

ABSTRACT BOOK

TEXAS TECH UNIVERSITY
UNDERGRADUATE RESEARCH CONFERENCE
April 11–15, 2011

DISCOVER...CREATE...INSPIRE...
through
Undergraduate Research

Texas Tech University Undergraduate Research Conference

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Texas Tech University Undergraduate Research Conference

Event Schedule

Supported by the following undergraduate research partners:

Center for Undergraduate Research
Office of the Vice President for Research
TTU/HHMI Program at CISER
University Honors College

Monday, April 11

11:00 AM – 1:00 PM Kickoff Celebration: *Engineering Key*
2:00 PM – 4:00 PM Registration & Poster Set-Up: *SUB, Ballroom*
4:00 PM – 5:00 PM Opening Ceremonies: *SUB, Ballroom*

Tuesday, April 12

10:00 AM – 11:30 AM Oral Presentations: *SUB, Arroyo*
12:00 PM – 1:00 PM Undergraduate Research Luncheon: *SUB, Red Raider Lounge*
1:30 PM – 3:00 PM Oral Presentations: *SUB, Arroyo*

Wednesday, April 13

10:00 AM – 11:30 AM Poster & Oral Presentations: *SUB, Ballroom*
11:30 AM – 1:30 PM Raider Research Fair: *SUB, Ballroom*
1:30 PM – 3:00 PM Poster Presentations: *SUB, Ballroom*
3:00 PM – 4:00 PM Closing Ceremonies: *SUB, Ballroom*

Thursday, April 14

6:00 PM – 7:30 PM CUR Spring Banquet: *Merket Alumni Center*

Friday, April 15

6:00 PM – 7:30 PM TTU/HHMI Spring Banquet

Texas Tech University

Undergraduate Research Conference

Acknowledgments

The TTU Undergraduate Research Conference committee would like to extend a special thanks to the following supporters for their contributions and dedication towards making the URC a success. A special thanks to the following:

- CISER, CUR, and University Honors College faculty, staff, and students for providing invaluable administrative assistance, program editing, and planning support for the conference.
- Presenters, Faculty Mentors, Raider Research Fair participants, Session presenters, Moderators, and Poster / Paper Evaluators.
- Office of the Provost, President, and the Vice President for Research for supporting the conference.
- Undergraduate Research Conference Committee for their dedication to undergraduate research and the spring conference:
 - Center for Undergraduate Research Staff
 - Julie Isom, Associate Program Director of Administration, TTU/HHMI at CISER
 - Dr. Marjean Purinton, Professor & Associate Dean, University Honors College
 - Donna Srader, Undergraduate Research Coordinator, University Honors College
- TTU Library for hosting sessions, providing conference space, and actively supporting undergraduate researchers.
- All TTU campus partners for assisting with the preparation for the conference.



TEXAS TECH UNIVERSITY

Center *for* Undergraduate Research

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TEXAS TECH UNIVERSITY

Center *for* Undergraduate Research™

The Center for Undergraduate Research recruits, promotes, and supports TTU undergraduates, faculty, and staff. The Center is committed to the advancement of knowledge, fostering intellectual and personal development, and creating meaningful research and service for both students and faculty.

The Center provides resources for undergraduate students interested in conducting research under the guidance of a faculty mentor. Throughout the semester, the Center hosts educational trainings for students targeted at organizing, conducting, and presenting research, preparing for graduate school, and ethics and research discussions.

This spring the Center awarded competitive travel scholarships for undergraduate researchers. More than 20 travel awards provided assistance for students to present research at local and national conferences. The Center also hosts an annual spring banquet to support undergraduate researchers, graduating scholars, and faculty mentors. Join us this spring as we celebrate TTU undergraduate researchers on April 14, 2011 at the TTU Merket Alumni Center.

To learn more about the Center and resources we provide, please visit undergraduateresearch.ttu.edu or stop by Doak Hall, Room 125.



