAdvisor: Luring the Lurkers to Review Web Items

Presenter: Rajeshkumar Ganesh Kannapalli, Computer Science Engineering Graduate Student

Mentor: Gautam Das

Group Members: Azade Nazi

Abstract:

In this paper, we address the problem of how to engage the lurkers (i.e., people who read but never write reviews) to write online reviews by simplifying the reviewing task. Given a lurker, we identify top- k tags, when advised, would help the user review an item easily. We refer to it as the TagAdvisor problem, and formulate it as a general-constrained optimization problem. Our framework is centered around three measures - relevance, coverage , and polarity in order to help a user review an item satisfactorily. By adopting different definitions of coverage, we identify two concrete NP-hard problem instances that enable a wide range of real-world scenarios. We develop practical algorithms with theoretical bounds to solve them efficiently. We conduct detailed experiments on synthetic and real data to validate the effectiveness of our solutions.

Palo Pinto, 8:50AM

Smart Micropillar Array for Molecular Detection

Presenter: Mohammad Abdallah, Electrical Engineering Graduate Student

Mentor: Samir M. Iqbal

Group Members: M. U. Raza and Sai S. S. Peri

Abstract:

Several studies have explained the influences of the nanoscale topography on surfaces and structures in cell capture, growth, adhesion, and orientation. Every cell type has a characteristic profile based on its mechano-physical properties. Ion selective field Effect transistors (ISFETs) huge advantage over traditional ion selective electrodes (ISEs) is avoiding the high impedance by signal amplification. ISFETs generate low impedance signal and provide low power consumption, because of the transistor properties. ISFETs make the selective detection of certain ions in complex samples more efficient and can open the way toward low-cost lab-on-chip devices. Currently, selective molecular detection at ultrahigh sensitivity is one of the most challenging problems for disease diagnostics. Micropillars of 20 Î¼m width with an average height of 338 nm were fabricated at pitch varying from 20 Î¼m to 60 Î¼m. These were made on the 200Âµm thick silicon wafer. Silicon oxide has been used as an insulator for ISFET. Silver/Titanium (150nm/50nm) were evaporated to cover the silicon portions between micropillars. Axopatch amplifier was used to monitor the voltage response as current has been changed. Different samples were used to observe the device response and compare impedance. One magnitude reduction in calculated impedance was observed for the device compare with bare electrodes. In addition, the electrical response was depending on the sample in the device. The L-lysine protein sample showed a higher current reading compare to Potassium chloride (KCl) sample.

Palo Pinto, 9:10AM

Android Application for skin cancer detection with the use of thermal imaging

Presenter: Sandeep Patil, Mechanical Engineering Graduate Student

Mentor: Brian Dennis

Group Members: Ratan Kumar

Abstract:

More than one million people in the United States get cancer each year. The most common type of cancer on the list is breast cancer,skin Cancer, with more than 234,000 new cases expected in the United States in 2015. On reviewing cancer, it can be noted that certain modification in DNA can cause breast cells or any cells to termed as cancerous. These changes , causes cells not to die at the right time and cancer is more likely to develop and spread. These tumors (skin, breasts) can lead to increase in local blood flow and temperature whereas vascular sclerosis decrease the blood flowing to the skin, resulting in lower skin temperature. Among various types of non-invasive techniques for tumor detection, such as ultrasound or MRI, thermal methods appear to be economic and safe. Non-invasive diagnostics can be performed from skin surface temperature measurements using inverse analysis techniques based on Pennes' bioheat equation Different methods has been tried and tested to detect cancer cells on the basis of thermal images. Earlier research has supported thermal imaging mehtod with number of numerical study, trials and experiments. Author has developed android application for the same, where it has facitility to capture images, videos with the help of thermal imaging camera. Then this data has been stored on cloud/server and quantative analysis (ANOVA) has been carried out for detection of skin or breast cancer using MATLAB. At the end analysis will display the result as YES or NO for cancer detection.

Palo Pinto, 9:30AM

Solid State Nanopores used for translocation of biomolecules for biomarker detection

Presenter: Muhammad Usman Raza, Electrical Engineering Graduate Student

Mentor: Samir M. Iqbal

Abstract:

One of the most devastating diseases known to man is Cancer. In US, in 2014, cancer was responsible for half a million deaths occurring due to different variations of the disease. Most appropriate way to control the number of deaths due to this pandemic disease is to detect it as early as possible and start the treatment before the cancer reaches metastasis. Biosensors using nanopores give us the ability to target and sense this at an early stage. Detection of the known biomarkers at very low concentrations is the key to the early detection using nanopore based sensors. These rely on nanofludic channels separating two containers using silicon chips with nanopores drilled in them. Electrophoresis leads to the passing of the analyte through the nanopore channels leading to a drop in ionic current across the channel. This is characteristic for different biomolecules. The shape, size and surface characteristics of the nanopore channel can be modified to detect different molecules selectively. The translocation of the biomolecule results in a characteristic negative peak in ionic current which is detected by the digital circuitry. We conduct, simulations of this nanopore in order to better understand the complexities involved. We vary parameters of pH, voltage bias, and molecular surface characteristics in order to study the effects on the results. Finally, we compare these with actual results on a solid state nanopore using a target cancer biomarker, showcasing the efficacy of the simulation and the proposed biosensor.

Palo Pinto, 9:50AM

Fabrication of Hollow Sodium Alginate Microfibers for a Novel Drug Delivery Device /

Presenter: Sai Santosh Sasank Peri, Electrical Engineering Graduate Student

Mentor: Samir M. Iqbal

Abstract:

We used sodium alginate, a biodegradable and biocompatible polymer to fabricate hollow fibers to develop a new drug delivery device. These fibers were fabricated using a simple microfluidic device made of polydimethylsiloxane (PDMS) which had three inlets and one outlet. The inlets were arranged such that the middle channel was used to flow calcium chloride (CaCl2) and the two side channels were used to flow alginate. 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 passed out from the outlet. The microfluidic device provided a rapid and efficient platform to create microfibers in a bench-top setting. The dimensions of fibers could be modified as per the applications by varying the flowrate of alginate and calcium chloride. The hollow fibers were produced with thick outer diameter and thin inner diameter and vice-versa. Loading of these fibers with a drug and incorporating these into a hydrogel is underway for a drug-delivery device.

Palo Pinto, 10:30AM

Qualification and quantification of cannabinoids and terpenes in extracts of Cannabis sativa using gas chromatography – mass spectrometry

Presenter: Allegra Leghissa, College of Science Graduate Student

Mentor: Kevin A. Schug

Abstract:

Cannabinoids are a class of chemical compounds that can be found mainly in Cannabis sativa plants. All the isolated cannabinoids derive from cannabigerol-type compounds, and they are believed to have different effects and possible benefits in medical treatments. It is therefore fundamental to classify C.sativa extracts prior to their medical use. Thirty different C.sativa extracts were analyzed by gas chromatography and the adjusted areas of the peaks were used to compare and rank the amount of the different cannabinoids. Full quantification of five extracts was carried out using external standard calibration. Further, terpenes, that confer flavor and fragrance to the C.sativa extracts, were also quantified; considering the broad range of these compounds, the most recurrent ones (linalool, exo-fenchol, caryophyllene, guaiol, and ±-bisabolol) were considered. The concentrations of each cannabinoid differ between the extracts, and the same is true with terpenes. Thus, using the presented methodology, it is possible to create a guide to direct the choice of which extract to use for different medicinal effects and flavor/fragrance.

Palo Pinto, 10:50AM

Use of Mass Spectrometry to Detect Proteins Conferring Antibiotic Resistance to Bacteria

Presenter: Jonathan Thacker, College of Science Graduate Student

Mentor: Kevin A. Schug

Group Members: Brad S. Pierce

Abstract:

Each year in the US, infections caused by antibiotic-resistant bacteria result in about 23,000 deaths and $20 billion spent on associated healthcare. Antibiotic resistance is conferred to bacteria through a variety of protein-mediated mechanisms. The enzymatic destruction of Î²-lactam antibiotics, a commonly prescribed class of antibiotics that includes penicillin, by Î²-lactamases is among the most common resistance mechanisms observed in clinical samples. However, there are hundreds of known Î²-lactamase variants, each imparting its own spectrum of antibiotic resistance. The detection and identification of these proteins could be invaluable in clinical diagnostics. Here, we present the detection of a clinically relevant Î²-lactamase, CTX-M-15, using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS), an analytical technique that can characterize proteins by determining their masses. CTX-M-15 was expressed at high concentrations by inserting its excised associated gene from a clinical sample into pF1K, an expression system comprised of DNA. The system was studied in Escherichia coli BL21(DE3). Mass spectral signals were observed at 28.1 and 31.1 kDa corresponding to processed and preprocessed CTX-M-15, respectively. In addition, many fragments of CTX-M-15 generated by digesting it with trypsin, an enzyme useful for protein identification by virtue of its predictable cleavage sites, were observed. To the best of our knowledge, this is the first report of the detection of CTX-M-15 as well as its trypsin-digested fragments using mass spectrometry. These data demonstrate the feasibility of the use of MALDI-TOF MS as a platform for assessing antibiotic susceptibility by the detection and identification of resistance proteins.

Palo Pinto, 11:10AM

Scatter Correction for Cone-Beam Computed Tomography

Presenter: Cong Zhao, Physics Graduate Student

Mentor: Mingwu Jin

Abstract:

Cone-beam computed tomography (CBCT) is widely used in radiation treatment planning for cancer. Scatter contamination is a major source that significantly deteriorates reconstructed images. Blocker-based methods are effective for scatter correction, where the signal in the blocked region in projection images is assumed as scatter under an ideal condition and used to estimate scatter in the unblocked region. However, since this ideal condition violates in real data, the manual adjustment of scatter correction parameters was used and could lead to unacceptable treatment planning errors. In this work, we proposed to model blocker-based CBCT projection images as ideal ones convolved with a point spread function. A blind deconvolution method that alternatively estimates the point spread function and deconvolves the projection images was used to recover true scatter in blocked regions, thus leading to a more accurate scatter corrected reconstruction. The proposed method was evaluated using the CatPhan phantom data that were acquired using an Elekta Synergy XVI CBCT system.Our results showed that the image quality and reconstruction accuracy were significantly improved with scatter correction. The proposed method not only avoided the laborious parameter tuning that is suffered by the manual method, but also achieved a 38% improvement on reconstruction accuracy.

Palo Pinto, 11:30AM

Polymeric nanoparticles for Improving Protoporphyrin IX for Photodynamic Therapy

Presenter: Brian Bui, Physics Graduate Student

Mentor: Wei Chen

Group Members: Suni Sahi

Abstract:

Protoporphyrin IXâ€™s properties in aqueous solutions were enhanced by an application of Poly (styrene-co-4-vinylpyridine) particles. After involving an oil-in-water polymerization procedure to synthesize the particles, the photosensitizers were adsorbed to the surface by hydrogen bonding. Experiments and observations showed an increase in water solubility, PpIX fluorescence, and singlet oxygen generation rate. Cell studies using PC3 prostate cancer cells showed an improvement in cell uptake and cell destruction by photodynamic activity. Improvements in these areas suggest that this particle system can enhance Protoporphyrin IXâ€™s properties in aqueous solutions and for photodynamic therapy.

Palo Pinto, 11:50AM

Contribution of the topside and bottomside ionosphere to the total electron content during two strong storms

Presenter: Qingyu Zhu, Physics Graduate Student

Mentor: Yue Deng

Abstract:

In this study, the ionospheric observations from ionosondes, GPS receivers and incoherent scatter radars (ISR) at low and middle latitudes were used to investigate the contribution of the bottomside and topside ionosphere to the total electron content (TEC) during the September 2005 and December 2006 geomagnetic storms. It was found that the contribution of the bottomside TEC below F2 peak (BTEC) to the ionosonde ionospheric TEC (ionosonde ITEC) namely BTEC/ITEC was almost constant during both quiet and storm times, while the ratio of BTEC to the GPS TEC (i.e., BTEC/GPS-TEC) underwent obvious diurnal variations at all stations. The BTEC/GPS-TEC during the positive phase was similar to that during quiet time, regardless of the formation mechanisms of the observed positive phases. Moreover, our analysis revealed that the ISR calculated BTEC/ITEC during positive ionospheric phases was comparable to that during quiet time. This suggests that the positive phases in these two events mainly occurred around the F region. The calculated BTEC/ITEC from the ISR observations was larger than BTEC/GPS-TEC during the negative phase and at night when the plasmasphere possibly contributed significantly to the TEC in the relative sense.

Palo Pinto, 1:30PM

Cookbooks and Historical Memory, An Analysis of The Woman's Club of Fort Worth Cookbook of 1928

Presenter: Michael Burgess, English Graduate Student

Mentor: Desiree Henderson

Abstract:

In my analysis of The Woman's Club of Fort Worth's Cookbook of 1928, I show that food and cookbooks have a pivotal place in the story of society, giving a voice to women and minorities during a time when work in the kitchen was one of their primary means of self-expression. Some of our fondest memories can be invoked by the taste of specific meals and dishes that have often carved a defined presence in the emotional and historical narrative of our lives. How do these recipes, and the memories they contain, survive the ravages of time? The cookbook has long been the store house of this knowledge, an unassuming archive of historical memory. I argue that a book like The Woman's Club of Fort Worth's Cookbook of 1928, held within the Special Collections of the University of Texas at Arlington, sheds light upon historical events, gender roles, and even racial relations. All of these issues are present in seemingly simple and charming recipes, reflecting how social issues permeated the generations of cooks and kitchens preserved in these cookbooks. Drawing upon several fields of literary studies, including life writing and feminist criticism, and building upon my interview of current Woman's Club of Fort Worth members, I conclude that the this cookbook, and others like it, are relevant forms of life writing capable of presenting numerous sociological and historical examples of their time period, and a source of previously under-represented writings from women and minorities.

Palo Pinto, 1:50PM

Epistolary Fictions: Deceptive Correspondence in Nineteenth-Century American Literature

Presenter: Jordan Ivie, English Graduate Student

Mentor: Desiree Henderson

Abstract:

Letters are often studied as wholly factual and reliable historical documents, particularly useful for scholars who are interested in uncovering the lives of women whose words would otherwise go unheard. However, letters are often fabricated and fictionalized to at least some degree. In this essay, I examine three works of nineteenth-century American literature to illustrate how letters are almost inescapably fictitious by nature and are therefore unreliable as a source of authenticity or truth: Cherokee Sister: The Collected Writings of Catharine Brown 1818-1823; Memoirs of Elleanor Eldridge; and Susanna Rowson's Sincerity; A Novel in a Series of Letters (1803-04). The letters within these three works vary in their degrees of claimed veracity, ranging from undisputable historicity to admitted fictiveness. Despite their significant differences in genre, truthfulness, and critical reception, however, these works are worth examining in conjunction because they are surprisingly consistent in what they reveal about letters, particularly women's letters, as a form of life writing. My analysis demonstrates that letters are fictionalized in each of these texts, serving as vehicles through which either the writer or a third party molds the letter-writer's image in order to serve a certain purpose. I argue that letters are used in each of these three texts to shape women's personas, create romance and excitement, and deceive their recipients; letters should therefore be studied with care and discretion rather than with unquestioning credulity.

Palo Pinto, 2:10PM

Keats: In Defense of the Escapist Charge

Presenter: Raley Taliaferro, English Graduate Student

Mentor: Christian Worlow

Abstract:

Leading Romantic period scholar Jerome McGann has characterized John Keats's poetry as escapist who writes to avoid his own reality. In this paper, I defend Keats from McGann's charge by pointing to Keats's underlying philosophy of art, poetry, and the imagination. In extracting from many of his letters and two of his poems, "Ode on a Grecian Urn" and "Ode to a Nightingale," I will argue that Keats had a purpose for his work that was grounded in the relationship between the arts and human life and death. Through poetry, Keats seeks to explore human suffering and make sense of that suffering, a practice that hardly seems "escapist." His poetry and letters reflect his efforts to understand the pains of the world, not to escape them. I will argue how works of art and natural music inspire Keats to explore life and death and how an urn and a birdsong inspire him to find hope in his mortal existence. Keats used his distinct imagination to create poetry that explores the beauty of life and the ugliness of death by binding them to immortal subjects "and works that transcend death" that all of humanity has the ability to recognize. Critics who declare Keats's work as escapist fail to recognize how his works embrace his own harsh reality and they demean his search to uncover beauty in suffering.

Palo Pinto, 2:30PM

Inés Arredondo's "Nocturnal Butterflies" - transgression of genre, gender and eroticism

Presenter: Alicia Garza, Modern Languages Graduate Student

Mentor: Ignacio Ruiz-Pérez

Abstract:

The "Mid-Century Generation" in Mexico was a group of writers and intellectuals born during 1921-1935 whose cosmopolitan world views transformed the way of thinking and culture in Mexico. These writers lived in post-revolutionary Mexico and challenged political and societal constructs such as: nationalism, institutionalism, identity, sexuality and gender roles. Well-known writers from this generation such as Carlos Fuentes and Elena Poniatowska, innovated Mexican literature by questioning rigid societal norms and exploring forbidden subjects.The lesser studied, but equally significant and exceptional writer from this generation, Inés Arredondo (1929-1989), examined topics on gender and sexuality that fringed on taboo in Mexico's patriarchal and conservative heterosexual society. In this presentation I will focus on Arredondo's short story "Nocturnal Butterflies" (1979) to demonstrate how she deconstructs the canonical model of the rite of passage in order to transgress such literary genre, as well as traditional gender roles, and eroticism by portraying it as a performance. This tale of a woman's initiation into adulthood and the world consists of a love triangle between her and two men, and she is forced to negotiate her sexuality and identity as a valuable tool to gain knowledge and by extension feminine power in a patriarchal society. In order to show how this topic continues to be of relevance in contemporary Mexico, I will use the ideas of theorists such as Judith Butler,who prescribed that gender is a performance, and Michel Foucault, who explored sex and sexuality as a source of power in society.

Palo Pinto, 3:10PM

EVALUATION OF AMOUNT OF BLOOD IN DRY BLOOD SPOTS. RING DISK ELECTRODE CONDUCTOMETRY

Presenter: Akinde Kadjo, Chemistry and Biochemistry Graduate Student

Mentor: Purnendu Dasgupta

Abstract:

The use of dried blood spot (DBS) analysis is rapidly expanding. Typically one or more fixed area punches from the spotted filter are analyzed. The exact amount of blood spotted per unit area can depend on a number of factors. Based on the constancy of blood electrolyte levels, the preferred approach is to measure the sodium concentration in a portion of the aqueous extract. This analysis is typically destructive and is thus wasteful of the limited extract volume. We propose that electrical conductivity of the extract is an equally good but nondestructive measure. A small diameter ring-disk electrode (RDE) configured as a dip-sensor is ideal for conductance measurements in very small volumes. However, for a planar electrode like a RDE, the measured conductance depends on the dimensions of the liquid body extending from the probe. There are no analytical solutions for this geometry. Based on initial modeling results (COMSOL) that match experimental data, we provide a spreadsheet-based estimation approach. Using the RDE dimensions as the input parameters, the procedure determines the depth (D99) of the liquid below the probe at which the measured conductance reaches 99% of the value that would be attained with an infinite liquid depth. We demonstrate the use of such probes with actual DBS extracts.

Palo Pinto, 3:30PM

Comparative analysis of gene expression patterns underlying extreme organ regenerative growth in four major organs of the Burmese python

Presenter: Audra Andrew, Biology Graduate Student

Mentor: Todd Castoe

Group Members: Daren Card, Drew Schield, Richard Adams, Robert Ruggiero, David Pollock, Stephen Secor

Abstract:

Snakes represent an emerging model in biological research and provide a valuable model system for studying the extremes of organ regenerative growth due to the ability of some species to rapidly upregulate organ form and function upon feeding. The predominant model used to study this extreme response has been the Burmese python because of the extreme nature of the post-feeding response in this species. Here we analyzed RNA-seq data for four organs in the Burmese python (heart, liver, kidney, and small intestine) at three timepoints before and after feeding (fasted, 1DPF, and 4DPF) in order to dissect the gene responses and biological mechanisms leading to extreme organ regenerative growth. Our results indicate that hundreds to thousands of genes are significantly differentially expressed within the first 24 hours of feeding. Many of these genes are involved in cell cycling and apoptosis as well as in hypertrophy (specifically in the heart). Analyses also implicate a variety of key signaling pathways involved in this response. Notably, organs seem to respond with mostly unique patterns of differential gene expression, with only one common gene shared among all four major organ systems. However, some signaling pathways and regulators do appear to contribute to this response in multiple tissues. Overall, it is clear that organ regenerative growth in the Burmese python is mediated by clear and consistent patterns of differential gene expression involving factors important to increased organ function as well as those leading to the development and growth of new tissue upon feeding.

Palo Pinto, 3:50PM

Age dating and source identification of diesel fuel spills with gas chromatography and multiple detectors

Presenter: Ling Bai, Chemistry and Biochemistry Graduate Student

Mentor: Kevin A. Schug

Abstract:

The release of liquid petroleum hydrocarbons into the environment, especially marine areas, due to human activity, has been a continuous issue environmentally, economically, and socially. Oil spills can penetrate into the plumage of birds and the fur of mammals, which can affect their health and livelihood. Thus, knowing the source and the age of the contamination of the oil spills has become a significant and interesting topic. In this research, we have focused on the characterization of contaminants from diesel fuels and biodegraded diesel fuels. Diesel fuels contain complex chemical components ranging approximately from C10 to C22 in carbon number, along with many different isomers compared to gasoline. Here we applied gas chromatography â€“ mass spectrometry (GC-MS) and gas chromatography-vacuum ultraviolet spectroscopy (GC-VUV) to characterize complex diesel fuels and weathered diesel fuels mixtures. In these analysis, numerous peaks representing minor and major components were separated and detected ranging from non-aromatics to 1-3 ring aromatics by GC-VUV. GC-MS showed good abilities to see some basic group of components, but it is hard to decipher coeluting peaks and isomers like dimethylnaphthalenes because of their similar polarity, boiling points, and mass spectra. Meanwhile, we have identified some of the isoprenoids biomarkers that can be used as the age identification of diesel fuel since they are more resistant to biodegradation than alkanes. The results showed that GC-VUV provides a complementary means for solving challenging qualitative problems in diesel fuel analysis.

Palo Pinto, 4:10pm

Predator-induced Transgenerational Plasticity

Presenter: Nicole Hales, Biology Graduate Student

Mentor: Todd Castoe

Group Members: Dr. Matt Walsh, Drew Schield, Audra Andrews, Rich Adams, Daren Card

Abstract:

Organisms have the ability to alter heritable phenotypic traits in response to environmental signals without altering the DNA sequence of their genome through epigenetic genome modifications. Epigenetic changes, which are encoded by altering the chemistry of particular DNA bases in the genome, may control the expression of genes, and thus the phenotypes that are determined by such genes, and epigenetic changes can be passed down for multiple generations. We have recently developed a new genome-scale approach to accurately measure such epigenetic changes, and tested this approach on the zooplankton Daphnia. Previous work has shown that Daphnia rapidly alter their phenotype if exposed to particular environmentalÂ cues associated with predators. In this study we exposed Daphnia to these cues and tested for changes in gene expression and epigenetic state in successive generations of Daphnia. We found that there is a significant change in epigenetic states across generations that experience an environmental cue in only the first generation. These epigenetic and phenotypic shifts also correspond to multi-generational shifts in gene expression. This study provides exciting new evidence for the multigenerational altering of phenotypes based on reception of environmental cues through an epigenetic mechanism.

Pedarnales, 8:30AM

Body Shape differences in the Gulf Killifish

Presenter: Collin Funkhouser, Biology Graduate Student

Mentor: Matthew Walsh

Abstract:

The physical appearance (i.e. body shape) of a species is both a target of selection and ecologically important. Investigating body shape differences between separate populations along a selection gradient lends itself to understanding the selection pressures being exerted on those populations and the potential evolutionary consequences. Fundulus grandis, a species of killifish, is a common bait fish that has been introduced into the major rivers of Texas. Here they experience very different environmental factors that could potentially be driving selection for unique traits. We were interested in determining whether variations between populations have developed due to either biotic or abiotic selection pressures. As such, individuals were sampled from coastal, Brazos, Pecos, and Colorado river populations. Body shape was analyzed using landmark geometric morphometrics with 19 landmarks. Preliminary data suggests body shape differences do exist between populations, with future work to focus on finding patterns of differentiation and whether these differences are genetic or not.

Pedarnales, 8:50AM

Solar energy conversion using time-and-energy efficient solution combustion synthesized copper bismuth oxide($CuBi_2O_4$) and its heterojunctions.

Presenter: Mohammad Kabir Hossain, Chemistry and Biochemistry Graduate Student

Mentor: Krishnan Rajeshwar

Group Members: Dr. Dong Liu

Abstract:

As the fossil fuels are depleting quickly, one of the major challenges of the twenty first century is to meet the increasing energy demand through sustainable way. Moreover, fossil fuels generate greenhouse gases which are the responsible for the drastic climate change throughout the world. Solar energy has emerged as one of the promising renewable energy sources but conversion of solar radiation to consumable fuels which is called artificial photosynthesis still remains a great challenge to the scientist. Metal oxide semiconductors has shown promising as photocatalyst towards the hydrogen generation through water splitting but an efficient visible light active catalyst is still in search. Moreover, a cost effective method to synthesize the photocatalyst is also a prerequisite for commercialization. In our research, we employed a time-and-energy efficient solution combustion method to synthesize a promising visible light active photocatalyst copper bismuth oxide and its heterojunctions with CuO and Bi_2O_3 for the first time. We successfully optimized the reaction conditions and tested the photocatalytic performances of the materials. Although pure $CuBi_2O_4$ showed poor phocatalytic performance which is believed due to the fast recombination of charges but heterojunctions showed promising photocurrent performance which indicates that these heterojunctions could be employed for solar hydrogen generation through water splitting.