TEXAS TECH UNIVERSITY

CISER: Center for the Integration of Science Education & Research™

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TEXAS TECH UNIVERSITY

CISER: Center for the Integration of Science Education & Research™

Texas Tech University's Howard Hughes Medical Institute Undergraduate Science Education Program at CISER

The Howard Hughes Medical Institute is a nonprofit medical research organization founded in 1953 by aviator-industrialist Howard Hughes. The institute's major activity is to support the research by its hundreds of investigators located at medical schools, universities, and research institutes throughout the U.S.A. In 1988, it instituted a grants program to strengthen education in biological and related sciences at the graduate, undergraduate, and precollege levels; to increase public understanding of science; and to support fundamental biomedical research abroad and research resources at U.S. medical schools. The institute's undergraduate science education program, the largest private initiative of its kind in the U.S.A., has awarded over \$500 million.

Texas Tech University has enjoyed extraordinary success in the research universities round of the undergraduate grants competitions. The five awards received by TTU since 1992, total of \$7.8 million and represent the most HHMI funding received by any Texas institution and the only university to receive consecutive funding from HHMI. The TTU/HHMI grant program was institutionalized as the TTU Center for the Integration of Science Education and Research (CISER), a university-wide center expanding our science education and research initiatives. With the awarding of the fifth consecutive grant, we joined an elite group of universities such as the Massachusetts Institute of Technology, Purdue University, and the Harvard University.

Student Development and Broadening Access to Science

TTU/HHMI Undergraduate Research/Technology Scholars form the cornerstone of our program. We emphasize early and continuous involvement by undergraduate students in long-term research projects with faculty mentors. Since 1992, we have supported the research efforts of over 400 students. These students have been authors on almost 100 refereed scientific publications (many with senior authorship and publication in the leading journals of their respective fields). They have presented their research at over 300 professional scientific meetings. The graduates of our program have been admitted to nationally ranked Ph.D. and M.D./Ph.D. programs, as well professional schools offering MD, DVM and DDS degrees. With the 1998 grant we extended our undergraduate research model to students in the science teacher certification program in the TTU College of Education. The TTU/HHMI Science Education Scholars are involved in our pre-college outreach efforts in addition to being involved in a summer research experience.

Current and Future Faculty Development

The TTU/HHMI Graduate Teaching Scholars (GTS) Program and the new Postdoctoral Teaching Scholars (PTS) Program emphasize interaction with and mentoring by outstanding TTU teaching faculty, with the objective of producing the next generation of university teachers. The Scholars are paired with a mentor based on mutual research interests. The Scholars participate in mentoring activities, workshops/seminars sponsored by the TTU Teaching, Learning and Technology Center or DBS. The Graduate Technology Scholars Program, gives graduate Scholars the experience supervising the Undergraduate Technology Scholars (UTS), working with new technologies relative to CISER and scientific research projects.



TEXAS TECH UNIVERSITY

CISER: Center for the Integration of Science Education & Research™

Laboratory Equipment Upgrades and Curriculum Development

The HHMI grants have provided major equipment upgrades for the introductory biology, cell biology/plant physiology, and animal physiology laboratory courses. The third grant provided major support for the development of the Integrated Science course in the Honors College and a significant upgrade to the equipment in the Experimental Biochemistry course. The first three grants supported the creation of a TTU/HHMI Core Cell and Molecular Biology Teaching Laboratory and the development of a course in techniques of cell and molecular biology. The core lab equipment has benefited a number of other courses and mentor research.

Science Education

The TTU/HHMI Science Education Program has had a major positive impact upon K-12 education in Texas. Highlights of the pre-college outreach activities at CISER include:

The Traveling Laboratory Program: We deliver fully equipped and supplied laboratories to high school and junior high school classrooms across the region. The labs travel thousands of miles per year and affect the education of approximately 10,000 students annually. Teachers are provided training in summer workshops to gain the opportunity to have the labs in their schools.

Small Grants Program: We have awarded hundreds of small grants of amounts up to \$500 to area teachers, who have used the grants to equip new lab exercises, implement innovative ideas or travel to state and national meetings to present workshops.

Summer Teacher and Research Partners: We provide summer research opportunities in TTU and TTUHSC settings for area science teachers. In addition, area teachers work with the HHMI staff in program activities including teacher workshops and camps for K-12 students.

Project Future: We partner with the College of Education in this program designed to prepare minority students as 1st generation college students for future careers in teaching.

Science, It's a Girl Thing: This camp for middle school and high school girls was created by our program in collaboration with a long-term partner, IDEAL (Institute for the Development and Enrichment of Advanced Learners).

IDEAL Super Saturdays and Shake Hands with Your Future: The Science Education Scholars gain valuable K-12 teaching experience by serving as science instructors in both of these programs designed to provide science enrichment opportunities for pre-college students.

Give Teaching a Chance: The TTU/HHMI Science Education Scholars designed and piloted a new program designed to offer science majors the opportunity to be involved in K-12 science education. The class is now a three hour, upper level biology class offered each spring.

Science Teacher Academy at CISER (STAC): Our academy focuses on recruitment, retention, and training of pre-service and in-service teachers for grades K-12. New teachers receive assistance in their classrooms from the associate director of outreach, the pre-college outreach coordinator, science education scholars, as well as master teachers in the area.

GLOBE: As an international training site for teachers at TTU, we provide training for teachers in GLOBE (Global Learning Observations to Benefit the Environment). This program provides training and guidelines for teachers to apply inquiry techniques in teaching students about relevant science as they interact in an international community.

T-STEM Center: Our newest partnership with the Center for Engineering Outreach and the TTU Outdoor School at Junction focuses on science, technology, engineering and math integration with a relevance to students, and an emphasis on engineering.



TEXAS TECH UNIVERSITY
Honors College™

Staff:

Dr. Marjean Purinton, Professor & Associate Dean
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TEXAS TECH UNIVERSITY
Honors College™

Honors College Undergraduate Research Fellowship

The Honors College promotes the professional development of researchers and scholars through its Undergraduate Research Fellowship Program (URF). This co-curricular opportunity enables motivated and curious students to participate in the commitment made by the university to research across disciplines and in interdisciplinary venues. The URF Program encourages Honors students' collaborations with research faculty so as to learn the methods, strategies, process, and responsible conduct expected of researchers in that field.

In collaboration with other undergraduate research programs on campus, such as the Howard Hughes Medical Institution scholars and the Undergraduate Research Center students, Fellows participate in various professional development workshops relevant to research, scholarship, conference presentations, and publication.

Fellows are paid for their year-long participation in the program, their salaries funded by a grant from the C.H. and Helen Jones Foundation. Fellows share their research/scholarship each spring in poster or paper presentations at the annual Undergraduate Research Conference. Some Fellows also present their work at regional and discipline-specific conferences.

Participation in the Undergraduate Research Fellowship Program prepares Fellows to step right into graduate programs, corporate-sponsored research opportunities, community-based research and grant-writing activities, and competitive scholarships. The program helps Fellows make transitions between the student-centered undergraduate experience to research and scholar-centered professional development. The faculty mentor-Fellow relationship generates role-modeling and professional networking that Honors students find extremely beneficial in their futures.

The Honors College takes great pride in the work being presented by its Undergraduate Research Fellows at this conference, and we invite you to enjoy the excitement and the energy their scholarship generates.

Texas Tech University Undergraduate Research Conference

Presentations by Affiliation

Poster Presentations

Center for Undergraduate Research

10: Blackwell, Stephanie
14: Brun, Carlos
33: Enih, Monique
37: Ferguson, Daniel
45: Horton, Brian
47: Hutton, Kelly
52: Laxane, Pallavi
54: Lees, Jess
61: Matthey, Alexander
62: McDonald, Priscilla
64: Merry, Nathaniel
66: Nelson, Andrew
84: Snow, John
93: Willingham, Meagan