Pedarnales, 9:10AM

Reversing Hydrocarbon Combustion with Solar Energy: A Tandem Photo/Thermochemical Approach

Presenter: Mohammad Fakrul Islam, Chemistry and Biochemistry Graduate Student

Mentor: Frederick MacDonnell

Abstract:

With industrialization, urbanization, and population growth has come an ever-increasing need for cheap energy, which is realized by an increasing use of fossil fuel. The combustion of fossil fuel leads to a significant emission of CO2, one of the major green house gases, has severe impact on global climate change. However, the ready availability, stability and high energy density make fossil fuels exceptionally difficult to replace. One potential solution is to use solar energy to reform hydrocarbon from CO2, thus developing a sustainable, abundant, inexpensive and carbon neutral fuel cycle. Our major focus is to explore a direct photothermochemical process for the reduction of CO2 into liquid hydrocarbon fuels with the concomitant oxidation of water to oxygen, which could provide a one step process for the formation of liquid hydrocarbon fuel using solar energy. In this process, we use a metallic oxide semiconductor photocatlayst mixed with a co-catalyst under specific reaction conditions (temperature, pressure, UV radiation) to generate liquid hydrocarbon products from CO2 and H2O. Success of this project will lead to a solar-based sustainable energy solution.

Pedarnales, 9:30AM

Microbial co-occurrence networks on geographic distances reveal losses of endemic species in forest-to-pasture conversion in the Amazon

Presenter: Md Khan, Biology Graduate Student

Mentor: James Grover

Group Members: James M. Tiedje, Brendan J. M. Bohannan, Klaus Nüsslein, Jorge L. M. Rodrigues

Abstract:

Forest-to-pasture conversion in the Amazon rainforest disturbs soil microbial community, which triggers microbial diversity loss. In this study, we attempted to evaluate this impact on the geographical pattern of microbial co-occurrence networks. Here, we introduce a novel approach using 16S rRNA genes to construct site-wise networks and establish relationships across these two contrasting ecosystems. Betweenness centrality, a parameter describing node-wise contributions of network, was used to estimate the distances of pairwise correlations between networks. Principal Component Analysis showed significantly distinct network clusters between soil types. We estimated that networks for both soil types were comprised mostly of their endemic members, which averaged 54.4% in forest and 62.23% in pasture. In contrast, forest-enriched and pasture-enriched members were only 9.56% and 14.34%, respectively. Then we attempted to learn whether network members that are associated with a specific soil type contribute to unique topological features and observed that enriched members have a much higher average values compared to endemic members. Networks in both soil types follow this pattern. This result indicates that most of the enriched members reside in the core while endemic members reside in the periphery of networks. Since peripheral members are not tightly linked to the rest of the network, this result therefore suggests that ecosystem conversion is characterized mainly by loss of peripheral members which might result in substantial alteration of biogeochemical processes. A novel strength of employing network topology is that it focuses the relative importance rather than abundance of each member in estimating relationships across networks.

Pedarnales, 9:50AM

Genome-wide evidence of evolution and adaptation in the invasive Florida python population

Presenter: Daren Card, Biology Graduate Student

Mentor: Todd Castoe

Group Members: Drew Schield, Richard Adams, Audra Andrew, Giulia Pasquesi, Blair Perry, Nicole Hales

Abstract:

Analyzing how natural selection exerts its effects on a genomic scale is difficult because substantial evolutionary changes often happen over long time periods in most species. Invasive species, however, represent a promising model for analyzing the processes of evolution and adaptation on timescales that are tractable for study, and have been shown to demonstrate rapid evolutionary responses over short or ecological timescales. Such recent invasive introductions often demonstrate rapid responses to this shift in environmental conditions and habitat (from native to introduced), and present ready opportunity to test the genome-wide effects of natural selection. The Burmese python (Python molurus bivittatus) is ideal for this work due to its recent establishment in Florida, a location with climatic conditions much different from those in the species' native range of Southeast Asia. A 2010 freeze event in Florida led to a large (>50%) die-off of snakes in the Florida python population (FPP), and represents a selective event that likely catalyzed selection-driven evolution in the FPP. We used discrete population-level sampling of the FPP before (2007) and after (2013) the freeze event and genome-wide marker sequencing (RADseq) to test the hypothesis that large fluctuations in allele frequencies (i.e., evolution) have occurred in the FPP as a result of the freeze event. We found multiple regions of the genome that appear to show major fluctuations in heterozygosity, indicating in situ evolution in the FPP, and we used the Burmese python genome to identify genes and associated functions linked to these putatively selected loci.

Pedarnales, 10:30AM

Evaluation of the Degree of User Interest in Data at Production and Distributed Analysis system "PanDA"

Presenter: Mikhail Titov, Computer Science Engineering Graduate Student

Mentor: Gergely Záruba

Group Members: Kaushik De

Abstract:

In distributed computing systems that deal with large amounts of data the distribution of input data among computing nodes should follow data popularity metrics. With limited resources for data storage it is important that data is replicated at sites where it will be most frequently and most likely accessed, thus user interests in data should be considered. This work is focused on user activities and interests in such Production and Distributed Analysis system (PanDA) that is used for the ATLAS experiment at Large Hadron Collider, CERN (European Organization for Nuclear Research).Initial estimation of the correlation between users' data needs validated the belief that a recommender system would benefit users as it would empower them in finding interesting data more readily and rapidly for their experiments. Results showed that user activity can follow usage patterns within groups of similar users and can be correlated with specific user interests.Recommender system â€œData Watcherâ€ is designed to estimate the degree of dependency and demand between data objects in PanDA (e.g., users and users' used data), and to utilize this knowledge in providing corresponding ratings for desirable data objects. Estimated data ratings aim to extend standard popularity metrics and tend to increase the quality of analysis processes to meet user needs.Preliminary analyses of the first results from Data Watcher show its relative efficiency in the estimation of the relationship between user and data that was not used by user before, thus providing the potential degree of user interests over data.

Pedarnales, 10:50AM

Two-factor authentication using Graphical Password

Presenter: Sonali Marne, Computer Science Engineering Graduate Student

Mentor: Matthew Wright

Abstract:

In the recent times, we have seen a gradual increase in the number of cybercrimes. To secure our system from hackers, intruders, sniffers and those stealing information we need to develop special means of authentication. Most of the authentication systems allow users to create a textual password. Users, however, create passwords which reflect common patterns and are easily memorable but are often insecure. Whereas on the other hand, system-assigned passwords are secure but difficult to remember. To address this issue of memorability and security, we have designed a system which will provide an extra layer of security and memorability by providing two-step authentication. This system provides strong security against online attacks by assigning a system-generated password and at the same time eases learning and memorizing of the password with the help of graphical images and verbal cues. We conducted a user study to study the impact of our system. The results present a new potential future for graphical passwords.

Pedarnales, 11:10AM

Countering Double-Spend Attacks in Bitcoin Fast-Pay Transactions

Presenter: John Podolanko, Computer Science Engineering Graduate Student

Mentor: Matthew Wright

Abstract:

Bitcoin is a Proof-of-Work based payment system that doesn't rely on a centralized trust authority. As its popularity grows, its adoption is becoming more dynamic as new kinds of businesses who accept fast payments are starting to accept Bitcoin. This includes fast food restaurants, vending machines, and several other types of on-the-go delivery entities. Being that fast payment systems are more vulnerable to fraudulent (double-spend) transactions, there is an ever-pressing need to discover deployable and scalable countermeasures to such attacks. In this paper, we identify the current vulnerabilities in Bitcoin, present countermeasures to each of these vulnerabilities, and integrate these countermeasures into Bitcoin's latest version of source code. Then, we simulate a scaled Bitcoin P2P network using the Shadow framework and deploy our countermeasures. Finally, we compile our results and demonstrate the viability of the deployed countermeasures.

Pedarnales, 11:30AM

Forming guard sets in Tor network using network similarity

Presenter: Mohsen Imani, Computer Science Engineering Graduate Student

Mentor: Matthew Wright

Abstract:

Tor is a privacy technology that helps the Internet users to hide their identity in the Internet. Tor consists of thousand computers (relays) and millions of daily users. In Tor, the user browses the web through a secure tunnel. These tunnels are built from three randomly selected relays in the Tor network. The first relay (out of three selected relays) is called guard, and each user uses its guard for six to nine months while other two relays in the tunnel change every time the user uses the Tor. One way that increases the security of the Tor is to group guards together to form shared guard sets. In this way, we have sets of guards in the Tor network and users select their guard sets and use guards in their sets to build the secure tunnels. The last searches have proposed using the relaysâ€™ bandwidth to form the guard sets. In this paper, we show that using bandwidth in forming the sets is not a good idea, and we implemented an attack that the attacker owning 2% of total bandwidth in Tor network can endanger the security of 45% of the users. We also propose using the network similarity in forming sets in which guards with similarity in their network should be in the same set. We show that our method is more secure against the limited resource attackers.

Pedarnales, 11:50AM

Development and Flight Test of Moving-mass Actuated Unmanned Aerial Vehicle

Presenter: Sampath Reddy Vengate, Aerospace Engineering Graduate Student

Mentor: Atilla Dogan

Group Members: Sukru Akif Erturk

Abstract:

This paper investigates the feasibility of installing a Linear Electric actuator in an air-plane with attached internal masses for generating moments instead of aerodynamic control surfaces. Two internally moving masses are considered, which are placed inside both wings to generate rolling moment as a replacement to the ailerons. The study focuses on the development of the mechanism with an electric actuator in a small unmanned aerial vehicle and a fight test to showcase as a proof of concept, that internal moving mass actuation systems can replace the conventional aerodynamic control surfaces (aileron in this study). Furthermore, the data acquisition work flow is discussed, where we present the layout in which the actuator position, rate and motion data is stored by the onboard autopilot system and used for analysis.This paper focuses on flight test analysis of the mass actuated aircraft for various cruise speeds. Given the constraints on how far the moving-mass can move within the airplane in the limits of the linear actuator chosen, an analysis is performed to determine the rate at which it is producing the rolling moment. This analysis is repeated by performing a set of rolling moments/banks using either ailerons or the moving masses within the wings. The data-logs obtained from the onboard autopilot system containing the flight performance information are then compared with the simulations in which, we have the aircraft dynamics model replicating the same scenario. Within the feasible cruise speeds range, the effect of using moving-mass actuator instead of ailerons is quantified.

Pedarnales, 1:30PM

Development of a Novel Organic Photobasic Catalyst and its Application on Organic Reactions

Presenter: Horacio Enrique Barragan Peyrani, Chemistry and Biochemistry Graduate Student

Mentor: Alejandro Bugarin

Abstract:

A photobase is a chemical compound which, upon exposure to light of a certain wavelength, becomes a more effective electron donor. Previous studies in our group indicate that compounds derived from N-heterocyclic carbenes and aromatic azides show intense absorption in the UV-Vis region of the spectrum. It has also recently been discovered that irradiation with UV light significantly increased the ability of these compounds to act as bases in aqueous solution. This increase in basicity is believed to be caused by the photoinduced isomerization of the azide derivative into its less stable (Z) form. Due to its particular geometrical features, the nitrogen atom of the (Z) isomer accumulates more negative charge which makes it substantially more basic. In order to assess the applicability of the light-activated basicity of our catalysts to synthetic organic chemistry, we prepared several azide derivatives and utilized them as photobasic catalysts on a common base-catalyzed organic reaction, the Henry reaction. A variety of aldehydes and nitro compounds were made to react with our photobase under UV light irradiation. Our compounds proved effective in catalysing the reactions, which produced the desired nitroalcohol products in acceptable to excellent yields. These results open up the possibility of utilizing this new variety of photocatalysts to perform a wider variety of organic syntheses in the future.

Pedarnales, 1:50PM

An Implantable In-line Shunt Flow Monitor for Hydrocephalus Treatment

Presenter: Chuchu Qin, Chemistry and Biochemistry Graduate Student

Mentor: Purnendu K. Dasgupta

Group Members: Phillip Shelor; Brian Stamos; Hongzhu Liao; Akinde Kadjo; Weixiong Huang;

Abstract:

Hydrocephalus is a deadly medical condition in which there is an abnormal accumulation of cerebrospinal fluid (CSF) in the brain. Patients' life is highly dependent on surgically inserted shunt systems which fail at an alarming rate of 40% within the first year of implantation. Conventional monitoring techniques for shunt failure are time consuming, expertise dependent and often inconclusive. In this project, we are developing a novel implantable in-line shunt flow monitoring system that offers quick, easy, and quantitative measure of the CSF flow. The system operates on the principle of thermal pulse induction and detection. A heat pulse is applied to an embedded thermistor in the tube. After the thermal pulse dissipates, the thermistor temperature gradually levels with the body temperature. The sensing electronics measures temperature decay signal and the time (Î”t) it takes for the thermistor's temperature to drop from the heat pulse level back to a baseline level. Our results show that the 1/Î”t is in a logarithmic relationship with the volumetric fluid rate (R2= 0.9890). This logarithmic relationship has been also observed on the exponential decay constant of a mathematical fit for the temperature decay signal (R2= 0.9755). With the built-in flow meter in this project, hydrocephalus patients can be easily and more frequently monitored at home or out-patients care facilities for proper functioning of the hydrocephalus shunt. This allows timely remediation of shunt-flow malfunctions, thereby avoiding severe complications that can arise, and escalate rapidly at a later stage, due to the failure in CSF drainage.

Pedarnales, 2:10PM

Natural selection and multispecies / coalescent models: investigating the impacts of directional selection on / phylogenomic inferences of recently-diverged species complexes

Presenter: Richard Adams, Biology Graduate Student

Mentor: Todd Castoe

Group Members: Drew Schield, Daren Card

Abstract:

Coalescent-based phylogenetics have dramatically improved our ability to resolve evolutionary relationships despite genealogical discordance. However, inferences derived using coalescent models rely on the assumption of strictly neutral evolution, which may be violated when studying genomic-scale datasets. Here we develop and apply forward-time multispecies simulations to generate genomic-scale datasets under varying scenarios of neutral and non-neutral evolution. Using our forward-time multispecies model, we investigate, characterize, and quantify the effects of both directional selection and divergent selection between sister species on Bayesian species tree estimation of recently-diverged species complexes. We provide evidence that natural selection may influence species tree topology, theta, and divergence time estimates under the multispecies coalescent model. Our forward-time simulations highlight the combinations of parameters and evolutionary scenarios in which natural selection is likely to have a particularly strong influence over coalescent-based inferences.

Pedarnales, 2:30PM

Mass spectrometry cleavable cross-linking approach for large-scale identification of Protein-Protein Interactions

Presenter: Jayanta Kishor Chakrabarty, Chemistry and Biochemistry Graduate Student

Mentor: Saiful Chowdhury

Abstract:

The chemical cross-linking strategies coupled to mass spectrometry is a powerful tool for studying protein-protein interactions globally. There is no significant method in large scale interactome studies which can able give the authentic information of protein signaling networks in native biological conditions. We designed a novel cross-linking agent that has N-hydroxysuccinimide (NHS) esters that can interact with primary amines of peptide to form stable amide bonds. CID and ETD fragmentation selectively cleaved the cross-linker in specified positions and shown duel cleavable properties. We tested our newly designed cross-linker with different types of peptides (neurotensin) and proteins (BSA and ubiquitin). The cross-linked peptides that produce signature fragmentation extensively characterized by MS. In this study, the proteins were digested by in-solution and in-gel digestion along with SDS-PAGE with trypsin and analyzed by nano LC-MS/MS couple to LTQ velos pro mass spectrometry. The cross-linked samples in the gel exhibited higher molecular weight bands compared to the uncross-linked control. The higher molecular bands were excised from the gel, digested properly and analyzed by LC-MS/MS. We also have developed complementary bio-informatics software that can analyze large scale data using cleavable cross-linking approach. This approach will help to give more confidence in cross-linking data analysis due to simultaneous fragmentation with CID and ETD. For application of that method, we are investigating the large scale protein-protein interaction networks of Toll-like Receptor (TLRs) in immune cell macrophage.

Pedarnales, 3:10PM

The wait is over: development of new technologies to enable ultrafast analysis

Presenter: Darshan Patel, Chemistry and Biochemistry Graduate Student

Mentor: Daniel W. Armstrong

Abstract:

Developing a new drug on average costs over $2 billion and takes 15 years. A significant portion of this time and money are invested in studying the efficacy and toxicity of potential drug candidates using high-performance liquid chromatography (HPLC) and supercritical fluid chromatography (SFC). With more than 80% of the new drugs being chiral (having asymmetry), chiral HPLC and SFC are the most widely used techniques in pharmaceutical research. Chiral stationary phases (CSPs) are the heart of chiral HPLC and SFC that enable analyses of compounds to obtain qualitative and quantitative information. However, current technologies available in chiral stationary phases offer poor performance resulting in long analysis times (typically 15-45 min) and high cost. We developed new and improved chiral stationary phases with state-of-the-art technologies that enable ultrafast analysis of compounds in less than 60 seconds. Many of the compounds can be analyzed in merely 10 seconds. These chiral stationary phases offer high performance, drastically shorter analysis times, lower toxic waste, and reduced cost of analysis. Also studied are the instrument optimizations necessary to obtain the full performance of stationary phases. By enabling rapid identification of compounds, this technology can allow researchers to obtain information from their samples in real-time, increasing the productivity and lowering the cost of drug development.

Pedarnales, 3:30PM

Reducing Matrix Effects for the Quantification of BTEX in Contaminated Soils using Ionic Liquids in Headspace Analysis

Presenter: Emmanuel Varona, Chemistry and Biochemistry Graduate Student

Mentor: Kevin A. Schug

Group Members: Michelle Reyes, Doug D. Carlton Jr.

Abstract:

Due to its increasing use in the United States and in other countries, concerns about the environmental impact of fossil fuel extraction activities (i.e. hydraulic fracturing, and other drilling and well-stimulation techniques) have risen. Soil can be easily contaminated by hazardous semivolatile organic compounds (VOCs) to include but not limited to benzene, toluene, ethylbenzene, and xylene isomers (BTEX) as a consequence of fossil fuel extraction activities. 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, ionic liquids (ILs) as a solvent, in headspace gas chromatography mass spectrometry (HS-GC/MS) were evaluated in an effort to normalize sample component (matrix) effects associated with varying soil compositions. The physical properties of ILs have been shown to improve the linearity of response of BTEX in soils with varying compositions. ILs show promising results for the quantification of BTEX by reducing and normalizing the matrix effect caused by the varying compositions in soil, and leading to the potential development of a universal calibration curve. Analysis times are also reduced compared to standard EPA methods.

Pedarnales, 3:50PM

Computational Investigations of Bare and Functionalized Silica Surfaces

Presenter: John Nimmo, Chemistry and Biochemistry Graduate Student

Mentor: Peter Kroll

Group Members: Atreyi Dasmahapatra, Susana Aguirre-Medel, Greg Monson, Ilia Ponomorev, Sabrina Ahmed, Hope Montgomery. James Mao

Abstract:

In this work we investigate the stability and reactivity of various hydroxylated surfaces of crystalline silica (SiO2). Three polymorphs of SiO2 of increasing density are studied: Î±-quartz, Î²-cristobalite, and stishovite. Surface models are constructed by slicing the crystal structure along well-defined lattice planes and then inserting vacuum (open space) into the slab. Using Density Functional Theory (DFT) calculations as implemented in the Vienna Ab-initio Software Package (VASP), we optimize the geometries and calculate surface energies. We augment the theoretical approach by adding Van der Waals interactions using the approximations of Grimme [DFT-D2 method, J. Comput. Chem., 2006] and of Kim, Choi, and Goddard [ULG method, J. Phys. Chem. Lett., 2012]. Our calculations for hydroxylated quartz surfaces are in agreement with structural data [Goumans, et al., PCCP, 2007]. We find that surface energies depend strongly on i. the number of surface silanol groups, and ii. the number of hydrogen bonds between silanol groups. More stable (thus also less reactive) surfaces have more of hydrogen bonds per unit area. Since hydrogen bonds benefit from the addition of dispersion forces, our results show improvement in comparison to previous calculations [Murashov, J. Phys. Chem. B, 2005]. Results for surfaces of cristobalite and stishovite are analyzed in view of the transformation path from the high-density polymorph (stishovite) to the low-density polymorph (cristobalite). We show that water molecules on the surface impact the energetics of the transformation due to interactions between water and silanol groups.

Pedarnales, 4:10PM

Crystal structure of a His40 variant of the F420 cofactor dependent glucose-6-phosphate dehydrogenase from Mycobacterium tuberculosis reveals the basis of substrate binding

Presenter: Mercy Oyugi, Chemistry and Biochemistry Graduate Student

Mentor: Kayunta Johnson-Winters

Abstract:

Tuberculosis disease (TB) is a deadly infectious disease that is caused by Mycobacterium tuberculosis (Mtb). The World Health Organization (WHO) estimates that TB is currently affecting about one third of the world's population. 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 essential enzyme that catalyzes the conversion of glucose-6-phosphate (G6P) to 6-phosphogluconolactone within Mtb. A previously proposed mechanism suggests that Histidine_40 (His40) acts as the active site base involved in the first step of the FGD reaction. We aim, therefore, to probe the functionality of this His40 residue using mutagenesis, binding assays, steady state kinetics and crystallography. Here, we present the results of the characterization of wild-type FGD (wtFGD) and the FGD H40A variant. The binding assays revealed that His40 is not involved in G6P binding, but it helps in anchoring the F420 cofactor into the active site. The steady state kinetics showed a drastic loss of catalytic efficiency for the FGD H40A variant, suggesting that the His40 residue is indeed crucial for catalysis. Finally, a novel FGD H40A crystal structure was solved at 2.9 …, thus providing valuable insight into the basis of G6P binding within the active site.

Red River, 8:30AM

Band-gap engineering at a semiconductor - crystalline oxide interfac

Presenter: Kamyar Ahmadi-Majlan, Electrical Engineering Graduate Student

Mentor: Joseph Ngai

Group Members: Kamyar Ahmadi-Majlan,Mohammadreza Jahangir-Moghadam, Xuan Shen, Timothy Droubay, Mark Bowden, Matthew Chrysler, Dong Su, Scott A. Chambers, / and Joseph H. Ngai1* /

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 SrZrxTi1âˆ’xO3 and Ge, in which the band-gap of the former is enhanced with Zr content x. We present structural and electrical characterization of SrZrxTi1âˆ’xO3-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.

Red River, 8:50AM

Detonation-Turbulence Interaction: Computational Generation and Flow Analysis

Presenter: Sarah Hussein, Aerospace Engineering Graduate Student

Mentor: Frank Lu

Abstract:

Turbulence remains, until today, a topic not well understood in classical physics and modern fluid dynamics. The turbulent flow of the smoke rising from a lit candle is not quite the same as that of a propagating forest fire. This doctoral research project establishes a method of studying the first case, a pure turbulent flow, as well as the second case, turbulence interacting with naturally occurring shock and detonation waves. Understanding these flows is important in advancing fuel system mixing, as in engines, as well as establishing disaster mitigation techniques for coal mine explosions and power plant fires. Since laboratory experimentation of these phenomena is costly and dangerous, a computational model is generated with an original code. The code is written in MATLAB and validated with literature trends and previous rudimentary studies. This pioneering code outputs data sets that are visualized and analyzed to determine turbulence velocity profiles, energy cascade, and stresses as well as flow propagation through and past the shock-detonation wave. Results show mutual interaction between the turbulence and the wave properties that requires further decoupling analysis. Results also show the presence of instabilities and hotspots in the flow that require additional safety precautions for practical applications.

Red River, 9:10AM

Survey Paper on Short Fiber Placement Techniques

Presenter: Blesson Isaac, Mechanical Engineering Graduate Student

Mentor: Robert M. Taylor

Abstract:

Composite materials with short carbon fibers in a polymer matrix are useful in applications where formability and ductility are desired while maintaining stiffness and strength. In this paper, short carbon fiber placement techinques for the manufacture of composite materials are surveyed and evaluated. In these methods, the aim is to align the short carbon fibers in predefined directions and impregnate with resins to form prepregs. The advantages and disadvantages of each method are given. Thge author suggests potential design improvements to bring up efficiency and effectiveness of placement techniques. A novel fiber alignment device is designed and the prototype is made for preliminary studies. This prototype helps us to understand the possibility of aligning the short carbon fibers in one particular direction.

Red River, 9:30AM

In-situly harvesting solar energy by an all-vanadium photo electrochemical storage cell / with a continuous flow reactor /

Presenter: Zi Wei, Materials Science and Engineering Graduate Student

Mentor: Fuqiang Liu

Abstract:

As renewable energy becomes more prevalent, there is a pressing need for large-scale & high-efficiency solar energy storage as a sustainable solution to the problem of energy shortage. To this end, we herein describe an all-vanadium photoelectrochemical storage cell (all-V-PESC) based on geometry-enhanced anatase TiO2 nanobelts (TNBs) to significantly improve storage efficiency. The TNBs, consisting of both highly crystalline type I belts with thermodynamically stable {101} facets, and heterostructured type II belts with exposed high-energy {001} and {100} facets, were obtained by stirring-assisted hydrothermal synthesis. The feasibility of solar energy storage using the geometry-enhanced TNBs by generating energy-rich vanadium redox species in the all-V PESC is demonstrated. The obtained incident photon-to-current efficiency (IPCE) was ~22% at 350 nm without any external bias, double that of commercial P25 TiO2 (~11%). Besides, a continuous flow reactor (CFR) is integrated with the all-V PESC and it is discovered that the introduction of flow during photo electrochemical conversion greatly enhanced photocurrent by 5 times comparing to no flux condition. The enhanced photocatalytic performance is largely attributed to improved charge separation efficiency implemented by TNBs and enhanced transport boosted by Vanadium species flow. This concept may be extended to other nanostructured semiconductor materials and photoelectrochemical systems, and potentially offers ramifications for sustainable and efficient solar energy storage.

Red River, 9:50AM

FLEXIBLE AND CONDUCTIVE FOAM MICROSTRIP PATCH ANTENNA

Presenter: Shahnavaz Eilbeigi, Mechanical Engineering Graduate Student

Mentor: Haiying Huang

Abstract:

The primary objective of recent antennas research is to reduce the size and make them more flexible. The study of flexible wireless antenna sensors is widely presented in papers in recent years. These sensors are light weight, compact, stable, flexible and durable even after many times of using. Flexible wireless antenna sensor has several applications and the usages of the flexible sensors are spreading widely in all fields and areas as diverse as mobile and satellite communication, healthcare, Telemedicine, Police and Military and Athlete monitoring. Particular wireless antenna sensor can be designed for each application. For example, in the military domain, personnel are expected to carry a large amount of equipment and are likely to require the addition of sensors around the body for situational awareness and medical monitoring. This paper presents a flexible microstrip antenna sensor based on conductive foam that can be placed in contact with the human skin as it is flexible and non-allergenic. Moreover, having the low dielectric losses and not absorbing moisture improve the efficiency and makes it suitable for wearable antenna applications. The design of the antenna, analytical results using simulation models in Ansoft High Frequency Simulation Software (HFSS) and measured antenna performance in terms of return loss and far-field gain radiation pattern with and without the presence of the human body are presented.

Red River, 10:30AM

Improving Memorization and Long Term Recall of System Assigned Passwords

Presenter: Jayesh Doolani, Computer Science Engineering Graduate Student

Mentor: Matthew Wright

Group Members: Dr. Taiabul Haque

Abstract:

System assigned passwords (krvzpt, for example) are extremely secure and hard to guess by friends, family members or adversary software, because of the random arrangement of the characters. It is this very unique characteristic of system assigned passwords which also leads to a major memorability issue, as memorizing a string of random characters is an extremely arduous task. Hence, if given a choice between choosing your own password or opting for system assigned ones, users tend to choose the former and create passwords that help in quick and easy recall but often ignore to make it highly secure. In order to increase security of user accounts, we suggest that systems should assign randomly generated passwords to users and also assist them with memorization and long term recall. In our work, we are aiming to accomplish this task by designing a unique technique where users play a small game, as a part of account registration process, when they are assigned a randomly generated password and at the end of game the users would have memorized the password and can recall it in the future. During our first hand investigation of this strategy, we found that users would benefit if the password is broken down into equal chunks and the game helps plant each chunk in correct order in users memory. Our technique can be deployed in real world systems for enhancing the memorability of system assigned random passwords.

Red River, 10:50AM

OGMA: Language Acquisition System using Virtual Reality

Presenter: Sanika Sunil Gupta, Computer Science Engineering Graduate Student

Mentor: Filia Makedon

Group Members: Dylan Ebert

Abstract:

One of the traditional methods for learning a new language, also called as Second-language acquisition (SLA), which is still dominant and beneficial is the immersion method. In this method, one temporarily relocates to a new place where target language is the predominant language and tries to learn their language by immersing in the local environment & learning by interacting. One of the disadvantages of this method is that relocating to a new place is not always a viable option and that's where Virtual Reality (VR) can come to our rescue. VR is an immersive technology which is regarded as an extension of 3D Computer Graphics and can help in getting transported virtually into a real world environment. In our research, we explore the possibility of utilizing this power of VR for SLA by building a system called OGMA, which helps users immerse themselves in an environment representing a foreign place. In our pilot study, we built a VR system and performed user studies by comparing SLA using VR against the traditional method. In both cases, the users were given a set of 10 Swedish words to learn. Results indicated that percentage retention in our method was 25% more than that of traditional method. The effectiveness & entertainment rating from users for our method was considerably higher than that of traditional method. This proves our system can have a potential impact in learning a new language effectively using VR technology without suffering the disadvantages of the traditional method.

Red River, 11:10AM

Why number counts in the grammar: Evidence from Creek

Presenter: Kimberly Johnson, Linguistics Graduate Student

Mentor: Colleen Fitzgerald

Abstract:

Most words are packed with information. Sometimes this is transparent, like *work* versus *work-ed,* where the *-ed* morpheme communicates past tense. Other times this is less transparent, like *go* versus *went*, where both the *going* and the *past* meaning are packaged together in the form *went*. This opaque meaning-to-form ratio is labelled suppletive. The identity of a root word is a question under debate (Harley 2014; Borer 2014 inter alia). Are *go* and *went* two different root words with similar meaning? Or are they two different ways to spell out the same abstract root? Adding to the evidence for abstract roots presented by Harley (2014), this study examines verbs in Creek - an endangered Native American language spoken in Oklahoma. Creek verbs have regular, irregular, and suppletive forms which, instead of packaging verb and tense, communicate verb plus the number of subjects or objects. The verb 'to sit' in (1a-c) has a different form for talking about *one* sitting person versus *two* or *three or more* sitting people (Martin 2011, Haas 1948).

(1)	a. leyk-itá	b. ka:k-itá	c. apo:k-itá
	(one) to sit	(two) to sit	(three or more) to sit

Creek presents evidence for two arguments in favor of an abstract root. First, number of verbs making this three-way number distinction suggests the forms in (1) are not just three words with almost identical meaning. Secondly, special uses of plural verbs for clothes or liquids supports the notion of a root separate from but dependent on number of the subject.

Red River, 11:30AM

What's a Word in Cherokee?

Presenter: Samantha Cornelius, Linguistics Graduate Student

Mentor: Colleen Fitzgerald

Abstract:

Cherokee is a Southern Iroquoian language spoken in Oklahoma and North Carolina. Like many Native American languages, Cherokee is a polysynthetic language, which means that one word in Cherokee can mean a whole sentence in English. Due to this fact, wordhood is a topic of debate in the literature of polysynthetic languages. In this talk, I show that there is phonological evidence for word boundaries in Cherokee. This evidence comes from a process I call word-final vowel deletion (WFVD). WFVD is a previously observed phonological process in Cherokee (Scancarelli 1987, Uchihara 2013, Montgomery-Anderson 2015) that makes reference to a word, though there is little analysis of the process. When WFVD occurs, the final vowel in a word is deleted; if the word-final syllable is h plus a vowel (i.e. ha) or glottal stop plus a vowel, the entire syllable is deleted. However, clitics, which appear at the ends of words, are immune to this process. Clitics are language particles that often modify entire phrases rather than single words. However, clitics in English, like possessive ‘s in John’s (cf. Anderson & Zwicky 2003), are included phonologically in the last word they modify. Therefore, John and David’s is three words, not four. The fact that WFVD does not affect Cherokee clitics suggests that clitics are not part of phonological word. These findings deviate from previous scientific studies on the word in Cherokee (Lindsey 1985, Haag 1999).

Red River, 11:50AM

Fortis-Lenis Consonant Contrasts in Chicahuaxtla Triqui

Presenter: Jazmin Chinea Barreto, Modern Languages Graduate Student

Mentor: A Raymond Elliott

Abstract:

Chicahuaxtla Triqui (ISO CODE: trs) is an Otomanguean language spoken by the indigenous people of San AndrÃ©s Chicahuaxtla in Oaxaca, Mexico. There are two other Triqui languages spoken in San Juan Copala and San MartÃ-n Itunyoso. Chicahuaxtla Triqui has contrastive fortis-lenis, or long-short, consonants in word initial position. These contrasts include: mm/m [mË m], nn/n [nË n], ll/l [lË l], yy/y [Ê jË], and huu/hu [wË w]. Researchers define fortis-lenis distinctions as contrasts in: consonant length, voicing, or strength of articulation. The purpose of this research is to identify precisely what distinguishes fortis from lenis contrasts in Chicahuaxtla Triqui. Data for this study were collected in San AndrÃ©s Chicahuaxtla during the summer of 2015. The sample consisted of six adult native speakers of Chicahuaxtla Triquiâ€”3 males and 3 females. Tokens of fortis-lenis consonant contrasts were subsequently measured for strength of articulation and duration to determine what differentiates fortis from lenis pronunciations. Our research shows that fortis consonants differ in length of articulation in comparison to their lenis counterparts. Elliott et al. (2012) note that fortis-lenis distinctions have important implications for the still-developing orthographic system of Chicahuaxtla Triquiâ€”some native speakers are in favor of representing these distinctions in writing while others are opposed. Based on the results of our statistical analysis, I propose that fortis-lenis consonants in word initial position in Chicahuaxtla Triqui should be represented in writing, not only for native speakers of the language but also for individuals who are learning Triqui as a second language.

Red River, 1:30PM

Green Synthesis of Organic Dyes by Artificial Riboflavin Mimics

Presenter: Pawan Thapa, Chemistry and Biochemistry Graduate Student

Mentor: Frank W. Foss Jr.

Group Members: Diego Lopez, Abu Afzal Mohammad Shakar

Abstract:

In nature, riboflavin (Vitamin B2) is known to catalyze carbon-carbon (C-C) bond forming reactions, which generate valuable metabolites require for proper growth, development, and survival of organisms. In an effort to perform C-C bond formation in a sustainable manner, a number of artificial riboflavin mimics were designed, synthesized, and studied to perform reactions normally carried out by heavy metals, rare-earth metals, or powerful acids. A subclass of riboflavin mimics was found to catalyze C-C bond formation by activating small molecules in a new manner. This approach was used to synthesize various industrially important dyes and chemical reagents. Additionally, the relationship discovered between molecular structure and catalytic function of riboflavin mimics in these new chemical reactions revealed a plausible explanation for the function of natural riboflavin-dependent oxynitrilase enzymes in natural system. Oxynitrilases are poorly understood, but valuable enzymes for the synthesis of cyanohydrins, an important class of organic compounds. Future efforts will be aimed at the preparation of cyanohydrins and other fine chemicals through similar green chemical methods.
Keywords: Green Chemistry, riboflavin, enzyme mimics, dyes, oxynitrilase.

Red River, 1:50PM

Assessing Remediation Protocols for Polycyclic Aromatic Hydrocarbons and their Metabolites in Contaminated Soils

Presenter: Alison Wicker, Chemistry and Biochemistry Graduate Student

Mentor: Kevin A. Schug

Group Members: Doug D. Carlton Jr.

Abstract:

Polycyclic aromatic hydrocarbons (PAHs) are common environmental contaminants with known toxic, mutagenic, and carcinogenic activity. PAHs are released into the air through a multitude of both natural and anthropogenic events eventually settling into our soil. Conventional techniques to treat PAH contaminated soils include excavation followed by incineration or containment. Due to the expense and invasiveness of conventional methods, establishing an alternative approach is warranted. Activated carbon (AC), charcoal treated to increase its absorptive power, is commonly used to adsorb or "tie up" organic chemicals, like pesticides and herbicides, in water. The main objective of this research is to determine the possibility of utilizing AC as a viable remediation technique to treat soils contaminated with PAHs and their metabolites. In this study, supercritical fluid extraction/supercritical fluid chromatography (SFE/SFC) was used to evaluate the effectiveness of various types of activated carbon in remediating soil by monitoring PAH levels before and after treatment with AC. Preliminarily, we have found that AC completely binds the 16 PAHs in our soil samples, including known carcinogens chrysene and fluoranthene, while decreasing a significant fraction of their metabolites. As levels of PAHs in our environment continue to rise, it is imperative that we design alternative methods to manage containment. The use of activated carbon to treat contaminated soil shows promise in binding a range of PAHs and their metabolites; it may provide a more affordable and less invasive method of remediation.

Red River, 2:10PM

Enhancing Sensitivity and Throughput for Targeted Bio-Analysis of Biomarkers

Presenter: Yehia Baghdady, Chemistry and Biochemistry Graduate Student

Mentor: Kevin A. Schug

Group Members: C. Phillip Shelor, Purnendu K. Dasgupta

Abstract:

Bio-analysis is one of the most important challenges for the current application of liquid chromatography mass spectrometry (LC-MS) methods. Reaching a part per trillion level of detection for the targeted determination of ultra-low levels of specific molecules, such as biomarkers of diseases and/or environmental carcinogens, is equivalent to the detection of one drop of water in 20 Olympic-size swimming pools. To reach such an ultra-high sensitivity and beyond in complex biological matrices by a well-developed and validated high throughput method, a state of the art instruments such as LC-MS cannot stand alone. The successful implementation and online integration of advanced, innovative and target biomarker-tailored sample preparation with LC-MS can achieve the desired sensitivity and throughput. We evaluated the trapping characteristics of different trap columns for four model compounds of variable physicochemical properties. Experimental determination of these parameters allowed selecting the most efficient trap column and the best trapping conditions for achieving the maximal solute pre-concentration on trap columns. Online pH modulation membrane was tested to evaluate its efficiency for post-column pH modification. All results showed efficiency of this membrane to affect the pH of the effluent coming out in both acidic and basic conditions using all tested flow rates. Adopting these optimized online pH and trap devices and successfully implementing them in further experiments with LC-MS can help to develop and validate a method for ultra-high sensitivity determination of biomarkers in biological matrices.

Red River, 2:30PM

Investigating Parameters to Improve Protein Quantitative Analysis

Presenter: Evelyn Wang, Chemistry and Biochemistry Graduate Student

Mentor: Kevin A. Schug

Group Members: Dananjaya Kalu Appulage, Erin A. McAllister

Abstract:

The increasing demand of protein analysis for clinical diagnostics and drug development calls for methods that are accurate and sensitive. A novel intact protein quantitation method using a triple quadrupole mass spectrometer (QqQ-MS) was recently developed in our lab to meet the demand. Although QqQ-MS is known for its sensitivity in quantitative analysis, we found a less than 5% transmission rate from the first quadrupole to the third quadrupole mass analyzer. To find the source that contributed the 95% signal lost, Shimadzu 8050 QqQ-MS was used to study proton-transfer reactions and ion scattering effects of the multiply charged intact protein. Protein standards myoglobin and ubiquitin along with small molecules reserpine were analyzed under various collision induced dissociation (CID) gases and gas pressures. The result revealed the mass resolution settings play a great role in decreasing ion transmission efficiency. By narrowing the resolution window by 0.4 m/z, 98% of the signal were lost during the process. Proteins, however, experienced additional proton-transfer effects (tenfold signal reduction) where protons were transferred from the multiply charged proteins to the CID gas. This phenomenon was especially prominent in higher charge states. The result of the study will aid future protein quantitation method development in achieving more sensitive yet accurate analysis to provide early disease diagnostic and better treatment plans.

Red River, 3:10PM

Justice for All?: A Case Study on Racial Tension in the United States /

Presenter: Karen McAlister, Communication Graduate Student

Mentor: Rachel Stohr

Abstract:

Racial tension in the United States is an increasingly hot topic of conversation. Racism has plagued our nation since its inception and its lingering consequences are evident in our societal structure today. This case study explores the rhetoric of racial tension in the United States between the 1980s and present day. To do this, I draw on a communication-centered lens to explore the historical roots of two social movements: (1) Fuck tha Police, a song by N.W.A. that became the anthem during the Los Angeles riots and (2) the #BlackLivesMatter campaign. In particular, I investigate communication messages associated with each, and discuss rhetorical similarities and differences across time and context. I conclude by arguing that, although each movement is driven by its own goals, such as creating a dialogue on racism and police brutality, a common thread exists across them: the message of equality and civil rights.

Red River, 3:30PM

"Say It Loud": The Power of African-American Protest Music in the Twentieth Century

Presenter: Justin Webb, History Graduate Student

Mentor: Stephanie Cole

Abstract:

This research focuses on the possible impact that African-American musicians had upon the racial struggles in the United States during the early- to mid-twentieth century. This paper examines three particular songs (“Strange Fruit” by Billie Holiday (1939), “Mississippi Goddam” by Nina Simone (1964), and “Say It Loud”, “I’m Black and I’m Proud” by James Brown (1968)), as well as the broader historical context of each time period. Through the use of scholarly articles and monographs, biographies and autobiographies, pertinent media publications from the 1960s, and the songs themselves “lyrics, audio recordings, and audiovisual media” the reader will encounter powerful examples of African Americans standing tall against the violent and oppressive racism of their day, using music as a weapon to expose the gross injustices of segregation and empower their fellow brothers and sisters. Each song contains lyrics that, at first glance, seem vulgar and outrageous; deeper examination shows the artistsâ€™ ability to fashion a song into a social weapon. Each song was borne out of profound violence “lynchings, bombings, assassinations, riots” but the end result helped propel African Americans, slowly but surely, to a greater degree of equality. I have found a number of books discussing protest songs in general, but there seems to be a dearth of inquiries into the lineal connections between the African-American music and musicians in the decades leading up to the Civil Rights movement. I hope to use this as a first step in remedying this.

Red River, 3:50PM

Confluence or Coincidence?: Black Workers and the Long Seventies

Presenter: Charles Grand, History Graduate Student

Mentor: W. M. Dulaney

Abstract:

U.S. labor and African-American historiographies have highlighted quite well the often contradictory and reactionary role played by the country's trade union movement. In many instances, organized labor played a central role in establishing job segregation throughout a number of industries. Few studies, however, look specifically at how African-American workers challenged their union from within and without. This presentation, based on archival sources from the Chicago Historical Society and interviews conducted by the author, surveys and analyzes the struggle of African-American teachers in 1960s Chicago against both the city's Board of Education and the Chicago Teachers Union (CTU). These teachers drew from the tactical traditions of black unionists in the first half of the twentieth century (strikebreaking, wildcat strikes, and organizational separatism) to ultimately force the CTU to fight against job segregation in contract negotiations with the Board. In addition to insights gleaned from the historical narrative, a historiographical reading of the struggle in Chicago places these African-American teachers at the junction of a number of trends in black unionism: migration into the public sector, the expansion of black labor caucuses, and heightened militancy. In light of this convergence, historiographical conceptualizations of organized labor's tumultuous "long seventies" must be revised to emphasize the catalytic role of African-American workers in the rank-and-file rebellions of that era.

Red River, 4:10PM

Spirituality and Resilience Among African American Foster Grandparents

Presenter: Dorothea Ivey, School of Social Work Graduate Student

Mentor: Noelle Fields

Abstract:

The Foster Grandparents Program (FGP) allows volunteers, ages 55 and over, to stay active by serving children in their communities. Foster grandparents are role models, companions, and mentors to children with special needs. They serve 15 to 40 hours per week in locations such as hospitals, juvenile correctional facilities, Head Start centers, and daycare centers. Past research on the FGP focused on the history, design, and evaluation of the program but have largely ignored the practice and experiences of foster grandparents. African Americans (AA) are the second majority ethnic group that volunteers in the FGP. Spirituality and resilience are driving forces of strength and sustainability in the AA culture. The purpose of this study was to explore AA foster grandparentsâ€™ perspectives on spirituality and resilience while serving in the FGP. A phenomenological qualitative study was conducted at a nonprofit organization in Dallas County. Guided by the resilience theory, Eriksonâ€™s gero-transcendence theory, and the transpersonal theory, one-on-one interviews were conducted with ten AA foster grandparents. Results revealed emerging themes that thwarted intergenerational reciprocity, the extent to which generations can strengthen one another. Those emerging themes revolved around love, kindness, bonding, and a sense of purpose. The findings suggest that foster grandparents should glean from their spirituality when working with children without imposing religion. The findings also suggest that the children, in return, provides foster grandparents with a sense of purpose in daily life.

San Jacinto, 8:30AM

Exploring Modified Vitamin B1 as an Antibiotic

Presenter: Caitlynn Reeves, Chemistry and Biochemistry Undergraduate Student

Mentor: Frank W. Foss Jr.

Group Members: Diego Lopez

Abstract:

Antibiotic resistant strains of bacteria cause over 2 million infections a year and have been declared a major public health threat by The World Health Organization. If new antimicrobial agents are not discovered, the world may see a pre-antibiotic world again in which previously minor infections pose major health threats. To aid in the search for new antibiotics we synthesized novel antimicrobial agents by modifying pyrimidine precursors of B1 (thiamine), a critical molecule in certain bacterial metabolisms. In vitro assays showed several small molecules with promising bacteriostatic effects, indicating a potential for thiamine-related antibiotics in the future.

San Jacinto, 8:50AM

A Method to Selectively Analyze the Antibacterial Compounds of Natural Products

Presenter: Misty Martin, Chemistry and Biochemistry Undergraduate Student

Mentor: Kevin A. Schug

Abstract:

There is a critical need for new antibiotics to combat drug-resistant bacteria due to the inefficiency of available drugs to treat these pathogens. There is a wealth of literature showing the efficacy of drugs derived from natural products, however it can be tedious to selectively isolate the active compounds. Compounds of interest were extracted from a coral, Pseudopterogorgia acerosa, separated, and analyzed for antibacterial activity by a growth inhibition assay. A modified method of disc-diffusion involving a polymer screen functionalized with a tri-peptide, L-lysine-D-alanine-D-alanine, was used to isolate active compounds and assess the activity. Antibacterial activity was seen against all strains, with activity being greatest for methicillin-resistant Staphylococcus aureus (MRSA). While the modified disc diffusion needs further development, P. acerosa shows promise of antibacterial compounds that could potentially provide a basis for new antibiotics.

San Jacinto, 9:10AM

Utilizing multiple reaction monitoring (MRM) on Liquid Chromatography-Mass Spectrometry (LC-MS) for the quantitation of antibiotics selectively extracted by peptide affinity capture formats

Presenter: Yu-Sheng Sung, Chemistry and Biochemistry Undergraduate Student

Mentor: Kevin A. Schug

Group Members: Veronica B. Waybright, Dananjaya Kalu Appulage

Abstract:

Antibiotic resistance is a growing problem and requires new discoveries of chemical compounds from novel sources to combat resistant bacteria. Vancomycin's mechanism of action as an antibiotic binding to the L-lysine-D-alanine-D-alanine (Kaa) motif on Gram positive bacteria cell walls has long been established. Previous work from our group includes attaching the Kaa tripeptide to a mesh-screen to capture potentially active chemicals from natural products for mass spectrometry analysis. Limitations to this approach include insufficient amounts of target compounds extracted for further identification. The goal of this research is to evaluate vancomycin retention on a Kaa-based column format to validate the use of said column for antibiotic scouting. Functionalized and unfunctionalized silica were packed into empty solid phase extraction (SPE) cartridges and end capped. Mixtures of spectinomycin and vancomycin were introduced and the column washed with different solvents to remove nonspecific binding and recover captured compounds. The levels of vancomycin and spectinomycin were then quantified using MRM on LC-MS. Vancomycin had the lowest recovery with 6% on the Kaa functionalized column compared to the 95% recovered from the unfunctionalized column. This likely indicates that the antibiotic was strongly captured by the Kaa due to low recovery from the functionalized column. Establishing that functionalized particles are able to effectively retain vancomycin would allow them to be used for antibiotic scouting to enrich current libraries to combat antibiotic resistant bacteria. Future work entails the use of a stronger agent to more effectively recover the vancomycin from the columns for quantitation.Â

San Jacinto, 9:30AM

Nanotechnological Advancements in Early Detection of Metastatic Cancer

Presenter: Raja Raheel Khanzada, Bioengineering Undergraduate Student

Mentor: Samir 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. Metastatic cancer, often called stage 4 or advanced cancer, spreads beyond the originating organ to other organs. For breast cancer, metastasis can reach bones, livers, lungs and even the brain. Detecting metastatic breast cancer at an early stage is of great importance for defending other organs and prescribing specific treatments. The early detection of metastatic breast cancer can dramatically improve the diagnosis and treatment procedure which in turn can reduce the possibility of occurrence of advanced cancer and improve life expectancy. Currently there are only few effective tools for early diagnosis, however, these methods are costly and time demanding. In our research, metastatic breast cancer cells were captured on anti-EGFR aptamers functionalized plain glass surface along with Non-Metastatic cells. The Non-Metastatic cells do not show a pseudopod when captured. This proves to be a more effective diagnosis tool for early detection

San Jacinto, 10:30AM

Carbohydrate Analysis using Gas Chromatography Vacuum Ultraviolet Spectroscopy in Comparison with Gas Chromatography Mass Spectrometry

Presenter: Jamie Schenk, Chemistry and Biochemistry Undergraduate Student

Mentor: Kevin A. Schug

Group Members: Xiaojian Mao, Jonathan Smuts, Gabe Nagy, Nicola Pohl, Phillip Walsh, Peter Kroll

Abstract:

Carbohydrates, commonly called sugars, are a class of compounds abundantly found in nature and used as an energy source and for energy storage in the body. They are composed of three different atoms-carbon, oxygen, and hydrogen, which can be arranged in many different structures. The focus of this study included single molecule carbohydrates, like glucose and fructose, and two molecule carbohydrates fused together, like lactose and sucrose. While some of these are fine for consumption in moderate amounts, others have been linked to different types of illnesses and cancers. In previous research, carbohydrates have been analyzed by using gas chromatography mass spectrometry (GC-MS), but some sugars are very hard to differentiate and the results can be ambiguous. In this research, analysis was performed on various carbohydrates for the first time using gas chromatography vacuum ultraviolet spectroscopy (GC-VUV). This type of analysis has never before been performed for carbohydrates and the results were compared to a parallel analysis using GC-MS to understand which instrumental technique could differentiate carbohydrates most effectively. The GC-VUV was able to identify each carbohydrate with a higher percent match from the library, while the GC-MS was able detect the sugars with a higher sensitivity. The GC-VUV is able to better differentiate between five carbon membered sugars, which are especially difficult for the GC-MS to differentiate. Overall, the future use of GC-VUV in carbohydrate analysis can provide less ambiguity for the identification of sugars. This has significant merit for improved determinations in biology, nutrition, and biochemistry.