TTU/HHMI at CISER

1: Abraham, Lesley
2: Ajmal, Aziba
8: Armstrong, Andrew
9: Ayankola, Olusola
11: Brewer, Will
18: Campos, David
20: Chen, Jeffrey
23: Collins, Emily
25: Cortinas, Abel
27: Daniels, Christopher
35: Estrada, Mayra
39: Galindo, Erik
48: Ibarra, Bianca
52: Laxane, Pallavi
53: Le, Loc
54: Lees, Jess
65: Moreland, Mason
68: Oostveen, Emily
70: Phillips, Jack
72: Powell, Emily
77: Salles, Jennelle
80: Scott, Ann Marie

84: Snow, John
86: Subedi, Sishir
88: Trivedi, Urvish
92: Warden, Anastasia
94: Zimmerer, Natalie

Honors

6: Amor, Wail
17: Calhoun, John
22: Cloutier, Aimee
26: Courtney, William
32: Embry, Brittany
41: George, Jessica
51: Judkins, Eileen
55: Lelko, Rebecca
58: Martin, Joseph
59: Mathew, Alison
60: Mathew, Marylyn
63: Medlin, Kandace
81: Shanks, Lindzi
85: Stull, Sierra
87: Tran, An
89: Venhaus, Dustin
90: Venkataraman, Ashwin

Paper Presentations

Center for Undergraduate Research

28: Darnell, Heather Marie
78: Sanchez, Jasmine

Honors

5: Allen, Kristen
24: Connolly, Cara
36: Fenske, John
44: Hester, Neil
57: Luker, Brittany
67: O'Neal, Caitlin
74: Ray, Rachel

Texas Tech University Undergraduate Research Conference

Presentation Abstracts

1: Abraham, Lesley

CELL SIZE AND GROWTH RATE ARE MAJOR DETERMINANTS OF REPLICATIVE LIFESPAN

Abraham, L., Dungrawala, H., Yang, J., Manukyan, A., Hua, H., Lane, W., Mead, H., Wright, J., and L. Schneider, B.

Texas Tech University Health Sciences Center, Cell Biology and Biochemistry, Texas Tech University

Genetic studies imply that myriad of genes modulate cellular lifespan. Counter-intuitively loss-of-function of a number of highly conserved genes extends lifespan. In addition, dietary restriction is a nearly universal means for increasing the lifespan of cells and organisms. Nonetheless, the mechanisms that control cellular lifespan are not well understood. To address this, we use the budding yeast as a model system to investigate the genetics of aging. As yeast cells near senescence, proliferation slows; however, cell growth continues unchecked. The end result is a gradual increase in cell size with age. Similarly, old mammalian cells are often two to three times larger than young cells. Our analyses of two systematic genome-wide size mutant screens have revealed that a number of gene deletions involved in cell size control also alter lifespan. To test the hypothesis that there is a relationship between size and longevity, cell growth and size were measured during real time replicative lifespan assays. Results revealed that lifespan was strongly proportional to both size and growth rate. For example, large cells grow, divide and age dramatically faster than small cells. Conversely, small cell mutants age slowly and are long-lived. In addition, conditions that reduce growth, such as dietary restriction and ribosomal gene deletions, also reduce cell size and increase lifespan. Investigation of the mechanisms involved suggests that attainment of a maximal size induces senescence. From our studies, we infer that dietary restriction extends cellular lifespan in large part by decreasing cell size and reducing growth rate.

2: Ajmal, Aziba

THE PSEUDOMONAS AERUGINOSA IRON-RELATED REGULATORY SYSTEM INCLUDES PA2383 AND PA2384 GENES

Ajmal, A., Kruczek, C., and Hamood A.

Microbiology and Immunology, Texas Tech University

The production of virulence factors by the opportunistic gram-negative pathogen *Pseudomonas aeruginosa* is regulated by different environmental conditions within the host, including the availability of iron. Iron activates the ferric uptake regulator Fur, which in turn represses the expression of several genes including the exotoxin A and the siderophore (pyoverdine and pyochelin) genes. However, Fur itself is not regulated by iron. So far, other regulators that function like Fur have not been fully characterized. Initial analyses suggested that the PA2384 gene is a global regulator of both iron-controlled and cell-to-cell communication (quorum sensing) genes. We recently showed that PA2384 expression is significantly enhanced by serum at early stages of growth of the *P. aeruginosa* strain PAO1. In this study, we provide further analyses of PA2384 and its adjacent gene PA2383. PA2384 codes for an 11.56 kDa predicted protein that carries a potential Fur binding motif at its amino terminus region. PA2383, which is located 42 bp 3' of PA2384, codes for a 33.29 kDa predicted protein that belongs to the LysR family of transcriptional activators. The protein carries a potential DNA binding (helix-turn-helix) motif at its amino terminus region and a typical LysR ligand-binding domain at its carboxyl terminus region. Using a PAO1 strain that carries a