San Jacinto, 10:50AM

DPLG4: from being a genomic parasite to serving novel host functions

Presenter: Sophia Le, Biology Undergraduate Student

Mentor: Esther Betrán

Group Members: Cedric Feschotte / Diwash Jangam

Abstract:

Transposable elements (TEs), also called “jumping genes”, are genetic units that are capable of moving from one location to another in the genome. In almost all living organisms, TEs occupy a significant percentage of the genomes. TEs are genomic parasites that are mostly detrimental to the hosts because of their ability to disrupt genes and regulatory sequences upon insertion. Sometimes, TE proteins are recruited by host and acquire new functionsâ€”this process is called molecular domestication. Although there have been quite a few domesticated TEs described, only a handful have been functionally characterized. In this study, the function of a PIF/Harbinger derived gene (DPLG4) is being investigated. We have used RNA interference (RNAi) in somatic cells that should deplete the RNA produced by DPLG4 and the effects in viability and fertility have been studied. From our experiments, we observe lower viability and male sterility when this gene is depleted. The number of DPLG4-depleted adult flies was significantly lower than the control and DPLG4-depleted male flies did not produce any progeny. Testis of these male flies are abnormal, specifically, the spermatids do not individualize into mature mobile sperm cells. This study shows that genes from parasitic elements can be recruited to perform novel host functions.

San Jacinto, 11:10AM

Increased Temperatures and Changing Arctic Insect Species Composition

Presenter: Fernando Hernandez, Biology Undergraduate Student

Mentor: Laura Gough

Group Members: Ashley Asmus, Jeff Demuth

Abstract:

Arctic temperatures have risen at higher rates than the global average, with the period from October 2014 to September 2015 being amongst the warmest on record. Warmer temperatures are increasing plant productivity and changing plant species composition in arctic tundra. Altered plant species composition is expected to change the composition of Arctic animal communities, but little work has been done on the subject. We studied the insect community response to a nine-year fertilization gradient experiment at the Toolik Field Station in northern Alaska that mimics an increase of greenness and plant productivity in experimental plots. We demonstrated that as plant productivity increased, diversity decreased initially, but increased as we approached the latter levels of our fertilization gradient. Abundance, however, increased slightly and only began to decrease as we approached the extremes of our fertilization gradient. These results suggest that arctic insect communities are sensitive to changes in plant productivity, but that higher levels of production may lead to a less diverse animal community, at least in the short term.

San Jacinto, 11:30AM

Understanding the relationships between urbanization, nitrogen deposition, and plant growth using a North Texas native species, little bluestem (Schizachyrium scoparium)

Presenter: Zane Winer, Biology Undergraduate Student

Mentor: Laura Gough

Group Members: Michelle Green

Abstract:

As increasing human populations coalesce into urban centers, studying the effects of urbanization on local ecosystems has become critical in preserving native flora and fauna. One way in which urbanization alters urban environments is through addition of nitrogen to the ecosystem. Nitrogen additions to urban areas include emissions from industry, agriculture, husbandry, and biofuel use. Some of this nitrogen enters the atmosphere and is deposited to the ground through precipitation (nitrogen deposition). Greater concentrations of atmospheric nitrogen can have long lasting and damaging effects on native plants including direct toxicity and increased sensitivity to secondary stresses. In an effort to study the effects of urbanization on North Texas prairies, the dominant grass little bluestem (Schizachyrium scoparium) was planted at six locations of varying urbanness. The number and length of both reproductive and nonreproductive grass shoots were catalogued, and nitrogen deposition was collected at each site from April 2014 to September 2015. Our results show that there is no direct relationship between urbanness and nitrogen deposition. Furthermore, no correlation was found between nitrogen deposition and number of shoots, size, or reproductive output of the plants. This study was the first to measure nitrogen deposition in North Texas, and our results suggest nitrogen deposition is not negatively affecting the growth of little bluestem in North Texas. Further research should be conducted to expand our understanding of the relationships between urbanness, land use (residential/industrial/natural), and nitrogen deposition.

San Jacinto, 1:30PM

Exploring the Undergraduate Experience of Black Students at an Urban, Predominantly White Institution: Using Concept Mapping to Examine Student Success

Presenter: Kandra Jones, Psychology Undergraduate Student

Mentor: Schnavia Smith Hatcher

Abstract:

The purpose of this study is to clarify two issues: indicators of success for Black students at a predominately white institution (PWI) and service areas of care that will help participant at the urban university. This study sought to find if Black students believed that factors such as racial identity, social capital, psychological adjustment, and academic achievement shaped their experiences at a university. The study used concept mapping methodology with thirteen students that attended an urban PWI. Eleven clusters were developed from the 103 statements generated by the students to the prompt: "What is one specific thing that will facilitate student success for you and your peers at the university?" These clusters consisted of statements that were frequently sorted into like categories by the students. The students also rated all statements on their importance and feasibility. Examples of statements provided to ensure success were: free tutoring, black faculty, mentoring, and unity amongst the black student organizations. The students generally ranked statements that involved self-actions as important and statements that involved the university providing resources as less feasible. The finding from this study provided insight on what the Black students believed they needed to facilitate success in college and allowed for their voices to be heard so that they can experience success at a PWI.

San Jacinto, 1:50PM

Rare Map Security: the ongoing security challenges facing rare map and document collections

Presenter: Virginia Morris, History Undergraduate Student

Mentor: Imre Demhardt

Abstract:

In June 2005, libraries and rare document collections were shocked to learn that a trusted rare maps dealer, Edward Forbes Smiley III, had admitted to stealing ninety-seven rare maps and atlases from libraries around the world. Smiley had stolen maps from such prestigious institutions as Yale, Harvard, and the British Library. Shockingly, in most cases, the institutions he victimized were unaware they had been robbed until they were contacted by the FBI. In the ensuing investigation, three significant areas of concern became evident. The rare map community faces challenges in cataloguing and inventory, institutional credibility, and proper identification. Although many of these concerns could also apply to rare documents in general, rare maps face specific security challenges not shared by rare books, manuscripts, or other documents. Cataloguing specifically poses a problem as rare maps are frequently located inside of rare books and may be overlooked. Thus while many of the security concerns are similar to those of rare documents at large, rare maps require a separate discussion because of their unique nature. Â Using the Smiley incident as a case study, this paper identifies and examines three areas of concern in rare map security, discusses improvements in security that have been implemented since 2005, and makes recommendations for the continued improvement of rare map security in the future.

San Jacinto, 2:10PM

Broken Identity: The Life and Hardships of Cynthia Ann Parker

Presenter: Jennifer Schoen, History Undergraduate Student

Mentor: Gerald Saxon

Abstract:

This paper centers on the life of Cynthia Ann Parker, a frontierswoman, who was a victim of childhood abduction amongst the Comanche Indian tribe in Texas in the nineteenth century. Throughout her twenty-five year ordeal, she became fully assimilated within her tribe and forgot her Anglo culture. She was recaptured by the Texas Rangers and forced back into a society in which she had become completely alienated from. Throughout this paper I incorporate both primary and secondary sources that divulge the details of Ms. Parker's life. In particular, I include multiple firsthand accounts of her capture and recapture from books written by James T. Deshields and James W. Parker, a blood relative. I use multiple secondary sources including reputable biographies and scholarly articles. The research conducted using these sources has led me to the conclusion that Ms. Parker was truly a victim of displacement and cannot be held accountable for the atrocities forced upon her. This conclusion is significant because it gives a perspective of life from both the settler point of view and the Native Americans as well. There is a longstanding negative bias from the Anglo perspective of Native Americans. Although it began in chaos and terror, Cynthia's story merges both worlds together and sheds a new light on Native American and settler relations. Although considered a victim of Stockholm syndrome, it is not hard to see why someone would sympathize with Cynthia and understand her suffering.

San Jacinto, 2:30PM

An Exploratory Qualitative Assessment to Identify Skills-Gap Perceptions Among Graduate Students, Early Work Professionals, and Industry Leaders in the STEM Fields

Presenter: Aiesha Calhoun, Psychology Undergraduate Student

Mentor: Nicolette P. Hass

Abstract:

The United States STEM workforce in underrepresented by unprepared graduates who are entering the STEM field unskilled. The purpose of this research was to assess the potential skills gap between academia and the work industry. In addressing this concern a set of interview questions were posed to three groups of participants (graduate students, early career participants, and industry leaders) in order to better understand characteristics that may be causing the disconnect. The results of the research indicated that a skills gap did exist due to the lack of pairing between the education system and the work field. As Dr. Seymor Papert of the Masechusetts Institution of Technology has stated, "Knowledge is only part of understanding. Genuine understanding comes from hands-on experience." After assessing the results, the suggested solution to this problem is to create a contract that will produce a partnership between academia and the work industry to equip STEM students with the necessary skill sets to prepare them for the work field which will also create a better skilled work force.
Keywords: STEM (science, technology, engineering, mathematics), skills-gap, graduate students, early career professionals, industry leaders, academia, industry, perceptions, preparedness, success, technical skills, practical skills

San Jacinto, 3:10PM

Logos for President: A Look at the Logos for the 2016 Presidential Primary Candidates /

Presenter: Esther Kentish, Communication Undergraduate Student

Mentor: Crystal Elerson

Abstract:

Modern organizations and political candidates attempt to use logos to identify themselves, connect with their audiences, and give their supporters a symbol to rally behind. In this paper, I examine the logos for Democratic and Republican party candidates for each party's nomination for President of the United States in the 2016 election. To analyze these logos, I researched a number of well-known theorists in technical communication such as John McWade, Richard Sheehan, Laura J. Gurak, among others. According to Mike Markel, all communication falls under the auspices of technical communication. Technical communication thus comes in many forms, but one consistent factor is design. Design includes all visual elements of various kinds of communication from large projects to seemingly small items such as logo design. This research is beneficial because it advances the understanding of how technical communication, especially its design aspect, is a powerful tool for political campaigns. In this paper, I analyze the logos of sixteen early presidential candidates including: Hillary Clinton, Bernie Sanders, Jeb Bush, Ben Carson, Ted Cruz, and Donald Trump. I specifically examine the following logo elements: shape, typography, and color theory.

San Jacinto, 3:30PM

Comparative Analysis of MSA to LSA Transitional Technologies in the Cape Floral Region, South Africa

Presenter: Sara Watson, Philosophy and Humanities Undergraduate Student

Mentor: Naomi Cleghorn

Abstract:

The Early Late Stone Age (ELSA) Industry of southern Africa shows a marked increase in regional variability compared to the Middle Stone Age (MSA) industries that preceded it. The ELSA dates between 50-20 kya (thousand years ago), a period climatic instability and social fragmentation between increasingly isolated populations. The archaeological record suffers a severe reduction in the number of occupied sites during this time, resulting in a poor understanding of the ELSA industry and its associated developments in behavioral complexity. Previously only two sites provided information on this period of the late Pleistocene in the Cape Floral Region of southern Africa, but the recent addition of a new site, Knysna Eastern Heads Cave 1 (KEH-1), bridges this gap in the record and provides a new perspective on the lives of humans living along the now submerged continental shelf. By comparing the lithics found here with those from the published literature on Boomplaas and Nelson Bay Cave we can expand our understanding of the technological industries present during the early LSA and their evolution from the MSA, along with the potential of raw material analysis to reveal insights into the mobility patterns of late Pleistocene forager populations of the southern African coast and the development of new production techniques based on raw material quality and availability.

San Jacinto, 3:50PM

The Consequences of Urbanization and Nitrogen Deposition on Little Bluestem (Schizachyrium scoparium)

Presenter: Margaret Park, Biology Undergraduate Student

Mentor: Laura Gough

Group Members: Michelle Green

Abstract:

Urban areas are a major source of nitrogen pollution, stemming from fossil fuel emissions, storm water, wastewater, and fertilizers. These nitrogen additions have altered the nitrogen cycle in urban areas, which may have a negative effect on local flora. Plants experiencing excessive nitrogen levels may experience lowered levels of stress tolerance and the thinning of leaf tissue, resulting in greater water loss and lowered drought resistance. For the future of environmental conservation efforts, it is important to understand how native plants respond to nitrogen addition. Little bluestem (Schizachyrium scoparium), a native drought-tolerant prairie grass, was grown at six sites of varying urbanness in North Texas during the spring and summer of 2015. Nitrogen ions in precipitation were also measured at each of these sites. Little bluestem was used as a bio-indicator to measure the impacts of urbanness and nitrogen additions on plant growth and reproduction. Plant size, biomass, and nitrogen content of the plants were measured. Preliminary results indicate no effect of urbanness or nitrogen addition on the height of the plants. However, the number of shoots increases with increasing urbanness. Although the literature suggests that increased nitrogen concentration should affect plant growth, no effects were found in little bluestem. The positive relationship between urbanness and plant shoots indicates that there may be other factors related to urbanness that are affecting plant growth. Further research should explore the interactions between plant growth, nitrogen deposition, and other pollutants such as ozone.

San Jacinto, 4:10PM

Mountain Creek Lake, TX: A Site for Environmental Investigation and Public Awareness

Presenter: Michelle Grier, Earth and Environmental Sciences Undergraduate Student

Mentor: Joniqua Howard

Group Members: Jamie Vineyard, Graduate 12/15, Micalah Spenrath Undergraduate, Kierstin Reed-Graduate 12/15 Dr. Ashanti Johnson

Abstract:

Mountain Creek Lake (MCL) is located in Grand Prairie, TX, just north of Joe Pool Lake and surrounded by a residential community, a university, mega church, several parks, and industries (both abandoned and active). The lakes principal use is to serve as a reservoir for Exelon Power Plant; however, it also acts as a popular site for recreational and subsistence fishing. According to studies conducted by the U.S Geological Survey (USGS) and the Environmental Protection Agency (EPA), MCL, its aquifers, soils and sediments have been contaminated with extremely high concentrations of legacy waste (such as DDT, chlorinated solvents, and heavy metals) from the formerly active Naval Weapons Industrial Research Plant (NWIRP) and the Dallas Naval Air Station that once occupied lands adjacent to the lake. These concentrations exceed the maximum contamination levels and are in fact deleterious to human health. Since 1996, the Texas Department of Health Services has placed fish possession and consumption warnings and now advisories on Mountain Creek Lake. However, there is no informational signage at the site and limited to no data on the current conditions of the lake exist. The purpose of this study is to determine the knowledge, perception, and the awareness of the public regarding fish consumption advisories for the area and the impacts of contaminants as well as determine water quality conditions.

San Saba, 8:30AM

Trans* Disabled Identities

Presenter: Taylor Long, Philosophy and Humanities Undergraduate Student

Mentor: Sarah Rose

Abstract:

When Jay Kallio was fifty-four years old, he was surprised to hear that he had breast cancer. Kallio, already living with multiple disabilities, had seen his doctor regularly, and underwent regular mammogram tests. He was even more surprised to belatedly learn of his diagnosis from a lab technician instead of his physician. After Kallio discovered he had breast cancer, his doctor called him and said â€œI have a problem with your transgender status." Delay in treatment caused Kallio to miss the ""therapeutic window" for his particularly aggressive form of breast cancer." Kallio experienced further discrimination for being transgender as his treatment progressed. Now terminally ill, Kallio depends on support from his queer community to survive. Kallio"s experience is not unique. One in five transgender people has been denied care by a medical provider. Despite decades of activism by the gay liberation and disability rights movements and the passage of laws such as the Americans With Disabilities Act of 1990, trans* disabled people like Kallio face discrimination and prejudice from normative medical, legislative, and criminal justice systems. This discrimination results in trans* disabled people receiving inappropriate medical treatment, the misgendering of trans*disabled people, and in trans* disabled people feeling isolated from their communities. This presentation will explain how and why trans* disabled people have been and are currently treated in the United States and will also connect trans* and disability identities using news stories and films, rhetoric of trans* and disability activists, legislative documents, and the National Transgender Discrimination Survey.

San Saba, 8:50AM

"Shell Shock" during and after WWII

Presenter: Nichole Sheridan, Philosophy and Humanities Undergraduate Student

Mentor: Sarah Rose

Abstract:

Ralph T Collier was medically discharged from the Navy in 1945 with a diagnosis of "psychological neurosis." In 1952 he was arrested for taking part in 18 months of KKK terrorism. Learning that he was diagnosed as "shell shocked," the judge commuted Ralph sentence, instead charging him $1,000 fine. Robert Lombard was diagnosed with neurosis in 1946, and when he felt he was "unable to control himself" he turned himself in asking to be put in jail, but instead of sentencing him, the judge arranged for Lombard to enroll in a psychiatric treatment center. These two stories illustrate the diverse ways in which officials, civilians, physicians, and fellow veterans debated the proper diagnosis, treatment, and potential "cure" of "shell shock" during and after World War II.Because of the long-standing stigma against those labeled with mental illnesses, shell-shocked veterans faced discrimination from the civilian world, unfavorable media accounts, and when seeking medical treatment after being discharged with mental disability. It raises the question of who set the standards of shell shocked at the time, cures, and how they reintegrated into society. This paper uses multiple newspaper and magazine archives from the New York Times and Dallas Morning News, books, ads, and medical journals will try to offer insight on the path that this diagnosis took throughout the 1940s and 1950s. It will also explain how the views went from a negative one, blaming the veteran, to a more acceptable one where they could get help from the surrounding community.

San Saba, 9:10AM

Stigma against mental disability in the workplace; how survivors can 'work like crazy'

Presenter: Travis Larson, Political Science Undergraduate Student

Mentor: Sarah Rose

Abstract:

Since the passage of the Americans with Disabilities Act, treatment of mental disability in the United States has improved. Canada's system of treatment has also evolved over the generations, but society's attitude toward mental disability hasn't Specifically, the way people with psychosocial impairments (such as anxiety disorder, obsessive-compulsive, or even schizophrenia) are treated in the American and Canadian workplaces has been very poor, as evidenced by instances of employment discrimination in the United States. My research was largely comprised of primary resources, for this best captures the reality and humanity of those who live with psychosocial impairments. Documentaries chronicling a community of "psychiatric survivors" in Ontario, testimonials from patients from both countries, and a case in our hometown of Dallas-Fort Worth: District Attorney Susan Hawk. By looking at these examples, it was easier to gain perspective on mental health and its treatment in both Canada and the United States. Research revealed that Canadian treatment places more emphasis on community involvement and work, whereas the workplace in the United States has been infiltrated by the stigma against psychosocial impairments. I argue that the stigma is, in many ways, more dangerous than the actual illnesses themselves. I also argue that although these impairments are seen as â€œdisabilities,â€ they play a large part in the eventual success and validation of those who experience them. In conclusion, my research calls for a more Canadian approach in the United States and attempts to answer the question: how do we continue to treat psychosocial impairments?

San Saba, 9:30AM

ABHORRENCE OR ADORATION?: A REEXAMINATION OF W.A. MOZART'S "HATRED" OF THE FLUTE AND TRUMPET /

Presenter: Kayleigh Miranda, Music Undergraduate Student

Mentor: Graham Hunt

Abstract:

Biographers and instrumentalists alike have speculated on Wolfgang Amadeus Mozart's opinion of the various instruments for centuries. Although some instruments appear to have been favored by the composer, others have not been so fortunate. It has been said that Mozart's hatred for the trumpet originated as a childhood phobia of the instrument, and that his opinion of the flute was a self-described "abhorrence." Through the careful analysis of scores, letters, and memoirs of those acquainted with Mozart, these myths can be effectively disproved. Despite the many circumstances which led researchers to believe and perpetuate these myths, the truth is that Mozart treated each instrument with the respect it deserved. Mozart's treatment of the trumpet in his compositions was unremarkable and quite standard for the time. Furthermore, Mozart seemed to have a fascination with the flute and incorporated it in his music in a way that was both beautiful and unexpected. This paper will reveal the actual motivation behind his works for trumpet and flute, and his methods for utilizing the instruments' unique abilities, while also compensating for their weaknesses. The study will first define the myths and their origins, examining the inaccuracies and assumptions therein, and in doing so negate the myths entirely. It will review the technical features of the two instruments and how their reputation was affected during Mozart's time. Finally, it will reveal Mozart's true feelings for the flute and trumpet through a musical analysis of his usage of the instruments.

San Saba, 9:50AM

Axellerating into Feminism

Presenter: Jennifer Cozad, Art & Art History Undergraduate Student

Mentor: Mary Vaccaro

Abstract:

Campbell's soup cans and comic book dramedies are some of the celebrated images within the Pop Art genre. While this art medium helped to make artists like Andy Warhol and Roy Lichtenstein household names, women Pop artists have gone mostly unappreciated and unknown, prompting the questions was there a female voice present within the Pop Art movement, and, if so, why has that voice been ignored within art history? Recent exhibitions have thrust women Pop artists to the forefront of the genre breaking up the previously male-focused, male-dominated canon. One such artist was Evelyne Axell. Evelyne Axell started her career as a Belgian model, film star, and television talk-show host. Becoming dissatisfied with the lack of creativity within the entertainment industry, she began a visual arts career that would lead to both critical acclaim and controversy. Through her works like Ice Cream and her Erotomobiles and Tarzan series, Evelyne Axell utilized various media to expose the overt sexualization of women in the advertising and film industries juxtaposed with the societal expectations of women. The implicit message of her works reveals the stereotypical dual roles that women are forced into within society: the Madonna versus the whore. While her images were striking, Evelyne Axell was initially critically panned as just another pretty face. With that in mind, Axell dropped her first name and embarked on an artistic mission to marry Pop Art techniques and unorthodox materials while exposing popular culture clichés about women and their place in society.

San Saba, 10:30AM

Deleting the Flagellar Protein FlaAC from the Genome of Vibrio cholerae

Presenter: Jessica Lilley, Kinesiology Undergraduate Student

Mentor: Karl E Klose

Group Members: Jesse Nyguen

Abstract:

Vibrio cholerae is the gram-negative bacterium that causes the human diarrheal disease cholera by colonizing in the host's small intestine, resulting in death if left untreated. This makes cholera especially deadly to third-world countries that do not have access to proper medical care. Colonization is aided by the use of the organism's single polar flagellum, which makes it extremely motile and able to push past the host's epithelial cells. The goal of the project is to remove the flagellum to create a non-motile, non-colonizing strain of bacterium. The flagellum gene segment, FlaAC, was removed from P Gem T Easy through the use of the three restriction enzymes NotI, XhoI, and NcoI. The insert was then ligated into the suicide vector PKEK 229 and then transformed into sm 10 lambda pir Escherichia coli cells. The mutant has been successfully grown on ampicillin-agar plates and proven through the use of gel electrophoresis because of the correct banding at 4018, 3691, and 675. Since the mutant has been created in E. coli cells, the next step is growing the mutant in wild-type V. cholerae cells and testing them for motility using motility agar. This mutant will help shed new light on the flagellar process for V. cholerae which can be used to effectively render it useless against humans through future works of creating a more effective and cheaper treatment for cholera.

San Saba, 10:50AM

Gas Chromatography Vacuum Ultraviolet Spectroscopy for Differentiation of Deuterated and Non-deuterated Compounds

Presenter: Courtney Weston, Chemistry and Biochemistry Undergraduate Student

Mentor: Kevin A. Schug

Group Members: Dr. Jonathan Smuts

Abstract:

Isotopically labeled standards have been used in mass spectrometry (MS) with noticeable distinction as important means to control the recovery and precision of quantitative analytical determinations. The trading of deuterium atoms, for atoms of hydrogen, increases the mass of a compound and allows it be easily differentiated from a non-labelled target analyte by a MS detector. With the development of a new vacuum ultraviolet (VUV) detector, which can also differentiate closely related compounds, the question was to understand whether MS methods that incorporated deuterated internal standards could be directly transferred to a VUV-based platform. The simple molecule benzene (C6H6) and its various isotopologues (C6H5D, C6H4D2, etc.), along with other common analytes and their isotopologues, were used to investigate this phenomenon. Samples were analyzed by gas chromatography and VUV spectra were acquired to determine how closely they matched. Results based on calculated sums of squares of residuals showed that while the addition of deuterium provides very minor changes in the shapes of spectra, when multiple deuterium atoms were added, some significant differences could be seen. A more comprehensive correlation analysis is currently being performed to understand the extent to which method transfer between detectors could be successful. This analysis is important because it can reduce the barrier to incorporating VUV detection into mainstream analysis where MS currently dominates.

San Saba, 11:10AM

A Mathematical Model of Recycling

Presenter: Amanda Patrick, Mathematics Undergraduate Student

Mentor: Benito Chen-Charpentier

Abstract:

Some policy makers have begun to form recycling programs in order to decrease the negative effects of waste buildup. In theory, collective effort of large scale recycling may help reduce the negative impacts of waste buildup, but there are many variables that play a role. As compartmental mathematical models have been previously used to study diseases, ideas and behavior, their application will be further applied to study recycling influence. The types of influences taken into account were recyclers influencing non-recyclers to recycle, recyclers influencing other recyclers to quit recycling, and advertisements influencing non-recyclers to recycle. The recycling population at UTA was modeled for constant and changing population. The average of population increase and decrease were calculated for the system with constant population to calculate stability, and for a more accurate representation, a linear equation was calculated for changing population. Surveys were used to calculate parameters for advertisement influence and social influence between recyclers and non-recyclers. Scenarios were compared by manipulating the parameters, and each system was solved for the values of recyclers and non-recyclers throughout time. The results showed that recycling discouragement could contribute to a decline in the proportion of recyclers over time even when advertisement influence is doubled. When general recycling influence between recyclers and non-recyclers was decreased, the proportion of non-recyclers was higher than the proportion of recyclers. This indicates recycling advertisements may have less of an effect on the number of recyclers than the negative effect of recyclers influencing other recyclers to quit recycling.

San Saba, 11:30AM

Arctic Mosquito's Abundance Enormously Increases Under Global Warming

Presenter: Thy Vo, Biology Undergraduate Student

Mentor: Laura Gough

Group Members: Ashley Asmus

Abstract:

The Arctic is an extremely sensitive ecosystem with a rapidly changing climate. Climate change will affect the arctic food web, but little is known about how land-dwelling animals, particularly insects, will respond. One of these insects, mosquitoes, is so abundant in tundra habitats that they influence caribou herd behavior. Previous laboratory research found that arctic mosquito growth rates and survival correlate positively with temperature. However, the effect of temperature fluctuations on natural mosquito populations in the context of other weather variables (like wind) is unknown. We counted mosquitoes from samples collected from four different sites of Arctic Alaska over 5 summers (2010- 2015). We hypothesized that the Arctic mosquito population positively correlated with warmer summers, and that the date when peak abundance occurred correlated with snowmelt timing. Mosquito peak population size greatly varied from year to year, but timing of the peak was similar, which was around July 1st. Surprisingly, the coldest year had the greatest mosquito abundance, likely because the previous year was hot and humid. This suggested that the mosquito population depends more on the weather from previous year than the current year. Our field study confirms previous laboratory findings and suggests that as the Arctic warms, mosquito populations will increase. This study is important because mosquitos are a pest and affect human population and animal lives.

San Saba, 1:30PM

Comparison of the Newbery and Bluebonnet awards in Children's Literature

Presenter: Kinsley Munoz, Curriculum and Instruction Undergraduate Student

Mentor: John Smith

Abstract:

Teachers are presented with an increasing amount of quality children's literature for their classrooms. The Newbery and Bluebonnet awards are two reputable awards that serve as resources for teachers in selecting books to use in their classrooms. This study sought to determine what features teachers could expect to find in either award, thus helping them narrow down their search for quality children's literature. The researcher found that there are not significant themes that present themselves within every winner of either award, but there are a few themes that cross both awards. The Bluebonnet award is chosen by children from an adult selected Master List (twenty nominees), while the Newbery award is selected solely by adults. The researcher looked at features including genre, text features, text length, readability, and interest level. The study found that the Bluebonnet award winners are usually lighthearted, shorter, and of lower readability and interest level. Their Newbery award winning counterparts are usually longer works with higher readability and interest levels, which deal with bigger issues. The differences that have been found among these books, coupled with the criteria for each award gives teachers an additional resource to use in the search for quality children's literature for their classrooms.

San Saba, 1:50PM

Cloistered Writers and Epistolary Correspondence in American Literature

Presenter: Hannah McKee, English Undergraduate Student

Mentor: Desiree Henderson

Abstract:

My research explores the ways in which individuals who have been physically or symbolically secluded from the world are able to have their voices heard through the act of letter writing. I will examine this topic within three works of American literature, Susanna Rowson's Sincerity, Alison Bechdel's Fun Home, and Alice Walker's The Color Purple. I contend that the increased agency that letter writing grants to the main characters in these works enables them to create presence in the form of their relationships with other characters or within themselves where there was a previous state of absence. I apply a women's and gender studies lens to examine the augmented agency that the main characters in Sincerity and The Color Purple acquire through the epistolary form in order to address how letter writing helped oppressed females throughout history to gain leverage and a voice. I also employ this same lens for the characters in Bechdel's Fun Home, as the narrator and her father are able to symbolically escape their seclusion and cloistered status regarding their sexuality through their epistolary correspondence. My analysis distinguishes between retrospective letter writing, which is not just a means of self-expression, and the use of the epistolary form for more meditative personal purposes. Ultimately, I conclude that the sentimental value and aura of intimacy contained in the epistolary form gives it an inherent ability to evoke presence, causing the epistolary genre to have a lasting impact throughout literature.

San Saba, 2:10PM

The Rise and the Fall of Hope and Disappointment in "Le vieux nègre et la médaille" and "L'exil selon Julia"

Presenter: Marcos Arellano Mendez, Modern Languages Undergraduate Student

Mentor: Severine Rebourcet

Abstract:

The Négritude movement strived to rehabilitate the black man in response to the alienation and racism that many indigenous people faced due to French colonization in their countries and in France. This movement was founded during the 1930's by Martiniquais Aimé Césaire, Senegalese Léopold Ségar Senghor and Guianese Léon Damas, who were all educated in France. As black students, they all felt isolated and marginalized. The Nègritude movement seeks to articulate and promote the political and cultural identity of the black man.

The critically acclaimed works inspired by this movement Le vieux nègre et la médaille (1956) by Ferdinand Oyono and L'exil selon Julia (1996) by Gisèle Pineau illustrate these impacts on the indigenous people of Cameroun and the island of Guadeloupe, now part of France, during the 20th century. These novels, examined through the themes of departure, return and distance, both physical and psychological, outline the exile and the day-to-day discrimination on the colonized inflicted by the French.

Upon careful literary analysis, the study reveals how the intent to assimilate the natives only turned into alienation and marginalization and that though the themes are the same in both books, their role is different, making Oyono's book a novel of disappointment and Pineau's that of hope. Through showing the adverse effects of French colonization, this project brings light to the issue of discrimination that still exists today.

San Saba, 2:30PM

Post-Tonal Form: Analytical Challenges in Shostakovich's String Quartets

Presenter: Jacy Pedersen, Music Undergraduate Student

Mentor: Graham Hunt

Abstract:

Analyses of post-tonal musical works typically employ 20th-century techniques to determine order and organization. These methods can define distinct sections or reveal underlying melodies that persist throughout. The application of classical analytical techniques, such as formal analysis, occurs less often. Expanding upon the work of Judith Kuhn, David Castro, and Michael Talbot, this paper will delve into the formal structures found in Shostakovich's String Quartets in order to present both in-depth and broad approaches to form, typical of classical pieces, in more modern music. The final movements of String Quartets 3, 5, 9, and 10 all demonstrate traits of a rondo form: a musical form that Â alternates between an A section, or refrain, and other contrasting episodes, or themes. The stand-alone nature of these sections and the return of the refrain are defining features of a rondo that have a tendency to be obscured or combined with elements of other types of forms when approached in 19th- and 20th-century music. Similar to the studies of other disciplines, the question of how "portable" an analytical technique can be when applied to works across differing styles and eras rises. The samples chosen for this paper lay the groundwork for determining how form is approached and utilized by Shostakovich in context, to not only to his other works, but also to classical pieces with similar form.

San Saba, 3:10PM

Beauty and the Beast: A Tale Before Its Time

Presenter: Mikayla Hixon, English Undergraduate Student

Mentor: Kathryn Warren

Abstract:

In my essay I examine at the original telling of Beauty and the Beast by Gabrielle-Suzanne Barbot de Villeneuve in light of the Romantic movement (approximately 1800-1850 CE). Villeneuve's novel was originally published in 1740 CE, over half a century before the Romantic movement began. My intent in this study was to see how much a text outside the historical bounds of a defined literary movement might participate in that particular movement's philosophies and defining literary practices. After examining the combined extraordinary and ordinary natures of the novel, the character of the Beast, and the use of self-reflection as a self-creating process, I submit that there are in fact strong connections between this children's story and the literary movement that came 50 years after it. In this one novel, Villeneuve participates in the romantic writings and philosophies of William Wordsworth, Samuel Taylor Coleridge, Lord Byron, and John Keats â€“ and that's just what I have found. I ask that this research be considered for the ACES symposium so that we as a community might begin to further understand what theorists and philosophers like Hans-Georg Gadamer tried to tell us: historicality is only one means by which we might interpret and understand a text, but to limit a text to the time period in which it was written is to limit understanding. Let us explore our own potential blind-spots to the ways in which we study and categorize literary study and interpretation.

San Saba, 3:30PM

Speaking Your Truth; a Response to Critics of Sherman Alexie

Presenter: Felicia Brice, English Undergraduate Student

Mentor: Desiree Henderson

Abstract:

The Native American writer Sherman Alexie, author of many poems, short stories, and novels including Reservation Blues and The Absolutely True Diary of a Part-Time Indian, has provoked extensive controversy, particularly within the Native American community. The debates around his work stem from Alexie's satirical, ironic, and postmodern writing style, as well as his frank portrayal of life on the reservation. In this essay I address one critic in particular, Gloria Bird, who criticizes Alexie not only for his style of writing but also for his depiction of alcoholism on the reservation, claiming that Alexie reinforces the negative "drunken Indian" stereotype and sells out his tribe in order to entertain white readers. I refute these claims by analyzing the portrayal of alcoholism in Alexie's popular but controversial YA novel, The Absolutely True Diary of a Part-Time Indian. In my analysis I strive to defend Alexie's right to individuality in both his satirical style of writing as well as his less than popular opinions of why it may be beneficial for other Native Americans to leave the reservation in order to live better lives. I conclude that these debates around Alexie's writing prove that no one person can dictate how another perceives their world or how they choose to tell their story.

San Saba, 3:50PM

Gender and Unity in "Tintern Abbey"

Presenter: Allison Piercy, English Undergraduate Student

Mentor: Kathryn Warren

Abstract:

The concept of self-invention that flourished in the Romantic period has since proved a constant area of critical study, particularly in the assessment of William Wordsworth's "Tintern Abbey" and its final stanza, in which the poet encourages his sister Dorothy's own self-invention. In a critical debate that buzzes with agitations about misogyny that risk oversimplifying the dynamics of gender, I challenge the current critical trends that argue for William's exertion of masculine control over and condescension toward Dorothy, which are too often based almost solely on theory and speculation. Through close readings of "Tintern Abbey," Dorothy Wordsworth's own poetry, other writings furnished from the siblings' lifetime, and convergent critical perspectives, I propose that, in the Wordsworths' forays into self-invention, the siblings are not only equal to each other in personhood but unified into one shared, supportive, and respectful state of selfhood that defies the separation of gender. This perspective provides a response to critics' current tendencies to overgeneralize gender roles based on time period and tenets of their field of study and introduces a take on self-invention that interweaves and transcends the boundaries of gender itself, resulting in a view of the Wordsworth siblings that is perhaps more representative of the authentic, intimate relationship they shared.

San Saba, 4:10PM

Orientalism and First Wave Feminism: How Early 20th Century American Dancers Utilized Orientalism to Break Free from Victorian Sexual Morality

Presenter: Tracey Peacock, Theater Arts Undergraduate Student

Mentor: Amanda Jackson

Abstract:

Orientalism played an influential role in the development of American dance in the early twentieth century allowing dancers to free themselves from Victorian sexual morality. American dancers, particularly Maud Allan, Isadora Duncan and Ruth St. Denis, found inspiration in Orientalism as they searched for female empowerment.Incorporating elements of the "mystical East" into their performances these dancers embodied what dance could become for American audiences. Allan, Duncan and St. Denis each developed connections to the female architype, merging religion and sexuality, transforming what was previously considered vulgar into spiritual high art. This created a catalyst for these dancers to gain power of self by usurping the patriarchy through the symbolism and ritual of the Eastern Other.My thesis addresses the connections between the Western concept of Orientalism and first wave feminism within American dance in the early twentieth century. By examining the influence of Orientalism employed by early American dancers Maud Allan, Isadora Duncan and Ruth St. Denis, I argue that Orientalism allowed these dancers to integrate the guise of Eastern deities and Western religious theme in the creation of art while challenging the established Victorian sexual morality in a push to gain personal self-power.

Poster Number: 1

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Data Driven Decision Making to Predict the Presence of Heart Disease

Presenter: Nicholas King, Computer Science Engineering Graduate Student

Mentor: Aera Leboulluec

Group Members: Andre Leboulluec

Abstract:

Diagnosing heart disease in patients is a difficult challenge that doctors face. Heart disease encompasses a range of cardiac issues and continues to be the leading cause of death in the United States and around the world. Fortunately, a wealth of data is available in the healthcare system that can help uncover hidden relationships and trends in patients' attributes. In this study, the dataset utilized comes from the Cleveland Clinic Foundation that features data on 200 patients, each with 12 attributes. The dataset is cleaned and missing values are imputed. Then the presence of heart disease is predicted in patients by building a model using the multinomial logistic regression. The overall purpose of this study is to accurately predict if a patient has heart disease and what type out of four different types. The significance of this research cannot be overstated. Poor clinical decisions often lead to a failure in quality care. This endangers patients and also wastes time, money, and hospital resources. Data driven decision making that is developed in this study can lead to improved accuracy in heart disease diagnoses, allowing for more effective treatment, and give alternatives to future decisions based solely on a physician's own intuition and experience.

Poster Number: 2

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Stable isotope composition of Oligocene-Pliocene pedogenic and groundwater carbonates in the Texas coastal plain: Implications for diagenesis and paleoclimate

Presenter: Conan Godfrey, Biology Graduate Student

Mentor: Dr. Majie Fan

Abstract:

The Oligocene-Pliocene sedimentary rocks in south Texas record past climate and environment in a low altitude region. The Catahoula, Oakville, Fleming, and Goliad formations contain abundant pedogenic and groundwater carbonates which may be useful in reconstructing paleoclimate and paleoenvironment if primary isotopic compositions are preserved. We integrate field observations, studies of carbonate texture on thin sections, and stable isotope composition of micritic and sparry carbonate in order to evaluate diagenesis. We then use the Â Î´18O Â and Î´13C values of micritic pedogenic and groundwater carbonates to reconstruct the paleoclimate and paleoenvironment in south Texas during the last ~40 Myr. The pedogenic carbonate nodules and laminar horizons are micritic, but contain abundant vugs and veins filled with calcite spar. The groundwater carbonate cement is composed of microsparry calcite. The lack of isotopic variation between spar and bulk carbonate, and the constant oxygen isotope values through time imply that prevalent late diagenesis may have influenced oxygen isotope composition, or the late Cenozoic global cooling signal was buffered by other regional climate factors. The Î´13C data suggest calcite spar formation during late diagenesis, but the micritic carbonate recorded original paleoenvironment information. In which case, the observed increase in Î´13C values may reflect global expansion of C4 plants during the late Miocene. Future work will focus on high-resolution sampling of micritic carbonate for stable isotope composition analysis in order to fully evaluate diagenesis, and collecting stable isotopic compositions of micritic carbonate to build a paleoclimate record in the Texas coastal plain.

Poster Number: 3

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Police Need for Control Over Others and Psychopathic Tendencies Explain Poor Police Performance

Presenter: Audrey Snowden, Psychology Graduate Student

Mentor: Dr. Daniel S. Levine

Group Members: Wyn Taylor

Abstract:

This study was conducted in order to investigate whether the personality trait psychopathy (impulsivity and aggression) would explain the relationship between need for control over others and police officer's disciplinary write ups. Police officers from the surrounding Dallas/Fort Worth metroplex completed a few surveys: The Need for Control Scale, The Dark Triad, and demographic questions assessing how many times they have been written up (disciplined for poor police performance). Mediational analysis revealed a significant indirect effect of need for control on police officer's write ups through the personality trait psychopathy. These results indicate that police officers who feel like they need to have control over others may act more impulsively and aggressively which in turn, may cause them to be written up for poor performance more often. These results may help explain poor police decision-making which is important due to the increase in police shootings of unarmed civilians.

Poster Number: 4

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

ClaimBuster: An Automated Live Fact-Checking Platform

Presenter: Naeemul Hassan, Computer Science Engineering Graduate Student

Mentor: Chengkai Li

Group Members: Mark Tremayne

Abstract:

Politicians and media figures make claims about “facts” all the time. Professional fact-checkers can often expose claims which are false, exaggerated or half-truths. For example, one of the Republican candidates Donald Trump claimed that Mexico doesn't have birthright citizenship, and Americans are the only ones to have it; PolitiFact.com rated this factual claim as “False.” Technology, social media and new forms of journalism have made it easier than ever to disseminate falsehoods and half-truths faster than the fact-checkers can expose them. This “gap” in time and availability limits the effectiveness of fact-checking. We are developing an automated live fact-checking platform named ClaimBuster (http://idir.uta.edu/claimbuster) which aims to monitor live streams, websites and social media to catch factual claims, detect matches with a curated repository of fact-checks, and deliver the matches instantly to viewers. For professional fact-checkers, ClaimBuster will suggest new claims worth checking and provide computational tools which help the fact-checking process. Major components of the platform are- text mining, big data analysis and collaborative fact-checking. ClaimBuster has covered all democratic and republican debates so far for the 2016 Election. Closed captions of these debates on live TV broadcasts are fed to ClaimBuster, which instantly scores each sentence and posts top-scored ones to http://twitter.com/ClaimBusterTM. Post-hoc analysis indicates a highly positive correlation between ClaimBuster and professional fact-checkers in deciding which claims are check-worthy.

Poster Number: 5

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Identification of prenylome by chemical oxidation and CID and ETD tandem mass spectrometry

Presenter: A.D.A. Shahinuzzaman, Chemistry and Biochemistry Graduate Student

Mentor: Saiful Chowdhury

Group Members: Ruchika Bhawal

Abstract:

Protein post translational modifications (e.g. farnesylation and geranylgeranylation) govern cellular localizations of certain proteins. We recently reported that CID of oxidized peptides demonstrates signature fragment ions which are selective to the mass of the modified prenyl groups. Here, we demonstrate that CID and ETD mass spectrometry of modified prenyl peptides can unambiguously identify the prenylation sites in proteins. Synthetic small peptide, REKKFFCAIL, in 1:1 molar ratio with trans-farnesyl bromide dissolved in 1 mL of 7M ammonia in methanol adds a farnesyl group to the cysteine sulfhydryl group via a thio-ether bond. This was confirmed by m/z at 1459.09 in MALDI-QIT-TOF-MS. The farnesyl peptide was then reacted with 3% H2O2 to generate a mono-oxidized thio-ether bond. The farnesyl peptide was reacted with m-chloroperoxybenzoic acid (mCPBA) to generate several epoxy groups in the peptide. CID-MS/MS fragmentation for REKKFFCAIL (epoxyfar)AIL confirmed variable epoxy modified prenyl peptides. MS/MS of all epoxy-prenyl peptides leads to a signature peptide signal at m/z 610.95 ((M+2H-RSOH)2+). ETD MS/MS generated c and z ions without significant loss of signature fragment and gave full sequence coverage of the modified peptides. Other type of prenylation (e.g. geranylgeranylation) were also performed, analyzed and we observed similar results. CID in MALDI-QIT-TOF-MS also validates this behavior of fragmentation. We have already performed CID-ETD fragmentation for GluC digested prenylated protein KRas, and we are going through data analysis now. Once this data is confirmed, we will apply this method to study large scale prenylation in activated macrophage cell lines

Poster Number: 6

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

A novel approach of water surface mapping using elevation and intensity of LiDAR data

Presenter: Partha Acharjee, Electrical Engineering Graduate Student

Mentor: Vekat Devarajan

Abstract:

Detection of water-body boundary is vital for cartography, environmental study, designing sustainability program etc. LiDAR-based remote sensing algorithms can provide practical solutions of water surface mapping for large areas. Geophysical properties of water and optical properties of laser returns from water surface can simultaneously be exploited for water-body detection and hydro breakline generation using LiDAR technology. Therefore, a new algorithm is proposed utilizing these optical and physical properties such as high absorption rate, specular reflection and local flatness as key characteristics of water surface. The method was proposed based on three key characteristics of inland water body. First of all, it can be safely assumed that at least a small part of the water surface has drop-out because of specular reflection. Second, water surface is comparable flat than water-land interface. Finally, LiDAR returns from water surfaces are more likely to have very low (absorption) or very high intensity (specular). It is observed that these key features are very useful to successfully detect water-bodies in both rural and complex urban scene. Results for different dataset from both rural and urban areas are also reported. From careful visual inspection on large areas, it is clear that the proposed method correctly detects water-bodies of different sizes and shapes e.g. rivers, small river branches, lakes, ponds, reservoirs etc. Furthermore, computational time is significantly low compared to existing reported algorithms. Therefore, the proposed method is a fast and reliable tool for hydro-breakline generation from large scale LiDAR dataset.

Poster Number: 7

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Humps, Bumps and Turtles - Traffic calming solutions

Presenter: Athena Seaton, Urban Planning Graduate Student

Mentor: Ardeshir Anjomani

Abstract:

Physical design measures on roads are originated for the intention of slowing down or reducing motor-vehicle traffic to improve safety. These measures are introduced for the safety of all road users, particularly pedestrians and cyclists. Urban planners and traffic engineers initiate measures such as speed humps, speed bumps or rumble strips to reduce accidents, noise, vibration, pollution and crime. Slower vehicles do save lives however; there are special considerations when initiating any of these measures. Speed humps, bumps and textured pavement are considered vertical deflection methods - design features which are raised above the roadway. The differences are in their geometry. If incorrectly planned or implemented, vehicles traveling at higher speeds will experience a severe jolting effect and damage to the vehicle. Due diligence is required regarding the type of street, speed limit, and costs. In addition, there are also special considerations for emergency vehicle passage, drainage and snow removal and signage. Research results indicate that traffic calming measures can have a limited impact on the average driver speed. Traffic calming measures address real problems and meet several criteria when implementation. Traffic calming measures are effective. They are sometimes referred to as “silent policemen.” Urban planners and engineers often struggle to decide what type of traffic calming strategy should be installed to address concerns from the public and within their field. The intent of this research is measure the effectiveness of these traffic calming strategies and utilize the correct design traffic calming measure when determining road conditions.

Poster Number: 8

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Radiogenic strontium as a potential fingerprint for determining the provenance of dissolved solids associated with hydraulic fracturing activities in the Barnett Shale, Ft. Worth Texas

Presenter: Richard Goldberg, Earth and Environmental Sciences Graduate Student

Mentor: Dr. Elizabeth Griffith

Abstract:

Over the last decade there has been a dramatic increase in unconventional hydrocarbon drilling utilizing hydraulic fracturing to extract oil and gas. The Barnett Shale in north central Texas has been a signifacant contributor to this increase in unconventional production of natural gas. Potential environment contamination from hyraulic fracturing and associated activities is a topic of current debate. Concerns include the presence of hazardous chemicals in the fracturing fluid and flowback water, which contain high amounts of total dissolved solids (TDS), acquired from interaction with the target formation itself or brines within the formation. Methods need to be developed to determine if a particular contaminant is present as a result of anthropogenic influences or natural sources. A flowback sample from hydraulic fracturing activities, along with water samples from private drinking wells and leached solutions from Barnett Shale samples will be analyzed to determine 87Sr/86Sr and total strontium concentrations. In isolation, analyses of Sr concentrations are difficult to attribute to a particular origin, but it is expected that 87Sr/86Sr will show unique values depending on the sample's source. In this way, 87Sr/86Sr can be used as a fingerprint for the provenance of dissolved solids in a sample. A contaminant, such as flowback water that is carrying a unique radiogenic signature, can then be compared to a suspected, contaminated surface or groundwater sample and used as a tool to potentially attribute or dismiss a claim that hydraulic fracturing activities contributed to a contamination event.

Poster Number: 9

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Liquid Chromatography Mass Spectrometry Method Development for the Separation, Detection and Quantitation of Formyl Peptides in Biological Fluids.

Presenter: Dananjaya Kalu Appulage, Chemistry and Biochemistry Graduate Student

Mentor: Kevin A Schug

Abstract:

Formyl peptides are short chains of peptides that have been modified (N-formulated methionine) as a result of a specific biological process. These are released when there is a damage to the cells and therefore are included in the class of molecules called damage associated molecular patterns (DAMPs). According to the literature, these formyl peptides are associated with Osteonecrosis, or bone cell death. This study focuses on development of a liquid chromatography mass spectrometry method for the separation, detection, and quantitation of formyl peptides present in biological fluids including blood plasma and bone necrotic fluid. Several different formyl peptides were obtained and separation, detection, and quantitation methods were developed. Separation methods were developed using Raptor biphenyl (2.1 x 100 mm, 2.7 Âµm) column with mobile phase A (Water + 0.1% formic acid) and mobile phase B (Methanol + 0.1% formic acid). Multiple reaction monitoring (MRM) was used for the detection of formyl peptides using Shimadzu 8050 tripe quadrupole mass spectrometer. The developed method will be used for the analysis of biological samples that are obtained from animal models as well as human patients in order to help better detect the onset of Osteonecrosis.

Poster Number: 10

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Lung surfactant coatings improve nanoparticle retention in lung epithelial cells

Presenter: Akshi Thakkar, Bioengineering Graduate Student

Mentor: Dr. Kytai Nguyen

Group Members: Roshni Iyer

Abstract:

Inhalational drug delivery employing nanoparticle (NP) carriers must overcome obstacles such as mucocilliary clearance and macrophage phagocytosis to achieve efficient deposition in distal lung. Incorporation of lung surfactants in drug formulations enhanced lung penetration by reducing macrophage phagocytosis, and also improved drug encapsulation. We synthesized two types of NPs from either poly (lactic-co-glycolic acid) (PLGA) or pluronic based-polyurethane (PU) and coated these with dipalmitoylphosphatidylcholine (DPPC, a major component of lung surfactant) to investigate improved NP retention in the lungs. Texas Red conjugated-bovine serum albumin (TR-BSA) was used as a model drug. These biodegradable NPs are negatively charged, with diameters (nm) of 220Â±27 and 385Â±16 for DPPC-coated PLGA and PU NPs, respectively. Uncoated PLGA and PU NPs have diameters of 182Â±30 and 250Â±33 nm, respectively. DPPC coating enhanced TR-BSA loading efficiency into both NPs by almost 30%. Both NPs with or without DPPC coating showed sustained drug release over 25 days, however the uncoated NPs released about 10% more drug than DPPC coated NPs within 25 days. These NPs are also cyto-compatible (>85% cell viability up to 1mg/mL concentration) with alveolar type 1 (AT1) epithelial cells. Additionally, DPPC coating on the NPs resulted in enhanced uptake of both PLGA and PU NPs by AT1 cells. DPPC-coated NPs were biodegradable and cyto-compatible with AT1 cells. Additionally, DPPC coating enhanced drug loading efficiency for the NPs, and improved uptake by lung cells. This new NP formulation has the potential to improve the pulmonary delivery and biological action of growth-promoting genes and proteins.