chromosomal PA2384 transcriptional fusion, we examined the effect of iron on PA2384 expression. At different time points, iron significantly repressed PA2384 expression. Yet, both PAO1 and its PA2384-deficient mutant produced comparable levels of pyoverdine siderophores. Additionally, iron reduced pyoverdine production by both strains. Furthermore, the two strains produced similar levels of the quorum sensing controlled virulence factor elastase. These results suggest that: 1) PA2384-PA2383 is part of the *P. aeruginosa* iron-related regulatory network, 2) PA2384 may function like Fur but is stringently regulated by iron, 3) iron does not regulate pyoverdine production in *P. aeruginosa* through PA2384, and 4) PA2384 may not regulate elastases production.

3: Al-Afyouni, Malik

SYNTHESIS AND REACTIVITY OF TRANSITION METAL COMPLEXES CONTAINING STERICALLY EXPANDED ARENE LIGANDS

Al-Afyouni, M., Hung-Low, F., and Bradley, C.A.

Chemistry and Biochemistry, Texas Tech University

Our group has recently discovered that cyclopentadienyl Co(I) arene triple decker complexes can break sp³ C-H bonds in activated substrates at ambient temperature, permitting transfer dehydrogenation in silyl protected amines. Coinciding with mechanistic studies of these systems, we hope to develop more reactive, monomeric cobalt arene complexes. In pursuit of this goal, several sterically expanded arenes have been prepared via Friedel-Crafts reactions. The coordination chemistry of these arenes have been explored for the first time with Mo(0) and Ru(II), both metals are well known to form arene compounds. Characterization of these complexes by NMR and IR spectroscopy, electrochemistry, and X-ray crystallography will be presented. Efforts towards preparation of the desired cyclopentadienyl cobalt arene complexes will also be discussed along with their reactivity toward C-H bonds.

4: Al-Buraiki, Mohamed

DEVELOPMENT OF A PORTABLE FLUID FLOW APPARATUS FOR CONDUCTING MULTIPHASE FLOW WITH VISUALIZATION

Al-Buraiki, M. and Burgess, M.

Petroleum Engineer, Texas Tech University

Computerized Tomography is a powerful tool to understand the behavior of fluids as they flow through a porous medium. It has been used by the Petroleum Industry for 30 years to measure flow characteristics in a nondestructive and noninvasive way. CT helps in visualizing and quantifying multiple phase flow in rocks, which is important in production forecasting and Enhanced Oil Recovery. This tool, however, presents challenges that must be overcome on an individual basis. Texas Tech University's Petroleum Engineering Department recently acquired a CT scanner which required a fluid flow apparatus to be custom built to needed specifications. Among other things, the apparatus must be portable so that it can be taken in and out of the CT room, it must have a core holder that is transparent to CT, it must have the ability to be saturated in-situ, and it must have the ability to flow multiple fluids either together or individually. We built the apparatus to be completely self-contained on a cart and adapted to work with the CT scanner using a special made coreholder and custom made manifold to direct the fluid flow. This paper discusses the process of creating this apparatus and our end product.

5: Allen, Kristen

AN INVESTIGATION OF THE EXPERIENCE LEVELS AND SWEETNESS PREFERENCES OF WINE CONSUMERS

Allen, K.M., Duhan, D.F., Kolyesnikova, N., and Dodd, T.H.