Poster Number: 11

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Investigation of novel drug delivery strategies for treatment of atherosclerosis

Presenter: Roshni Iyer, Bioengineering Graduate Student

Mentor: Dr. Kytai Nguyen

Group Members: Serkan Yaman, Aneetta Kuriakose

Abstract:

Atherosclerosis is the deposition of plaque within blood vessels causing blockage. Conventional treatments like angioplasty, stenting, and drug eluting stents, suffer from drawbacks like restenosis, late-stent thrombosis, and reduced drug availability. Here we investigate an alternative nanoparticle (NP) delivery strategy by coating drug loaded NPs directly onto angioplasty balloons (AB) by A) Layer-by-Layer (LbL) electrostatic coating and B) Acrylic acid hydrogel (AAH) coating. Three types of NPs (Urethane-doped polyester (UPE), poly lactic-co-glycolic (PLGA), and biodegradable photoluminescent polymer (BPLP-PLGA) were coated on the balloons using both strategies. While UPE is biodegradable with abundant functional groups to assist peptide conjugation, PLGA is an FDA approved biodegradable polymer and BPLP-PLGA allows visualization in vivo. UPE, PLGA, and BPLP-PLGA NPs had an average size of about 300, 200 and 150 nm, respectively. Additionally, these NPs showed a sustained release of BSA (model drug) over 21 days. They were also cyto-compatible with HEPCs and hemocompatible with human blood. AAH coating improved the loading of each NP onto the balloon. Ex vivo UPE NP transfer efficiency study also revealed a larger number of NPs being transferred to the rat arterial wall by the AAH coating. The results conclude that the AAH technique has superior NP loading and transfer efficiency. Thus, this technique can be potentially used to provide highly efficient NP delivery to the atherosclerotic site.

Poster Number: 12

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Computational studies of crystalline structures and glass models in the Na2O-SiO2 system

Presenter: Ilia Ponomarev, Chemistry and Biochemistry Graduate Student

Mentor: Dr Peter Kroll

Abstract:

Glasses containing soda (Na2O) and silica (SiO2) are among the most widely used materials in industry. They find such everyday life applications as container glass or window glass (silica glass with addition of lime, alumina, magnesia), and at the same time advanced uses, such as biocompatible glasses (soda-lime-silica glass with phosphorus oxide). In this study, we investigate crystalline structures and glass models in the soda-silica (Na2O-SiO2) phase system using Density-Functional-Theory calculations. Analyzing the enthalpy of formation at different pressures, we find that at 0 GPa the compounds Na4SiO4, Na2SiO3, and Na2Si2O5 are stable besides a-quartz SiO2 and fluorite-type Na2O. At 5 GPa a high-pressure modification of Na2Si4O9 becomes stable as well. However, due to formation of the high-pressure modification stishovite-SiO2, only Na4SiO4 will remain a stable phase at 10 GPa. We model soda-silica glasses by ab-initio molecular dynamic simulations via a melt-quench procedure augmented by simulated annealing. We calculate enthalpies of formation with respect to crystalline compounds of the same composition. For both crystalline and amorphous models we compute 29Si-Nuclear Magnetic Resonance (NMR) chemical shifts. The comparison of computed results with experimentally data allows us to clarify assignments of chemical shifts in the structure C-Na2Si2O5. Analyzing further the relation between local environment and chemical shifts let us establish correlations between bond angles and 29Si-NMR data for Q4-, Q3- and Q2-vertices in soda-silica glasses. These relationships can, conversely, be used to analyze experimental spectra.

Poster Number: 13

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Geodesic-Based Landform elements classification from LiDAR data

Presenter: Md Ahsan Habib, Electrical Engineering Graduate Student

Mentor: Venkat Devarajan

Abstract:

There has been increasing interest in developing procedures for topographic feature detection of land cover from LiDAR data for the study of geomorphology and environmental application. Existing method classify landforms on the basis of geomorphometric variable from a Digital Elevation Models (DEM). Analyst who classifies manually instead rely on topographic patterns corresponding to specific landform. This paper describes a robust new solution that capitalizes on this observation. As a first step, seed growing segmentation based on the local geodesicity property is used for the delineation of large scale landform entities from their surroundings. All geodesic arcs comprising the segment are then extracted. The cluster of the geodesic arcs identify landform features at different spatial scales. Classification of each landform feature is then based on the analysis of the hypothetical motion of a particle along the direction set by the tangent vector associated with its representative geodesic curve. Minimum usage of threshold in the proposed procedure guarantee its effectiveness for a wide variety of terrain particularly challenging terrain with high surface variability.

Poster Number: 14

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Hyaluronic Acid Based nanoscaffold for Cartilage Regeneration

Presenter: Shuxin Li, Bioengineering Graduate Student

Mentor: Liping Tang

Group Members: Qinglan Yang, Jun Zhou, Liping Tang

Abstract:

Osteoarthritis is the most common form of arthritis and the leading cause of chronic disability in the United States. Traditionally, treatment is oral administration of paracetamol combined with NSAIDs and surgical intervention which either is a temporary relief of pain or has risk and suffering. Hyaluronic acid (HA), which is already common practice in many clinics, is considered to be a feasible injectable biomaterial in joint because of its lubricity and biocompatibility. In this study, in vitro cell migration and differentiation assay demonstrate cytokines like Epo and SDF-1Î± have remarkable effect on stem cell recruitment and chondrogenic factors like TGF-Î²1 and TGF-Î²3 can trigger chondrogenic differentiation of autologous Mesenchymal stem cell (MSC). Additionally, since particle size of HA has a significant influence on targeting efficiency, degradation rate, drug loading and releasing efficiency which all determine final degree of cartilage regeneration. To achieve a high efficiency, HA particles with different ranges of size have been fabricated and comparative tests have been done to select the most efficient size of HA particles involved in the system. With specific interaction with CD44 receptors on inflamed chondrocytes, selected HA particles loaded with MSC cytokines and chondrogenic factors can significantly target to damaged area on cartilage and start drug releasing process. This hypothesis is currently being tested in vitro using cartilage explants. We hope that the results of this work lead to a novel and permanent treatment for osteoarthritis.

Poster Number: 15

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Government Size and Economic Growth: A new Framework and Some Evidence from Cross-Section and Time-Series Data - Replication from Original Research from Rati Ram (1986)

Presenter: Nicolas Lopez, Economics Graduate Student

Mentor: Dr. William Crowder

Abstract:

The role of government and its direct involvement in the economy has always been subject to debate, as different sides of the political spectrum tend to have opposite views. The goal of this replication paper is to determine the effect that government size has on economic growth and in the process of doing so, determine the externality effect that government exerts on the economy as well as finding the inter-sector productivity differential between the private and the public sector. The model proposed by Ram (1986) is derived and used to estimate these effects for different countries. Using data for all available countries from the latest version of the Penn World Tables, the paper shows that the overall effects of government size are positive when evaluated both as a Cross-Section and as a Time-Series. From this conclusion, the productivity differential and the externality effect are both determined to be positive as well. The findings of this research support the idea that governments are capable of positively influencing economic growth. Although the results are econometrically sound there are some limitations to the model, thus, some caution has to be taken to interpret the results. The simple model utilized in this research is strongly supported by theory, thus, it is believed that the most important contribution is the fact that the replicated results, even adding 30 years of data, remain consistent with those originally reached by the author in 1986.

Poster Number: 16

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Silicon Oxycarbide Aerogels: Synthesis and Characterization

Presenter: Susana Aguirre-Medel, Chemistry and Biochemistry Graduate Student

Mentor: Peter Kroll

Group Members: JP Nimmo / Ilia Ponomarev / Atreyi Dashmahapatra

Abstract:

Aerogels are porous materials with a wide array of applications in research and industry. We synthesize silicon oxycarbide (SiCO) aerogels from silicon-based polymers containing Si-H bonds reacting with crosslinkers bearing carbon-carbon double bonds in presence of a platinum catalyst. The reaction was performed in highly diluted solutions (80%vol) with five different solvents: acetone, cyclohexane, n-hexane THF and ethanol. We characterized the microstructure of the aerogel samples and analyze the dependence of various properties on synthesis parameters: specific surface area, nanoparticle size, and total porosity. In particular, we highlight that the aerogel microstructure is controlled by the choice of solvent as well as by the temperature at which crosslinking is performed, We characterize these materials using transmission electron microscopy (TEM), scanning electron microscopy (SEM) and nitrogen adsorption analysis. We obtained samples with Specific Surface Area (SSA) as high as 392m2/g. Average pore diameter ranges between 6.4nm and 26.5nm; the maximum porosity found is 1.99cm3/g.

Poster Number: 17

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Iris's Coffee Shop Decision

Presenter: Isaac LaBauve, Economics Graduate Student

Mentor: Mike Ward

Abstract:

The fictional firm, Iris's Coffee Shop wanted to increase the price of the medium cup of coffee. To determine whether or not the chain should keep a price increase, the owner increased the price by $0.10 in 4 of the 8 locations. Information for the experiment, collected from customer loyalty cards, included age group (1-6), gender, size of cup purchased, date purchased, and store location number. Data was collected for 45 days before the price change and 80 days after the price change. I used a difference in differences technique to determine the impact of the price change on sales and profits. The scope of the results, conclusions, and recommendations are limited to the decision of this coffee shop chain based on the evidence provided; the techniques used are the same ones used in the field of economic data analysis. Loyalty customers substituted away from medium cups of coffee into small cups of coffee. There was evidence of increased store substitution. There was no evidence of substitution to competitors or of age effects. There was some evidence males were less likely to be affected by the price change. Since most of the substitution that occurred resulted in customers substituting to the lower margin small cup of coffee, the price change should not be propagated to the other stores and should be rolled back in the treatment stores. It may be beneficial to lower the price of the medium cup and increase the price of the small cup of coffee.

Poster Number: 18

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

A Decision Support System for Traffic Diversion around Construction Closures

Presenter: Arezoo Memarian, Civil Engineering Graduate Student

Mentor: Dr. James C. Williams

Group Members: Dr. Siamak (Sia) A. Ardekani / Civil Engineering Department / ardekani@uta.edu

Abstract:

While highway infrastructure ages and road congestion increases, roads need to be expanded and reconstructed. Further work zones have led to an unavoidable interruption to regular traffic flows and have resulted in traffic congestion, more vehicle emissions, and traffic safety problems. During roadway construction, it would be desirable to inform motorists of alternative routes around the construction site well in advance of the project location. However, inappropriate traffic diversion plans will degrade the traffic flow on alternative routes and increase travel time of the entire network. The objective of the proposed study is to develop a Decision Support System (DSS) with a user-friendly Graphic User Interface (GUI) to allow development of optimal alternative routes around highway construction sites. An optimization model is proposed to minimize the total travel time in the network while considering travelers' behavior for minimizing their own costs. The DSS tool has an easy to use GUI including a graphical representation of the roadway network around the construction site and Tarrant County network is used as the test network in this study. The link attributes are available for displaying and editing in the software interface and once a link is closed, the GUI displays optimum alternative routes that were obtained from the optimization model. Diverting drivers to alternative routes would help reduce traffic demand through the construction site, enhance the safety of the workers and motorists, reduce traffic delays and agency costs as well as road user costs.

Poster Number: 19

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Decision Support System for Dynamic Pricing of Managed Lanes

Presenter: Maryam Zabihi, Civil Engineering Graduate Student

Mentor: Dr. Siamak Ardekani

Group Members: Dr. Yasar

Abstract:

Congestion pricing and Managed Lanes (MLs) have been gaining interest as congestion management strategies and as means to generate revenue. Congestion pricing in MLs entails several strategies including: time of day pricing, real-time pricing based on predicted traffic conditions, and based on actual traffic conditions. The congestion pricing concept is well documented for static networks, but research still lacks in the area of dynamic pricing. In this study, the optimal toll is sought to prevent MLs from becoming congested while simultaneously maximizing revenue subject to some constraints. A key constraint is drivers' willingness to pay. This study is expected to result in a Decision Support System for dynamic toll pricing based on actual traffic conditions in the managed and general-purpose lanes. The study section is segment1 of the first phase of the North Tarrant Expressway (NTE) in suburban Fort Worth, along I-820 between the I-35W and the SH183. The goal is to estimate the Value of Travel Time Savings (VTTS) of the potential users obtained from a stated-preference survey. The data is then augmented by monitoring the actual demand on the NTE at different times of day and pricing conditions to capture the drivers' revealed preferences. The result of drivers' sensitivity to toll values is then used as an input to modify a Toll Pricing Model (TPM) simulation package. Then, various corridor demand levels and conditions on NTE is simulated and the outputs is used to recommend dynamic toll scenarios in response to various traffic conditions.

Poster Number: 20

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Three Dimensional Indeterminate Impacts Using Rigid Body Constraints

Presenter: Abhishek Chatterjee, Mechanical Engineering Graduate Student

Mentor: Alan Bowling

Abstract:

This work presents a framework for analyzing impacts using a large number of impact points. The minimum number of impact points required for analysis of impact vary depending upon the nature of impact. Furthermore, it would be also necessary to analyze the geometry of the impacting bodies for appropriately choosing these impact points. The additional analysis for the selection of impact points could be avoided by creating a grid or mesh of points on the surface of the impacting body. However, if the number of impact points used for the impact analysis is more than the number of degrees of freedom of the impacting body(or the multibody system), the impact problem becomes indeterminate. This work presents a method for resolving such indeterminacy using rigid body constraints.

Poster Number: 21

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

DECREASED UTILIZATION OF FATS FOR ENERGY IN ATHLETES WITH SPINAL CORD TRAUMA

Presenter: Sara Hermansen, Kinesiology Graduate Student

Mentor: Dr. Judy Wilson

Abstract:

The differences in VO2peak levels between able-bodied athletes and wheelchair athletes has been well documented, however, it has not been determined as to why this difference occurs. We tested the hypothesis that athletes with spinal cord trauma will use a higher percentage of carbohydrates and will reach a respiratory exchange ratio value of 1.0 sooner than able-bodied athletes which could be a contributor to the lower VO2peak levels. Able-bodied basketball athletes underwent VO2max testing on a treadmill in our laboratory. Â VO2max was found and RER values were determined for each minute the subject ran. Wheelchair basketball athletes also underwent a maximal exercise test (VO2peak) on an adaptive treadmill in the laboratory. The wheelchair athletes were further split into groups with and without spinal cord trauma. Within each group we determined the averages of VO2, RER, and carbohydrate and fat use percentages. The spinal cord trauma and non-spinal cord trauma disability groups showed a significant difference of VO2peak and RER values when compared to the able-bodied subjects. But what did appear unusual was that the wheelchair users appeared to be more dependent on their glycolytic energy system and used carbohydrates at a lower energy output when compared to able-bodied athletes who are able to utilize fats as an energy source through lipolysis in the early stages of their exercise tests. This finding is important to future nutritional and training plans for all wheelchair users and athletes to help them achieve their maximal potential.

Poster Number: 22

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

T09A mutant of F420 cofactor dependent NADP oxidoreductase (Fno) showing insights of the active site

Presenter: Md Hasmat Ullah, Chemistry and Biochemistry Graduate Student

Mentor: Kayunta Johnson-Winters

Group Members: Quong Quang Le, Joshua Aubert, Thein Phan, Joseph Tran

Abstract:

Factor F420 is an unusual cofactor found in methanogenic bacteria, sulfate reducing archaea, halophilic archaea and some eukaryotic organisms. F420 cofactor dependent NADP oxidoreductase (Fno) is an essential enzyme for methanogenic bacteria responsible for catalyzing the reversible hydride transfer to Nicotinamide compound (NADPH). Methanogens produce over 90% of the environmental methane, which widely used as an energy source and also acts as a greenhouse gas. The mechanism of the hydride transfer is already revealed through kinetic enzyme studies. Our aim is to explore the active site of Fno. The hydroxyl group of a conserved amino acid, Threonine 9 (T09) is very close to the phosphate group (2.6 Ã… distance) of NADPH within the Fno active site. To study the functionality of T09, we created the T09A variant, using site directed mutagenesis. The binding studies of T09A Fno to NADPH give higher dissociation constant, Kd (4.8 nM) compared to wild type Fno (wtFno) (2.0 nM). The pre-steady-state data revealed a burst phase rate constant that was `40X higher (3391 s-1) for the T09A variant, in comparison to wtFno. However, the slow phase rate was slightly lower, 2.41s-1 (T09A) compared to the 3.40 s-1 for wtFno. Steady State analysis revealed typical Michaelis-Menten kinetics with respect to FO and a biphasic with respect to NADPH. Thus, our study suggests that T09 may function to regulate the rate of hydride transfer within Fno.

Poster Number: 23

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

STABLE ISOTOPE COMPOSITIONS OF EARLY EOCENE CARBONATES ASSOCIATED WITH FLUVIAL SEDIMENTATION IN CENTRAL WYOMING

Presenter: Daniel Kirkwood, Earth and Environmental Sciences Graduate Student

Mentor: Marie Fan

Abstract:

Characterizing extreme climate events in Earthâ€™s history is important to understanding of how these events occurred. The Early Eocene Climatic Optimum (EECO) (53-50 Ma) is the warmest and wettest period in the western U.S.A. during the Cenozoic, and high-resolution stable isotope compositions of carbonate minerals may bring new understanding to climate characteristics of this time period. The lower Eocene Wind River Formation in the Wind River Basin, central Wyoming, is a sequence of sedimentary rocks formed in river environments during the EECO. Here we study the stable isotope compositions of carbonates in the Wind River Formation in order to reconstruct paleoclimate and document climate cyclicity. A previous study suggests that the carbonates in the Wind River Formation retain information of paleoclimate during deposition. Peak Î´18O and Î´13C values may reflect dry climate conditions in which surface water was evaporated and atmospheric CO2 was the dominant carbon source. Trough Î´18O and Î´13C values may reflect wet climate conditions in which evaporation was low and soil respired CO2 from existing plants was the dominant carbon source. The covariation of Î´18O and Î´13C values during the EECO could be equally explained by changing abundance of recycled marine limestone clasts through time. Climatic variations between dry and wet periods may influence the abundance of recycled limestone by enhancing or diminishing chemical weathering of recycled sediments. Future work aims at differentiating the two plausible mechanisms, and collecting high-resolution stable isotope data in order to document the cyclicity of climate variations during the EECO.

Poster Number: 24

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Can L2 words access meaning? Evidence from false memory tasks

Presenter: Juliet Huynh, Linguistics Graduate Student

Mentor: Naoko Witzel

Abstract:

The recurring issue in bilingual research is bilingual speakersâ€™ ability to access meaning from words in the second language (L2). This study examines (i) whether Vietnamese-English (VE) bilinguals can access meaning from L2 words, and (ii) whether this will depend on the age of first exposure to L2 English (early or late). Early and late VE bilinguals studied lists of words in their L2 English that relate in meaning (bed, rest, awake, etc.) to an unpresented topic word (sleep) (Roediger & McDermott, 1995). Later, they were tested on whether they studied those words. Specifically, we tested whether there is facilitation in recognizing the studied words when they were preceded by the topic word. If participants activated the meanings of the L2 words on the list during the study phase, other words related in meaning would be activated, including the topic word. Â Thus, it was predicted that the presentation of the topic word would assist the recognition of the studied words. On the other hand, if these bilinguals did not activate the meaning of the studied L2 words, then the topic word would not influence the recognition of the studied words. Preliminary findings showed that early bilinguals recognized the studied words faster when they followed the L2 topic word (sleep) than an unrelated word, while late bilinguals did not show this effect. The results suggest that whether L2 words can access meaning depends on the age of L2 exposure.

Poster Number: 25

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Photoluminescence of Silicon Carbide Quantum Dots: Instrument Detection and Issues

Presenter: Gregory Monson, Chemistry and Biochemistry Graduate Student

Mentor: Peter Kroll

Abstract:

Quantum dots are small crystalline fragments less than 100nm in diameter that are restricted in what electromagnetic radiation they will absorb and emit to the point they have a unique excitation and emission spectra dictated by their parent crystal structure and material. However, the analytical equipment necessary to analyze these spectra can have various temperamental issues, in this particular case fluorometers. Silicon carbide quantum dots less than 30nm in diameter, measured by both a Horiba Fluoromax-3 and Perkin Elmer LS55 require the equipment to be operated under adverse conditions which in turn produce various signal artifacts, complicating the analysis process. Both of these devices contain various compensating detectors and program algorithms that attempt to reduce such abnormalities, yet still produce outputs at variance between each other and literary results. The Perkin Elmer suffers the issue of that the peak emission for the emission spectrum runs across the region where sensitivity of the Hamamatsu R928 photomultiplier tube decreases.Â Compensated and uncompensated signals provided by the software produce abnormalities not present in the Horiba instrument. However, the Horiba instrument wavelength excitation source and detector sensor settings promote a form of stray light to appear in the signal. Therefor, individuals engaged in research using this equipment need to be wary of providing their instrumentation with complete faith.

Poster Number: 26

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

MavRoomie

Presenter: Vijendra Kumar Bhogadi, Computer Science Engineering Graduate Student

Mentor: Dr. Gautam Das

Group Members: Habibur Rahman

Abstract:

Crowdsourcing has been used for great applications like Waze, Jabberly where users voluntarily provide information which will be constructive to the user community. We introduce "MavRoomie", a crowdsourcing android application, which can leverage the framework of crowdsourcing in order to provide a dedicated platform for finding roommates and apartments for the UTA student community. Existing websites such as roommates.com,roomiematch.com have garnered a large user-base with the goal of finding a suitable roommate. However these apps suggest roommates solely on geographical and cost constraints and ignore the most important human factors which can play a substantial role in finding a compatible roommate or roommates. We assume that we are given a set of users with detailed profile information, user preferences, and budget constraints. Our goal is to present each user with potential roommates or a set of preferable apartments satisfying the given budget and preferences. This demonstration showcases the complete architecture of "MavRoomie", its potential application and a real world case study with the students from UTA.

Poster Number: 27

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Anxiety's Impact on Fear of Falling

Presenter: Eric Salas, Psychology Graduate Student

Mentor: Robert Gatchel

Abstract:

The purpose of this study was to determine the predictive relationship between composite scores of balance and various psychosocial variables comprised of physical function, anxiety, depression, and the use of a walking aid (cane, walker, etc.). Additionally, this examined if a relationship existed between anxiety, composite balance scores, and falls within the last year. The population sample consisted of 66 geriatric adults that ranged in age from 60-89 years old. Balance composite scores were obtained through the NeuroCom Balance System. In order to measure all psychosocial variables, participants completed the Patient-reported Outcomes Measurement System (PROMIS-29). Results of the study indicated that the first hypothesis was partially supported with a significant predictive association of participants with lower composite balance scores as more likely to use an assisted walking device, but no predictive value in regards to depression, physical function or anxiety. Further analysis showed a significant relationship between the use of an assisted walking device and perceived physical function, with individuals that use an assisted walking device having lower perceived physical function scores. The second hypothesis was not supported, displaying no significant relationship between anxiety, composite balance scores, and reporting a fall in the last year.

Poster Number: 28

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Educated and Physically Abused? Applying the Theory of Learned Helplessness

Presenter: Bernadette Ombayo, School of Social Work Graduate Student

Mentor: Dr. Randall Eugene Basham

Group Members: Moses Okumu / Cecilia W Mengo

Abstract:

Introduction: The World Health Organization recognizes violence against women as a complex social and public health problem of today. The theory of learned helplessness (Peterson, Maier, & Seligman, 1993) postulates that women may remain in abusive relationships if they do not foresee alternatives. The theory argues that staying in abusive relationships may vary according to social and cultural contexts of individuals' lives. The current study examines the association between literacy levels and physical violence among women in Uganda. Methods: The study used data from Uganda Demographic Health Survey collected between 2010 and 2011. The study considered physical abuse as an outcome variable and literacy levels as the independent variable. Also, we controlled for marital status, wealth index, age, and geographical location. Descriptive and bivariate analysis were used to understand the sample.We tested the hypothesis using logistic regression. Results: Results indicate that literate women had 2.2 (C.I=1.18-3.446) times higher odds of experiencing physical violence compared to their illiterate counterparts. Also, women classified as poor had 2.5 (C.I=1.21-5.07) times higher odds of experiencing physical abuse compared to their middle and wealthy counterparts.Â Conclusion: Contrary to extant literature, the current study found that physical violence was higher among educated women compared to their illiterate counterparts. In patriarchal societies, educated women may experience violence due to men's desire to demonstrate dominance (Small, Nikolova & Narendorf, 2013). More research is needed to explore this phenomena.

Poster Number: 29

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Investigation of potent antibiotics using structure-activity relationship

Presenter: Abu Afzal Mohammad Shakar, Chemistry and Biochemistry Graduate Student

Mentor: Dr. Frank Foss Jr.

Group Members: Diego Lopaz / Mohammad Shawkat Hossain / Pawan thapa

Abstract:

Abstract: Antibiotic plays a vital role in fighting with infectious diseases caused by bacterial species. For seeking of survival, bacterial species maintain certain smart mechanistic pathways, which nullify all scientific endeavors. The everlasting game play of scientist and bacterial species is going on for the decades by the name of so-called bacterial resistance. The investigation of bacterial survival pathway encourages us to design the antibiotics. The inhibition of vitamin B1 biosynthetic pathway in the bacterial cell will inhibit the survival of bacteria. First generation synthetic molecules exhibit the inhibition of vitamin B1 synthetic pathway, which was confirmed both experimentally and computationally. From the first generation structure-activity relationship (SAR), second generation of molecules were designed and a number of them were synthesized. The verification of SAR with second-generation molecule will be investigated to develop potent antibiotic library.

Poster Number: 30

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Study of protein-protein interactions in different ionic strength solutions using Dynamic Light Scattering

Presenter: Sabrina Ahmad, Chemistry and Biochemistry Graduate Student

Mentor: Dr. Peter Kroll

Abstract:

The time dependent fluctuations of scattered light is analyzed by Dynamic Light Scattering (DLS) to determine the size-dependent diffusion of colloid particles in suspension or polymers in solution. In our study, we used this technique to determine the diffusion and inferred the size of the protein bovine serum albumin (BSA) and its dependence on concentration and ionic strength. The measurements explored the effects of excluded volume and charge on the dynamics of protein diffusion. In a buffer (pH=5.4) we generate solutions of different ionic strengths (0.05, 0.1, 0.2 and 0.5 M) by adjusting the salt concentration. We then add different volume fractions of BSA (0.01, 0.02, 0.03 and 0.04) and measure the diffusion coefficient via Dynamic Light Scattering. Extrapolating the diffusion coefficient data to zero salt molarity and zero volume fraction, we determine a free particle diffusion coefficient D0 = 6.08 Ã—10-7 cm2s-1 at 24Â°C. The Stokes-Einstein equation was used to obtain a radius of the BSA protein of 3.93 nm, which agrees well with the literature values. While our results show that at low ionic strength the diffusion coefficient of BSA increases linearly with increasing protein volume fraction, this trend does not continue at higher ionic strengths where the diffusion decreases and is attributed to protein aggregation. While we continue our characterization, the present results demonstrate that DLS is an effective technique to study protein interactions.

Poster Number: 31

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Design and Construction of a 3D Printer for the Regeneration of Bone and Soft Tissue in Cleft Palate

Presenter: Ashley Dacy, Bioengineering Graduate Student

Mentor: Dr. Liping Tang

Abstract:

Cleft palate is a facial deformity of the palate and soft tissues of the mouth, occurring in over 30,000 births in the US each year. Current treatments for this condition involve invasive surgeries throughout infancy. 3D printing is a computer-guided manufacturing technique used to quickly produce complex structures. In this project, a 3D printer was designed to move two extruders in Cartesian coordinates and then constructed. Then, SolidworksÂ® software was used to design 3D models of bone and soft tissue. Next, the printer used the 3D models to print hydroxyapatite and a collagen hydrogel. Finally, using the same 3D models, the printer was used to print live cells, creating a cell-laden combination of scaffolds designed to regenerate bone and soft tissue for the treatment of cleft palate. The printer simultaneously printed hydroxyapatite with osteoblasts for bone and a collagen solution with fibroblasts and epithelial cells for soft tissue. Printing took place in an aqueous media to increase cell survivability in a variation on current techniques for 3D printing cells with scaffold material. Upon sectioning and histological analysis of cells in the scaffolds after printing, cells were found to survive the printing process. This study was significant in conquering several challenges of integrating computer-plotted 3D printing techniques and tissue engineering applications by printing live cells in both hard and soft substrate. This study contributed greatly to the advancement of 3D printing in tissue engineering and has laid the foundation for future work in cleft palate regeneration.

Poster Number: 32

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Optimization of Passenger Transfer Time between Gates in Connecting Airports

Presenter: saeed reza ramezanpour nargesi, Civil Engineering Graduate Student

Mentor: Dr.Steve Mattingly

Group Members: Sirwan Shahooei

Abstract:

Nowadays minimizing the layover time is Crucial for both passengers and airlines. Assigning the arrival and departure gates for transferring passengers is a challenging task in airport planning. Various parameters may affect the assignment job like the availability of airplanes for the airline, the number of passengers for the next destination and the transfer time between gates. Lowering the transfer time between terminals enables the airline planners to decrease the layover time between connecting flights. The transfer time between gates is affected by multiple factors including the terminal design, the airport size,and the boarding and disembarking system. This research tends to model the distance between gates in an airport and use linear programming methods for gate allocation and assignment.To do so, three large, medium and small airports are studied and the transfer times are measured. GIS software is used for measurement of distance between gates of Phoenix Sky Harbor, Dallas Love field and Denver International Airport. The goal of this project is, first to find out what factors have the most impact on passenger transfer time, and then, optimize this time using linear programming models.This study has application in airport engineering and airlines planning.

Poster Number: 33

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Differences in levels of support for gender equality between working and nonworking women in Mexico

Presenter: Jeyle Ortiz Rodriguez, School of Social Work Graduate Student

Mentor: Dr. Vijayan K Pillai

Abstract:

Improvements in women's support for gender equality has for long been a crucial component of social policies in developing countries such as Mexico. Women's entry into the labor force is associated higher levels of support for gender equality. It can be expected that working women are more supportive of gender equality than nonworking women. However, the gap in the support for gender equality between employed women and full-time housewives could derive from differences in their education level, age, and level of support within the household rather than from their employment related characteristics. Using the Blinder-Oaxaca method this paper decomposes the impact of women's participation in the labor market and socioeconomic characteristics on women's support for gender equality in Mexico. Results of this study suggest that a large share of the difference in levels of support for gender equality between nonworking and working women may be attributed to broad level socioeconomic changes.

Poster Number: 34

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Atomistic simulation and investigation of thermal conductivity of amorphous silicon boron nitride materials (a-SiBN)

Presenter: Atreyi Dasmahapatra, Chemistry and Biochemistry Graduate Student

Mentor: Peter Kroll

Abstract:

Silicon boron nitride (SiBN) is an amorphous material with applications in ceramic fibers and protective coatings. SiBN exhibits stability against crystallization up to 1800Â°C, and can resist oxidation up to 1300Â°C due to the formation of a protective layer of silica glass. Here we investigate the structure, thermochemistry, and thermal conductivity of amorphous SiBN materials with general composition Si3nBmN4n+m displaying a molar ratio n:m of silicon nitride (Si3N4) to boron nitride (BN). We generate multiple independent models of Si3BN5 (1:1), Si3B3N7 (1:3), and Si3B9N13 (1:9) each comprising 100-200 atoms via a computational network algorithm augmented by simulated annealing using ab-initio molecular dynamic simulations. Using accurate quantum mechanical calculations, we compute thermochemical and elastic properties of the systems. We estimate the minimum thermal conductivity (kmin) of these models at high temperatures using the phenomenological Clarke's model. We then turn to molecular dynamic simulations using empirical force fields to study temperature dependence of thermal conductivity of SiBN via the Green-Kubo (GK) method. We use different force fields "the Tersoff potential and the Marian-Gastreich potential" to describe the interatomic interaction between Si, B, and N atoms and compare and contrast results. We find that thermal conductivity in these materials is impacted by the presence of BN domains inside the a-SiBN structure. Small isolated BN units act as scattering centers and reduce thermal transport (e.g. in Si3BN5), while large, planar BN segregations as in Si3B3N7 and Si3B9N13 increase thermal conductivity.

Poster Number: 35

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Novel Optical Imaging Probe for Osteoarthritis Diagnosis.

Presenter: Yihui Huang, Bioengineering Graduate Student

Mentor: Dr. Liping Tang

Group Members: Jun Zhou, Hong Weng, Qinglan Yang, Jinglei Wu, Yi Hong, Joseph Borrelli

Abstract:

Osteoarthritis is one of most common diseases among elders. 52.5 million adults in US have arthritis in 2010-2012. The early onset of this disease begins from corruption of cartilage surface and the structure of the cartilage slowly becomes destroyed. It is generally believe that early diagnosis and treatment are essential to the improved outcome of the disease. However, due to lack of early diagnosis tool, early treatment is impossible. To overcome such challenge, we carried out research to develop a new diagnosis method for the injured cartilage at early stage. Since many studies have demonstrated that apoptotic chondrocyte is a hallmark of OA of early stage, our work has been emphasized on the fabrication of an apoptosis-targeting optical probe for non-invasive detecting the early stage of osteoarthritis. To increase its specificity to apoptotic cells, this probe was conjugated with apoptotic cell targeting peptide and near infrared dye. In vitro study showed that the probes possess good biocompatibility, high binding affinity and specificity of probe to apoptotic chondrocytes. Additionally, there was a good linear relationship between apoptotic cell numbers and probe-associated fluorescent intensities. Using mice xiphoid injury model, we found significant accumulation of the apoptosis probes at the damaged cartilage within one hour following probe injection. There was an excellent relationship between the extent of probe accumulation and the number of apoptotic cells on injured cartilages. The results supported that our apoptosis probes can be used to monitor and measure the extent of cartilage/chondrocyte injury at early stage in vivo.

Poster Number: 36

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Empirical and Theoretical Approaches Across Three Social Work Journals: A Systematic Analysis /

Presenter: Jamel Slaughter, School of Social Work Graduate Student

Mentor: Alexa Smith-Osborne, PhD, LCSW

Group Members: Mary McCoy, LMSW; Vivian Miller, LMSW; Shamsun Nahar, MSW; Anh Nguyen, MSW; Moses Okumu, MSW; Bernadette Ombayo, MSW; Chang Hyun Seo, MSW

Abstract:

Abstract Background and Purpose. Social work leaders have challenged the profession to grow as a science by publishing articles that are empirically and theoretically driven. The purpose of this study was to compare how social work journals including American Journal of Community Psychology (CP), The Journal of the Society for Social Work and Research (SSWR), and Journal for Social Work Education (SWE) publish articles that use empirical methods and theory. Methods. Content analysis was used to organize data from three academic social work journals. Key concepts were defined before considering a sample of 741 journal articles from 2011-2015. Articles were coded by use and type of empirical method and theory. Descriptive and chi-square analyses were conducted. Findings. The journals used empirical methods (67.1%) more often than not (32.9%). Particularly, SSWR published the highest percentage of empirical articles (82.7%) compared to CP (67.1%) and SWE (46.2%). Only one third of journals used theory (35.7%); CP (43.5%) and SSWR (42%) were more likely to publish theory driven articles than SWE (15.4%). Statistically significant differences were observed in journalsâ€™ preferred empirical methods and theory use. Conclusions and Implications. Findings suggest the journals have placed an emphasis on publishing empirically driven articles. However, they use empirical methods and theory to different degrees, which may impact the profession’s knowledge base. Future research should examine the impact of the use of empirical methods and theory on the quality of academic journals, and to compare how theory drives the research process in various journals.

Poster Number: 37

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

What's really influencing why you work out? Evaluating the effects of Stress, Physique Anxiety, and Self-Efficacy on Exercise Intentions.

Presenter: Cory Newell, Psychology Graduate Student

Mentor: Angela Liegey-Dougall

Group Members: Adeel Sajid Daniel Tebbe

Abstract:

Background: People exercise to lose weight, relieve stress, or lead a healthier lifestyle. However, intentions to exercise can be eroded by factors, such as anxiety about how others perceive one's physique or general feelings of stress. These negative emotions may decrease self-efficacy, or the belief that one can perform exercise, which may, in turn, further decrease intentions to exercise. Purpose: The purpose of this study was to assess whether the negative effects of social physique anxiety and perceived stress on exercise intentions could be explained through decreases in self-efficacy. Methods: The sample (N = 110) was recruited at the Mavericks Activity Center and included Â 51 females and 59 males with a mean age of 25.69 (SD = 9.60). Participants completed an online survey which included measures of social physique anxiety, stress, self-efficacy, and exercise intentions. Results: As expected, higher scores on social physique anxiety and perceived stress predicted lower exercise intentions, Î² = -.046, SE = .023, t(109) = -2.06, p = .04; Î² = -.152, SE = .061, t(109) = -2.505, p = .014. Furthermore, higher social physique anxiety and stress resulted in lower self-efficacy, which accounted for the reduction in exercise intention, Î² = -.052, 95% CI [-.083, -.026], p < .05; Î² = -.144, 95% CI [-.246, -.077], p < .05. Conclusion: The results suggest that low self-efficacy explains why social physique anxiety or stress undermines exercise intentions. Furthermore, improving self-efficacy may elicit improvements in exercise intentions and subsequently health.

Poster Number: 38

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Time-Frequency Analysis of Brain Responses to Pain Input

Presenter: Hongguang Xi, Mathematics Graduate Student

Mentor: Jianzhong Su

Group Members: Haley Harris, Frank Book

Abstract:

Research has suggested the involvement of multiple brain areas in pain processing by fMRI and PET scan techniques that provide better spatial resolution; however, much less is known about temporal relationships of pain signaling. Temporal resolution limits commonly used neuroimaging of prominent areas such as the somatosensory cortex and thalamus axis in studies of human pain processing. The current study uses electroencephalography (EEG) to track pain processing, with the recently-developed advanced source localization algorithms (ASLA) that will provide specific information about neuronal electrical activities in response to nociception. A case study of preliminary data reveals that four brain areas (prefrontal cortex, anterior cingulate cortex, somatosensory cortex, and thalamus) showed the same temporal activity; additionally, pain signaling occurred 800 ms after stimulus onset in the pain condition, whereas signaling occurred 500 â€“ 400 ms before stimulus onset in the control condition.

Poster Number: 39

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Quantifying the constraints for independent evoked and spontaneous NMDA receptors mediated synaptic transmission at individual synapses

Presenter: Sat byul Seo, Mathematics Graduate Student

Mentor: Dr. Su Jianzhong

Group Members: Justin Blackwell / Ege Kavalali

Abstract:

Presynaptic terminals release neurotransmitters either in response to action potentials or spontaneously independent of presynaptic activity. In the case of glutamate, released neurotransmitters activate NMDA receptors within a single postsynaptic site and give rise to miniature postsynaptic currents. In this study, we used a mathematical model to simulate spontaneous and evoked neurotransmission processes resulting from glutamate release within a synapse and evaluate the quantitative constraints that determine their degree of overlap independent signaling mediated by spontaneous and evoked release events. To access the geometric or biophysical conditions for synapses to sustain independent signaling in response to two fusion events, we examined how different factors, including the size of the synapse, the release rate of the neurotransmitter, and different diffusion mobility will affect post-synaptic currents. We conclude that the leading cause for the independence of spontaneous and evoked currents is the distance between spontaneous and evoked glutamate transmitter release sites as well as potential variations in the speed of glutamate release from vesicles. The computed results match well with existing experimental findings and serve as a road map for future studies. We then simulated release of the glutamate molecules through a vesicle by addition of two compartments that one modeled the vesicle and the other represented the fusion pore. After we obtains the glutamate concentration from the standard heat equation then determine the opening probability of individual receptor using a state model (3C2O). Those two problems in MATLAB are solved.

Poster Number: 40

Bluebonnet Ballroom, 2:00 PM to 3:30 PM

Censorship Circumvention Systems: Cost Analysis in a Game Theoretic Setting

Presenter: Jees Augustine, Computer Science Engineering Graduate Student

Mentor: Dr. Matthew Wright

Group Members:

Abstract:

"We (United States) believe that there should be one internet connecting all the people of the world, not multiple intranets dividing us," Tom Malinowski, Assistant Secretary of State for the Bureau of Democracy, Human Rights and Labor In state-sponsored Internet censorship, a country's government imposes partial or complete restrictions on publication and access of contents over the Internet it deems objectionable. The concept of Decoy routing offers a potential means of resistance to this censorship, allowing backdoor entry to blocked content. Even before the decoy technology was accepted and deployed recently available sophisticated Internet traffic pattern analysis enabled researchers to locate a Decoy within a network and to divert the traffic away from decoy. However, the elevated cost in traffic diversion for censor gave rise to a tension with proposed decoy system. We have modelled this tension to estimate the costs involved for both sides and to use standard optimization techniques to come up with solutions fetching consistent payoffs for decoys to ensure free and open Internet. We also used the model to prove the existence of a set values which restricts the censor from deviating the traffic from its regular path. The project was extended to study the effects of the knowledge about the optimal values, to both the developers of decoy and censors. To validate the claims, a miniature simulation of Internet was setup and conditions derived from the optimum results were applied.

Poster Number: 100

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

The effects of Acamprosate and CaCl2 on alcohol consumption and attentional set-shifting in a mouse model of alcohol addiction /

Presenter: Ariel O'Brien, College of Science Undergraduate Student

Mentor: Dr. Sven Kroener

Group Members:

Abstract:

Alcoholism and other addictions affect cognitive flexibility which inhibits compulsive and impulsive behaviors characteristic of drug abuse and dependence. Acamprosate (ACAMP) is an FDA approved medication to reduce alcohol cravings and relapse in alcoholics. In this experiment, we studied the effects of ACAMP and CaCl2 (believed to be the active ingredient in ACAMP) on cognitive flexibility in a mouse model. Mice were monitored for alcohol consumption and for their ability to learn a new strategy in order to confirm any difference in the treatments' effects. Mice chronically exposed to EtOH which did not receive a treatment increased their alcohol consumption, while mice chronically exposed to EtOH which received ACAMP or CaCl2 reduced their alcohol consumption. Mice chronically exposed to EtOH which which did not receive a treatment needed more trials to learn the new strategy than all other groups, but mice chronically exposed to EtOH which received ACAMP or CaCl2 needed approximately the same number of trials to learn the new strategy as the control group. ACAMP and CaCl2 both reduced alcohol consumption and improved the ability of mice to learn a new strategy after exposure to alcohol to a similar degree. Confirmation of the active ingredient in ACAMP can aid in lowering the cost of treating alcoholism through medication.

Poster Number: 101

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Bumetanide demonstrates amelioration of learning and memory deficits induced by ketamine administration in / a neonatal rat model

Presenter: Ryan Stevens, Mathematics Undergraduate Student

Mentor: Qing Lin, M.D., Ph.D.

Group Members: Saurabh Kokane, Brandon Butler, Andrew Womack, Qing Lin

Abstract:

Prolonged ketamine exposure in neonates at anesthetic doses has been previously found to cause long-term impairments of learning and memory. The current theoretical mechanism explains this phenomenon as being N-methyl-D-aspartate receptor (NMDAR) mediated. Whereby, noncompetitive blockade of NMDAR channels initiates intracellular signaling cascades, which ultimately leads to widespread neuroapoptosis. Additionally, neonatal neurons are thought to be especially susceptible to neuronal injury upon ketamine administration, and directly linked to the excitatory behavior of Î³-aminobutyric acid type A receptor (GABAAR) activation. This is due to differential developmental expression patters of Na+-K+-2Cl- co-transporter (NKCC1), and K+-Cl- co-transporter (KCC2). Previous studies have found that bumetanide, an NKCC1 inhibitor, allows neurons to become more inhibitory rather than excitatory at neonatal ages upon GABAAR activation. Blockade of NKCC1 via bumetanide allows inferences to be made regarding this mechanism. Within this study, Sprague-Dawley neonatal rats were used to measure ketamine's effect when co-administered with bumetanide. To this end, the Morris water maze test was employed to measure the behavioral effects of these drugs individually, and in combination. It was revealed that presynaptic GABA neurotransmitter release is likely to play a role in the overexcitation of neonatal neurons following ketamine exposure, which further influenced learning and memory retention later in life. This is supported by data presented, where bumetanide when co-treated with ketamine, was shown to significantly prevent behavioral deficits typically seen in animals exposed to ketamine alone. Thus, the reduction in GABAergic-excitatory hyperactivity suggests a new mechanism by which neonatal ketamine induced learning impairments are prevented.

Poster Number: 102

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

The Serotonin Transporter Gene and Child Temperament: An Exploratory Genetic Analysis

Presenter: Afsoon Gazor, Psychology Undergraduate Student

Mentor: Dr. Jeffrey R. Gagne

Abstract:

Associations between the serotonin transporter gene polymorphism, 5-HTTLPR/rs25531, and the child temperament dimensions of fear and activity level were investigated. Due to the uncertainty of 5-HTTLPR's role in regulating fear and activity level, this investigation was exploratory in nature. Parent ratings of the child temperament outcomes were gathered from 100 sibling pairs, 2.5-5.5 years of age. DNA was also collected from all child participants, extracted and analyzed. Regression analyses revealed that the low-expressing genotypes of the 5-HTTLPR/rs25531 polymorphism predicted child fearfulness, but not child activity level. No other genotypes were significant predictors of child temperament variables. Future research with a larger and more representative sample that separates child fear into the more discrete variables of object and social fear will further clarify links between the serotonin transporter gene and child temperament.

Poster Number: 103

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Arctic wolf spider diet determined by stable isotope analysis

Presenter: Taryn Flink, Biology Undergraduate Student

Mentor: Laura Gough

Group Members: Ashley Asmus

Abstract:

Arctic animals are experiencing the effects of climate change sooner and more strongly than animals from other biomes, but studies of arctic food webs is scarce. In other ecosystems like forests and deserts, wolf spiders play an important role in food webs comprised of insects, birds and mammals, and can even affect whole-ecosystem processes like decomposition. Although wolf spiders are incredibly abundant in arctic tundra, not much is known about them, including what their diet consists of, other than the insects in general and some amount of conspecifics (i.e., cannibalism). In order to learn more about their diet, we conducted a field and laboratory study of arctic wolf spiders inarctic tundra near Toolik Lake, Alaska. We used a type of chemical analysis to compare the concentrations of stable isotopes (13C, 15N) in the tissues of wild-caught spiders, spiders fed monotypic diets for several weeks, and a few possible prey sources. We found that the chemical signature of wild-caught spiders was most comparable to that of spiders reared on springtails, a type of soil-dwelling decomposer. Meanwhile, the chemical signature of wild-caught spiders differed from that of spiders reared as cannibals, and spiders reared on midges, suggesting that cannibalism rates in the wild are quite low. The fact that these spiders primarily eat a decomposer is important, because it means that these spiders can affect decomposition rates, which in turn affect nutrient cycling in the tundra ecosystem.

Poster Number: 104

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

"Mass Spectrometric Studies on Modified Cysteinyl Peptides" /

Presenter: Tam Nguyen, Chemistry and Biochemistry Undergraduate Student

Mentor: Professor Saiful M. Chowdhury

Abstract:

Bioconjugation is a chemical strategy applied widely in labs for studying biomolecules. Cysteine and lysine are common residues for bioconjugation reactions; however, cysteine residues are more advantageous than lysine residues because of its low abundance on proteins. Maleimide is an effective electrophilic reagent that modifies cysteine residues on protein, but the reaction is irreversible. Recently 3,4-dibromomaleimide (DBM) has been introduced as a new type of maleimide with a reversible reaction. In this study, we proposed exploring the introduction of DBM to free cysteine residues on RGDC peptides by using tandem mass spectrometry. The results showed appearances of both RGDC-DBM and dimer peaks. These proved that DBM only reacted to free cysteine residues on peptides while it did not react to dimers without using dithiothreitol. RGDC-DBM bioconjugation contained a bromine atom in the structure, so it was easy to recognize its peak on the mass spectra â€“ the presence of a characteristic peak at (M+2) was almost the same high as the molecular ion peak. The study of modified cysteine residues is only the first step in the larger scale study of determining exactly the sites of modified cysteine residues on palmitoylated proteins on cell membranes in the future. Moreover, it will help to identify exactly locations of s-s bonds when TCEP and DBM will be used.

Poster Number: 105

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Digital Holographic Microscopy and Laser Microbeam for Cancer Cell Imaging and Manipulation

Presenter: Kien Nham, Physics Undergraduate Student

Mentor: Samarendra Mohanty

Group Members: Sivakumar Gajjeraman, Subrata Batabyal, Young Tae Kim

Abstract:

It is well known that biochemical changes in cancer cell occur in response to environmental cues and during migration. However, information about changes in the physical properties (e.g., volume, elasticity) of cancer cells during migration and/or in response to physical modulations (confinement and perturbations) are still lacking. We report the use of a near-infrared (NIR) laser microbeam system integrated with a NIR digital holographic microscopy (DHM) to study physical response of cancer cells under osmolarity changes of extracellular medium and/or laser-induced perturbations. An ultrafast tightly-focused laser microbeam was used to expose the cell to radiation pressure. The changes in optical thickness (or phase map) of the cells were monitored with high spatial and temporal resolution during and after the physico-chemical perturbations. We report characterization of dynamic changes in physical properties of various cells and observed differences in response to different physical/chemical environment/perturbations.

Poster Number: 106

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Organic Prosthetic Design

Presenter: Adam Williams, Kinesiology Undergraduate Student

Mentor: Dr. Mark Ricard

Abstract:

Most prosthetics today are shamefully outdated, and have not changed much since the pirate days of peg-legs and hook hands. While there are a few labs currently working on advanced designs they realistically will not be accessible to the majority of those who need them. In addition, modern prosthetics are severely limited in their range of motion because their designs are based on the exterior appearance of organic limbs and fail to understand how and why the body accomplishes its complex functions. I have been developing a prosthetic arm that essentially mimics the structure of the organic human body. I have applied what I have learned in biomechanics, physics, and functional anatomy to my knowledge of 3D modeling, programing, and stress analysis. I have several renditions of a 3D printed hand and arm that I have designed from scratch using anatomically accurate data. In doing this I hope to make advanced prosthetic designs that a patient will feel more confident about wearing and comfortable using. Major factors in my research include keeping the price low for the eventual customer, making the model highly customizable to accommodate the user, make it rugged and easily replaceable, and finally integrate a smart program database so the prosthetic may react to the environment on its own (without neural integration or surgery). Data from this research could benefit disable veterans, those born with disabilities, and possibly even military technology.