Marketing, Texas Tech University

It is widely believed that wine consumers with greater experience are more likely to prefer dry wines. This relationship is referred to as the “conventional wisdom” (CW) hypothesis. A series of related studies were completed in this research investigating this and other hypotheses. The first study found no support for the CW hypothesis. Although it is entirely possible that conventional wisdom is wrong, other possible explanations for this finding were investigated before that conclusion could be drawn. They include: (1) a lack of effective manipulation of the sweetness level (a Just Noticeable Difference problem), (2) a sampling bias regarding age & experience (a lack of variance) and a lack of statistical power (small sample size). A second study replicated and extended the first. The extension expanded the range of the wine sweetness levels and the range of participant experience levels, as well as expanding the sample size. The second study also found little support for the CW hypothesis. To verify that the lack of support was not an artifact of the use of “preference” as a criterion variable, the third study was conducted that replicated the second and also collected assessments of perceived sweetness. The results of this study are being analyzed and will be reported at the Undergraduate Research Conference. Future research on this issue should explore (1) the influence of additional wine characteristics (e.g. tannins, acidity, viscosity, etc.) and their interaction with the Just Noticeable Differences among wines, and (2) the influence of “order effects” in conventional wine tasting methods.

6: Amor, Wail

GARLIC CREAM INHIBITS BIOFILM PRODUCTION BY BACTERIAL PATHOGENS FROM BURN WOUNDS

Amor, W., Nidadavolu, P., Dertien, J., Colmer-Hamood, J.A., and Hamood, A.N.

Microbiology-TTUHSC, Texas Tech University

The skin, a physical barrier that protects the underlying tissues from invading micro-organisms, is destroyed during thermal injury (burn). Thermal injury also depresses the host’s immune system resulting in an immunocompromised condition. Together, these two conditions facilitate the colonization and infection of the burn wound with potentially pathogenic microorganisms. Within the wound, many of these pathogens exist within structures termed biofilms. Biofilms protect the bacteria from the host response and enhance their resistance to different antibiotics. Burn wounds are predominantly colonized by *Pseudomonas*, *Staphylococcus*, *Serratia*, *Klebsiella*, and *Enterococcus*. Some of these pathogens are highly resistant to different antibiotics. Therefore, it is essential to investigate novel antimicrobial agents. In this study, we utilized our recently developed in vitro wound biofilm model to examine the effectiveness of formulated garlic cream (G-cream) in eliminating biofilms produced by wound pathogens. Different strains were individually inoculated onto nitrocellulose disks that were placed on agar plates. Equal amounts of either control cream or G-cream were evenly spread on the surface of bandages, which were then placed on the inoculated disks. We tested two garlic concentrations; 162 and 195 mg/cm². After incubation at 37°C for 24 hours, the bandages were removed and the biofilms were quantified and visualized. The numbers of microorganisms recovered from disks covered with G-cream bandages (at either concentration) were significantly less than those recovered from disks covered with control cream bandages. Confocal laser scanning microscopy confirmed these results. These results suggest garlic ointment is effective in inhibiting biofilms produced by different wound pathogens.

7: Arendale, Avery

CONSTRAINING THE ONSET OF CRETACEOUS PERALUMINOUS MAGMATISM IN THE RUBY MOUNTAINS, NEVADA

Arendale, A.H., Hetherington, C.J., Barnes, C.G., and Cottle, J.

Geosciences, Texas Tech University

The Ruby Mountain – East Humboldt Range in northeast Nevada exposes at least three generations of peraluminous granites Cretaceous or younger; all but the youngest are poorly constrained in age. An equigranular banded gneiss is proposed to be oldest based on field relations. Monazite from one sample has been dated 94 – 92 Ma. This is considered a minimum age because of complexity of the magmatic system, field relations, and evidence for post-emplacement deformation. Four samples have been prepared for petrography and zircon geochronology to better constrain emplacement age and source of the rock.