Poster Number: 107

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Personality and Social Factors Related to Forgiveness in a Hypothetical Conflict Situation

Presenter: Michael Perez, Psychology Undergraduate Student

Mentor: Jared Kenworthy

Group Members: Belinda Williams

Abstract:

The purpose of this study was to identify personality and social factors contributing to forgiveness between conservatives and liberals through a fictitious, violent political event. An online survey was administered through the SONA student subject pool as well as through Amazon Mechanical Turk's subject pool. Participant's levels of multicultural personality (cultural empathy, flexibility, open mindedness, social initiative, and emotional stability) and strength of identification within their own political group were measured. Following this, participants were presented with a fictitious news story involving a violent event against their respective group and were given items recording their opinions of forgiveness towards their opposing political group. A Pearson's r correlation was conducted and a small relationship was found between cultural empathy and open mindedness and support for future forgiveness between the two groups. However, individual's strength of group identification moderately related to discouragement of forgiveness. Findings from this study support the notion that possessing higher levels of empathy for other cultures and possessing an open mind relate to a higher likelihood to forgive intergroup political transgressions. Additionally, individuals who highly identify with their political groups are less likely to support reconciliation between group members. Results from this study could lead to additional research in regards to forgiveness and potentially promote the encouragement of open mindedness and empathy to potentially prevent radicalism and facilitate intergroup cooperation.

Poster Number: 108

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Exploring Extraction Methods for Drug Discovery through pH Manipulation

Presenter: Karen Boerner, Biology Undergraduate Student

Mentor: Kevin A. Schug

Group Members: Elizabeth Carpenter, Jessica Lilley, Markus Moore

Abstract:

An increasing problem in modern-day life is antibiotic resistant bacteria thatÂ leads to disastrous health effects, including the possibility of death. This has led to a major need for antimicrobial discovery that leads towards antibiotic development to counteract the antibiotic resistant bacteria. Marine life represents a largely unexplored region to search for antimicrobials. However, marine natural product collection is a difficult and costly procedure, which means small organism samples for scientists to work with and test in the laboratory. Because of this fact, our experiment focused on pH alteration to increase percent yield of crude extract from our marine natural sample. Our organism, a combination of Porphyra yezoensis and Porphyra tenera, showed to have the highest yield from methanol and then the higher pH gave a greater yield; however, unaffected pH had the highest percent yield overall. These results can help future scientists in our field in extraction by instructing them to use methanol versus ethanol or chloroform for an increase of around 10% in percent yield.

Poster Number: 109

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Jahn Teller Effects in Lead Ortho-Vanadate Chloride Minerals

Presenter: Melissa Orr, Chemistry and Biochemistry Undergraduate Student

Mentor: Dr. Robin Macaluso

Group Members: Natalia Quijano

Abstract:

Lead orthovanadate chloride minerals show promising signs of the second-order Jahn-Teller (SOJT) effect, a structural distortion which plays a key role in advanced materials for ferroelectric materials, non-linear optical materials, and microwave dielectrics. In the course of studying structure-property relationships in PbVO3Cl, we discovered that PbVO3Cl exhibits thermochromicity. Thermochromism is the color change of a compound due to temperature change and materials of this nature are of interest for data storage, microelectronics, and intelligent architectural glazing. Powder and single crystal samples of PbVO3Cl were synthesized. X-ray diffraction and X-ray fluorescence experiments will be presented.

Poster Number: 110

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Structural Determination of Silicon Oxycarbide Polymer Derived Ceramics by X-Ray Photoelectron Spectroscopy

Presenter: Hope Montgomery, Chemistry and Biochemistry Undergraduate Student

Mentor: Peter Kroll

Abstract:

Silicon Oxycarbide (SiCO) ceramics have a phase composition of silica (SiO_2), silicon carbide (SiC), and graphite (C). If synthesized at 1000°C, the materials are a mixture of an amorphous glass, into which "free" carbon is embedded. However, the structure of the amorphous state and how it develops upon further annealing up to 1400°C is still debated. While Si bonds to both O and C, the structure of the interface between SiCO glass and "free" carbon is unknown, and different hypotheses have been proposed. A "swiss-cheese" model proposes isolated carbon segregations surrounded by glass. A "nano-domain" model advocates that "free" carbon forms a three-dimensional graphene network enclosing silica domains, with a SiC-rich interface between SiO_2 and graphene.In this study, we analyze bonding in SiCO materials synthesized from pre-ceramic polymers, crushed to powders, and annealed at temperatures between 1000°C and 1400°C. Using X-ray Photoelectron Spectroscopy (XPS) we analyze changes in bonding as the annealing temperature increases. To avoid complications with so-called adventitious carbon, a surface contamination that develops when a material is exposed to air and regular atmosphere, we sputter the surface of the SiCO powders with argon, effectively removing the top few nanometers. Surprisingly, we not only observe a gradual change in bonding, as expected by the change in structure upon annealing, but also a significant difference between the composition of the material at the immediate surface and inside. Our results highlight the inhomogeneity of the SiCO powder samples and show that caution must be applied when interpreting XPS data.

Poster Number: 111

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Analysis of Cortical Neuron Stimulation via Patch clamp and How This / Can Affect Glioblastoma Multiforme Research /

Presenter: Eliezer Alvarado, Bioengineering Undergraduate Student

Mentor: Young-Tae Kim

Group Members: Loan Bui and Kien Nham

Abstract:

Glioblastoma multiforme (GBM) is a Grade IV astrocyte that has a 100% mortality rate with the standardized treatment of temozolomide (TMZ). An analysis of cortical neurons with laser stimulation via patch clamp was conducted to allow for testing in an environment similar to ex vivo conditions, where constant stimulation of the neurons is present in organic tissue.Â GBM cells and other drugs were added into the solution and analyzed by cell vitality and change in electrical current. Cell vitality was quantified by cell count, using PI (Propidium Iodide) and FDA (Fluorescein diacetate) staining, and the change in current was measured by patch clamp techniques. This experiment was unable to yield sufficient evidence to show that non-focused, near-IR pulsed laser stimulation produced enough a consistent electrical stimulation for the cell membrane without any optogenetic sensitization. This means that the laser did not provide enough stimulation to open the ion channels in a consistent manner. Consequently, chemical stimulation will be used for further testing.

Poster Number: 112

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Exposure to Music Outside of One's Culture and the Need for Cognitive Closure

Presenter: Whani Kim, Psychology Undergraduate Student

Mentor: Dr. Shannon Layman

Abstract:

Previous research suggests that novel stimuli are beneficial for cognitive development in individuals throughout the life span. The current study aimed to extend previous findings using novel stimuli by assessing how novel, culturally specific music affects college students' closed mindedness as assessed by the need for cognitive closure, or the avoidance of uncertainty or ambiguity (Kruglanski, 1989). Specifically, can exposure to novel music outside of one's culture reduce closed mindlessness or induce a lower need for cognitive closure? In the current study participants completed a demographics questionnaire and then listened to one of two pieces: An American folk song from North America and a Hispanic folk song from Latin America, which was followed by the Need for Closure Scale (NFCS) from Kruglanski et al. (1993). Based on results from a pilot study using short stories by Ernest Hemingway and Gabriel García Márquez, we hypothesize that participants that listen to music outside of their culture, as measured by their ethnicity and the ethnicity of the piece, will score lower in their need for cognitive closure than participants who listen to the music within their culture. All together these results would suggest that exposure to music outside of one's culture may provide a temporary tolerance to ambiguity and possibly enhance one's aptitude for creative thinking.

Poster Number: 113

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Characteristics of Bacteria Isolated from the Marine Sponge Amphimedon compressa

Presenter: Syed Ajaz, Biology Undergraduate Student

Mentor: Dr. Kevin A Schug

Group Members: Ariel O'Brien, Jonathan Ho, Matthew Mitchell, Teresa Tran, Dr. Laura Mydlarz

Abstract:

There is an ever growing need for novel antibiotics as the number of antibiotic resistant bacterial infections continues to rise. Bacteria that live symbiotically within the sponge Amphimedon compressa may be a promising source for the discovery of new antibiotic compounds. In this research six potential species of bacteria were isolated from A. compressa using sea salt based media. The bacteria were subjected to Gram staining to identify their structures and optical density to observe their growth. Methanolic crude extracts were obtained from five of the bacteria and tested for antibiotic activity against Escherichia coli using simple disc diffusion bioassays. At the conclusion of this research, no inhibitory activity of the extracts has yet been observed, and the bacteria have been partially identified as to their characteristics. The results of this research improve our understanding of the diversity of bacteria living within A. compressa and their potential in fighting infections. Future research may be able to completely identify the bacteria and discover new antibacterial compounds.

Poster Number: 114

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

The T in LGBT; an Analysis of Discrimination within the LGBT+ Community Towards Individuals that Identify in the Trans Spectrum

Presenter: Rebecca Clesse, Sociology and Anthropology Undergraduate Student

Mentor: Kelly Bergstrand

Abstract:

There have been many cases where trans individuals have been shown to face more discrimination within the LGBT+ population and society as a whole. Is there internal discrimination towards the trans population within the LGBT+ community? This research analyzes the level of discrimination found in the LGBT+ population towards trans individuals. After receiving IRB approval, it does so though ten semistructured interviews that ask interviewees about their personal experiences regarding the internal climate of the LGBT+ community whether there is prevalence of discrimination towards the trans population. We do find evidence that there are occurrences of the discrimination from LGB+ members towards T in other settings. However, the more involved with LGBT+ centric organizations a person is in the less likely they are to witness or experience the discrimination. This suggests that LGBT+ groups are centric in protecting the trans community and are a key source of support for those identifying within that spectrum.Â These results are crucial to the development of various resource centers geared towards LGBT+ individuals as well as more centrally focused trans focuses.

Poster Number: 115

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Identification and Verification of Housekeeping Genes in Nitrogen-Fixing Bacteria

Presenter: Amanda Plein, Biology Undergraduate Student

Mentor: Dr. Woo-Suk Chang

Group Members: Sanober Lateef, Dylan Parks

Abstract:

Housekeeping (HK) genes play an important role in gene expression analysis by serving as reference genes, which are utilized as a baseline for measuring gene expression under a variety of conditions. These HK genes are usually involved in basic cellular functions and thus, their expression should remain at relatively constant levels. Quantitative reverse transcription-polymerase chain reaction (qRT-PCR) is used to detect and monitor gene expression. Normalization of gene expression data depends on baseline experimental conditions and baseline expression of HK genes, therefore it is important to identify and verify true HK genes for qRT-PCR analysis. The goal of this study is to identify and confirm HK genes in Bradyrhizobium japonicum USDA110, a nitrogen fixing bacterium which forms a symbiotic relationship with soybean to provide the host with a source of nitrogen and receive photosynthetic products in return. By revealing HK genes, novel insights into gene expression for this agriculturally important species could be provided. HK genes found in B. japonicum could also be applied in closely related species by identifying homologs in other nitrogen-fixing symbiotic bacteria. To identify potential HK genes, we analyzed our previous DNA microarray-based gene expression data for B. japonicum under multiple treatments. As a result, we identified 8 constitutively expressed genes among 8,000 genes across all conditions. Their fold change values were within a range of $-0.25 < x < 0.25$. To validate these potential HK genes, we are underway to measure their expression in other experimental conditions, such as heat, acid, and heavy metal stress.

Poster Number: 116

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Neuroprotective Effect of Basil Leaf Extract on Hippocampal Cell Line Exposed to Ethanol

Presenter: Nadine Shihabeddin, Chemistry and Biochemistry Undergraduate Student

Mentor: Dr. Mandal

Group Members: Paromita, Monira

Abstract:

Basil plant (Ocimum basilicum) is commonly used in the South Asian part of the world, and it is utilized to aid the health of many. The plant is known to behave as an antioxidant. To further understand the potential of the basil leaf's ability to relieve oxidative stress and to observe its neuroprotective effect, basil was crushed and the extract was applied to mouse hippocampal cell line (HT-22) exposed to ethanol. The hippocampal cells' toxicity was reduced significantly after the application of the extract, and significantly greater cell viability was calculated when compared to the control cells treated with ethanol alone. These data suggest that basil can act as a neuroprotective agent for cells undergoing oxidative- stress cell death, potentially leading to aid in neurological disorders that undergo oxidative stress.

Poster Number: 117

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Search for the mechanism of action of Agelas conifera using bacterial cytological profiling

Presenter: Frances Lewis, Biology Undergraduate Student

Mentor: Dr. Laura Mydlarz

Group Members: Tam Tran, Stanley Uche

Abstract:

Over the past decades, as a result of factors such as extensive use, an increasing amount of antibiotics have become less effective in treating infectious diseases. Bacteria have evolved and successfully adapted to various antibiotics and their effects, which results in bacterial resistance. This issue has become one of the biggest health care problems that we have to face in our modern life, and the need for new antibiotics has become more important than ever. Scientists have turned their attention toward natural products to search for novel antibiotic properties. There have been a few studies about the marine sponge Agelas conifera that shows promising antibacterial activity, but the mechanism of action (MOA) still remains unknown. The mechanism of action is a fundamental step for understanding and developing new antibiotics. Therefore, this study mainly focuses on the search for the mechanism of action in A. conifera using a new method, called Bacterial Cytological Profiling (BCP). A. conifera was subjected to a methanol extraction process and preliminary disk diffusion bioassays were held to confirm antibacterial activity. The preliminary optical density bioassay results suggest evidence of similarity of MOAs between A. conifera's fractions and known antibiotics. The model antibiotics that were similar to the fractions are DNA synthesis inhibitors and cell wall synthesis inhibitors. To complete BCP, fluorescence microscopy will be used to analyze and compare the cell morphology of treated bacteria with fractions and known antibiotics. Preliminary fluorescence microscopy images of untreated Escherichia coli cells have been captured.

Poster Number: 118

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Effects of the circadian feedback genes on symbiotic nitrogen-fixing bacteria

Presenter: Arunika Oyshi, Biology Undergraduate Student

Mentor: Dr. Woo-Suk Chang

Group Members: Christina W. Koo, Dylan B. Parks, Sanober Lateef, Sanjaya K. Shrestha, Dan C. Chu, Hae-In Lee.

Abstract:

Bradyrhizobium sp. strain ORS278 possesses photosynthetic and nitrogen-fixing abilities in association with tropical legume plants in the Aeschynomene species, forming nodules on both roots and stems of the plants. In these nodules, the bacteria supply the plant with nitrogen via nitrogen fixation and receive nutrients from the plant. Since the nitrogenase enzyme responsible for nitrogen fixation is oxygen-labile, the end product of photosynthesis could be disruptive to this process. Thus, we hypothesize that Bradyrhizobium sp. ORS278 will fix nitrogen only at night and perform photosynthesis during the day. In the previous study, two genes were independently mutagenized via double-homologous recombination; BRADO4470 (labA), encoding a putative protein that likely functions in circadian feedback, and BRADO3946, encoding a putative sensor histidine kinase that may be involved in the temporal regulation of nitrogen fixation and possibly feedback control of circadian rhythm in photosynthesis. In this study, the symbiotic phenotype of BRADO4470 and BRADO3946 mutants was compared to the wild-type in Aeschynomene indica plants using an acetylene reduction assay, which measures nitrogenase activity. As a result, the wild-type fixed nitrogen primarily during the night, while the mutant strains did not. To further investigate that BRADO4470 and BRADO3946 are involved in circadian feedback systems, we are underway to measure expression levels of these genes and others that are associated with the circadian oscillator system via quantitative reverse-transcription polymerase chain reaction (qRT-PCR). A better understanding of these symbiotic genes could allow optimization of bacterial nitrogen fixation, possibly leading to more prolific agricultural practices.

Poster Number: 119

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Intact Protein Separation for Quantitative Analysis Using Liquid Chromatography Triple Quadrupole Mass Spectrometry

Presenter: Yashaswini Nagarajan, Chemistry and Biochemistry Undergraduate Student

Mentor: Dr. Kevin A. Schug

Group Members: Evleyn H. Wang

Abstract:

Protein is essential for life and found everywhere in our body. However, abnormal amount of protein in urine often correlates to diseases including sickle cell anemia, polycystic kidney disease, and various forms of cancer. For example, anterior gradient protein-2 (AGR2) is a protein found in urine correlated to breast cancer. The current method of analyzing urine is the dipstick test, where protein level is estimated. However, this method is not accurate, sensitive, nor informative enough to detect trace amounts in a complex matrix for early diagnosis. To combat the difficulties of quantifying proteins in complex matrices, liquid chromatography is used, which separates different types of protein for later quantitation using the triple quadrupole mass spectrometer (QQQ-MS). This method, unlike the dipstick test, is informative about the type of protein present, which is important to indicate different diseases. The advantages of using QQQ-MS, compared to the dipstick test, are the higher sensitivity and quantitation accuracy to aid early clinical diagnosis. Intact protein standards including lysozyme, Î±-lactalbumin, ubiquitin, myoglobin, and cytochrome c (from bovine and equine) were used to develop and optimize the separation method. Parameters including acid concentration, temperature, gradient volume, flow rate, stationary phases, and mobile phases, were altered to enhance protein separation and signal intensities. The successfully optimized LC-MS method for protein quantitation will contribute to the oncological and medical field's knowledge in diagnostics.

Poster Number: 120

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Analysis of Compounds from Sargassum fluitans for Motility Inhibition against Pseudomonas aeruginosa

Presenter: Kyrell Dixon, Chemistry and Biochemistry Undergraduate Student

Mentor: Dr. Laura Mydlarz

Group Members: Daeyoung Lee, Nethania Ammanuel, Jose Segovia, Danajaye K. Appulage, Laura D. Mydlarz, Kevin Schugg

Abstract:

As bacteria become increasingly resistant to modern day antibiotics and sterilization techniques, new methods must be developed to counteract the bacterial resistance. Marine natural products are a potential solution to the growing problem of bacterial resistance. Phenols such as the phlorotannins found in brown algae have been shown to be antibacterial. They have also shown evidence of inhibiting motility of some bacteria. Our team aimed to investigate a method to disrupt the motility of Pseudomonas aeruginosa using the marine brown algae Sargassum fluitans. A standard motility assay using a solid sample extract of S. fluitans was used to determine its motility inhibiting properties. Following the assay, the Folin-Ciocalteu method was used to determine the presence of phlorotannins that were hypothesized to be responsible for the motility inhibition. We were able to determine through qualitative analysis that the extract contained phlorotannins and that the extract was indeed responsible for the motility inhibition. These findings have great relevance and importance to public health specifically in medicine and the food industry. Bacterial motility inhibition is a safe, cheap technique that can be utilized to combat bacterial infection and biofilm formation. These findings can provide other researchers with insight into the efficacy of marine organisms in counteracting the spread and of harmful bacteria.

Poster Number: 121

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Possible Antibacterial Activity of Sticholysins found in the Sea Anemone /

Presenter: andres urias, Biology Undergraduate Student

Mentor: Dr. Laura Mydlarz

Group Members: Christine T Le, Cherokee D Sauer, Thaddeus M Veranga

Abstract:

Antibacterial resistance has become an increasing issue in the last few decades, leading to research on novel, natural products. Stichodactyla helianthus, a sea anemone commonly found in Puerto Rico, has possible antibacterial properties found in its pore-forming toxin, sticholysin. In this experiment, a method to extract sticholysin was implemented that allowed the subsequent concentration of the pore-forming toxin. Lipid extraction, fractionation through gel filtration, and determination of sticholysin-rich fractions via the ultraviolet-visible spectrophotometry (UV/Vis) were the techniques implemented to increase the concentration of sticholysin. The methods attempted in this experiment were able to extract the sticholysin, as well as remove impurities from the solution without major preparation of the sample beforehand. The increased concentration of sticholysin was then tested against Escherichia coli using the Kirby-Bauer bioassay method. Even though no notable zones of inhibition were recorded, the method outlined was able to concentrate the sticholysin, which can be used to analyze sticholysin's possible antibacterial activity on instrumentation with higher sensitivity for the differentiation of antibacterial activity.

Poster Number: 122

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Expression of Heat Shock Protein 70 in Response to Increased Temperatures in Symbiodinium

Presenter: Bren Ledbetter, Biology Undergraduate Student

Mentor: Laura Mydlarz

Group Members: Contessa Ricci

Abstract:

Coral reefs are considered biodiversity hot spots in the world's oceans, providing shelter and food for thousands of species. While coral are able to filter-feed they predominately rely on nutrients provided by the photosynthetic algae, Symbiodinium. Symbiodinium form a symbiotic relationship and live within the coral. Unfortunately, as ocean temperatures rise due to global warming, the coral can become stressed and eject or destroy the algae. This leads to a loss of pigmentation in the coral known as bleaching. Bleaching events lead to unhealthy and less diverse reefs. A better understanding of the complex symbiosis between coral and Symbiodinium, particularly the cell to cell interactions, will be essential to protect, restore, and manage reefs in the future. After we subjected a strain of Symbiodinium to a period of heat stress, cell surface membrane proteins were isolated using avidin purification with a biotin probe. Samples were analyzed using nanospray LCMS/MS and the spectra were matched to a predicted proteome that was published by the Okinawa Institute of Science and Technology. Using this method, we were able to detect the presence of Heat Shock Protein 70. This is a molecular chaperone that is known to be expressed on the cell surface of several species and may be indicative of potential changes in protein stabilization during stress. Quantitative changes in the expression of this protein by heat stressed Symbiodiunium will be presented.

Poster Number: 123

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

METRIC: Measurement, Education and Tracking in Integrated Care: Strategies to Increase Patient Engagement and Reduce Mental Health Disparities among Hispanics /

Presenter: Jovana Valdez, School of Social Work Undergraduate Student

Mentor: Katherine Sanchez

Group Members: Katherine Sanchez / Brittany Hernandez / Monica Lechuga / Karina Morales

Abstract:

Depression is a worldwide issue that affects many individuals of various ages and of different backgrounds. It is noticeable in minority groups in the U.S by the few services they are offered and take opportunity of receiving. Factors as to why minorities, in particular Hispanics, don't believe that they need medical treatment is thought to be related to cultural factors such as relying on family and social networks for support instead of medical providers or medications, fear of treatment for depression, and having low health knowledge of their disease. The purpose of this presentation is to discuss the role of education to improve depression detection and treatment within the Hispanic community. Specifically, a research project, METRIC: Measurement, Education and Tracking in Integrated Care: Strategies to Increase Patient Engagement and Reduce Mental Health Disparities among Hispanics is being conducted at one community health center whose patient population is primarily Hispanics. The goals of METRIC are to1) examine the specific effects of a Depression Education Fotonovela (DEF) to increase knowledge, reduce stigma, and increase engagement in depression treatment among Hispanic patients; 2) to evaluate the impact of Measurement-Based Integrated Care (MBIC) for the treatment of depression in one community-based Federally Qualified Health Centers (FQHC) in Hispanic adult primary care; and 3) to examine the feasibility of universal screening and to have accurate detection of depression within the adult Hispanic patients, utilizing innovative iPad Depression Screening Technology.

Poster Number: 124

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Detrital Zircon U-Pb Geochronology and Sedimentary Provenance of Oligocene-Miocene Strata in South Texas

Presenter: Elizabeth Brown, Earth and Environmental Sciences Undergraduate Student

Mentor: Majie Fan

Abstract:

This study applies detrital zircon U-Pb geochronology to constrain the timing and provenance of Oligocene-Miocene sandstones in south Texas by using maximum depositional ages based on a cluster of youngest U-Pb ages of detrital zircons. It has been suggested that the Oligocene-Miocene sedimentary rocks in western and northwestern North America have abundant volcanic zircons derived from volcanic activities in western and southwestern North America, thus the maximum depositional ages may provide tight constraints on the depositional ages of these sedimentary rocks. Seven samples have been collected from the region, and approximately 100 zircons from each sample will be selected and analyzed on a LA-ICP-MS in order to date the grains. Age groups will be determined by identifying three or more grains with overlapping ages in order to determine a maximum depositional age. After filtering the data for discordance, normalized relative age probability diagrams will be constructed from concordant data. These diagrams will display age data in such a way that modes, ranges and proportions will relate to the timing and significance of geologic events.

Poster Number: 125

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Isolation of the Cell Wall from the Gram-Positive Bacillus subtilis to use as Affinity Capture for Antibacterial Compounds from Natural Products

Presenter: Brett Hadfield, Chemistry and Biochemistry Undergraduate Student

Mentor: Kevin A. Schug

Group Members: Misty S. Martin, Jaclyn B. Bazaldua, Jordan A. Eicke, Yu-sheng Sung, Dananjaya K. Appulage, Laura D. Mydlarz

Abstract:

Antibiotic-resistant bacteria are becoming high priority pathogens due to the increasing occurrence of infection and the limited available, effective treatments. A novel approach for antibacterial compound extraction has been previously addressed with a polymer mesh screen functionalized with synthetic tripeptide L-lysine-D-alanine-D-alanine (Kaa). Here we discuss an approach to isolate the cell wall containing the Kaa site from the Gram-positive Bacillus subtilis in order to use the site as an affinity capture for antibacterial compounds from natural products. Through preliminary gram-staining, the presence of the cell wall could qualitatively be confirmed. However, matrix assisted laser desorption ionization time of flight mass spectrometry (MALDI-TOF MS) was not able to detect the presence of the cell wall. B. subtilis has proven to not be a suitable model for the methods applied in this practice. Once a suitable method for isolation can be determined, the application of this work could potentially aid in the discovery of new chemical entities

Poster Number: 126

Bluebonnet Ballroom, 12:00 PM to 1:30 PM

Pretty colors or a future of clean light.

Presenter: Phuong Anh Do, Physics Undergraduate Student

Mentor: Dr. Wei Chen

Group Members:

Abstract:

Barium sulfate (BaSO4) particles doped with rare earth materials (Eu, Tb, and Dy) at different concentrations have been made in lab and characterized by several instruments in order to confirm their features and predict their possible properties. The BaSO4:Eu, Tb, and Dy samples emit red, green, and blue luminescence under ultraviolet light, respectively, which can be observed with the human eye due to the fact that their absorbed radiation is in the ultraviolet area of the spectrum. The intensity of the luminescence was tested by a spectrometer, and it showed that different concentrations of doped materials gave different relative intensities of luminescence. As such, these samples could be combined in certain ways to give away white light, and show potential applications for their tunable fluorescence in fields like lighting, analytical chemistry, and biochemistry.