The accessory minerals of all samples is dominated by sub-hedral to rounded monazite that range in size from 100-200 μm , and appears compositionally homogenous. Zircon is rarer and dominated by three morphologies: 200 μm neohedral form with length to width ratio of $\sim 8:1$ and prismatic terminations; $\sim 150\mu\text{m}$ sub-hedral prismatic terminated with ratios of $2:1$; and, $\sim 100\mu\text{m}$ gemmy grains. The first two populations display oscillatory or sector zoned cores with blue cathodoluminescence, surrounded by green luminescent, oscillatory rims. The rounded population contains oscillatory, euhedral cores overgrown by rounded, oscillatory rim. Grains from all three populations sometimes display an outer rim of brighter blue luminescence indicating a third zircon growth stage.

Preliminary U-Pb dating of green luminescent, oscillatory rims indicates ages of 85, 88.5 and 90.5 Ma. This age somewhat compliments the existing monazite age, but data shows significant spread suggesting that magmatic evolution, emplacement, and post-crystallization history of the lithology may be more complicated than originally proposed.

8: Armstrong, Andrew

UNDERSTANDING THE INFLUENCE OF AMPHIPHILIC MOLECULAR INTERACTIONS OF THE LIPID BILAYER ON THE FUNCTION OF TRANSMEMBRANE ION CHANNELS AND TRANSPORTERS

Armstrong, A. and Artigas, P.

Cell Physiology & Molecular Biophysics, Texas Tech University

The cell membrane is composed of a double layer of phospholipids called a lipid bilayer as well as many transmembrane proteins that facilitate the movement of molecules into and out of the cell. The lipid bilayer contains two distinct regions; a hydrophilic phosphate head region, and a hydrophobic hydrocarbon tail region. This property is referred to as amphiphilicity. The proteins embedded into the membrane are also amphiphilic and their hydrophobic regions need to match the length of the hydrophobic lipid tails in the bilayer. Many molecules including several with pharmacological applications are also amphiphiles. Although amphiphilic molecules have been used pharmaceutically for some time, their influence on the lipid bilayer properties and the subsequent change in function of transmembrane ion channels and transporters is not yet fully understood. To investigate the effects of amphiphilic molecular interaction with the lipid bilayer, ion channels were expressed in *Xenopus laevis* oocytes, and ion channel function was monitored using electrophysiological probes. We demonstrated that the amphiphilic molecule 2,3-butanedione monoxime (BDM) enhances the activity of the cystic fibrosis transmembrane conductance regulator (CFTR) protein by effecting the lipid bilayer conformation. Further investigations were conducted using the application of an amphiphilic class of drugs known as dihydropyridines, which have common pharmacological use as calcium channel blockers to treat hypertension. Initial measurements indicate that nifedipine enhances the activity of the CFTR protein similar to the effects of BDM on CFTR activity.

9: Ayankola, Olusola

THE EFFECTS OF A MARTIAL ARTS EXERCISE PROGRAM ON HEALTH AND BONE REMODELING RELATED PARAMETERS IN OVERWEIGHT/OBESE PREMENOPAUSAL WOMEN

Ayankola, O.J., von Bergen, V., Chaung, E., Dagda, R.Y., Shen, C.L.

Pathology, Texas Tech University

Both obesity and osteoporosis share several features, including a genetic predisposition and a common progenitor cell. With aging, particularly in overweight/ obese women, the composition of bone marrow shifts to favor the presence of adipocytes, osteoclast activity increases and osteoblast function declines, resulting in bone loss. This study was to investigate the impact of a 12-week martial arts exercise program on obesity and bone remodeling in overweight/obese premenopausal women. 63 overweight/obese premenopausal women were consented for this study. Inclusion criteria included premenopausal women, $BMI \geq 25$ kg/m², stable body weight, and non-smoker. Exclusion criteria included history of metabolic bone disease, cancers, and chronic diseases, use of weight loss medication/ surgery, and pregnancy. 45 qualified subjects (42.9 yr \pm 6.2, BMI 34.9 ± 6.8 kg/m²) were randomized into two groups: control group (n = 23) and martial arts group (n=24). Subjects in the control group were requested to maintain their regular activity. Subjects in the exercise group were requested to attend 3 sessions of 60 min martial arts group classes per week for 12 weeks. Outcome measures include body mass index, body composition (fat mass, fat-free mass, and bone mass) by body composition analyzer, and serum bone turnover and fat hormone biomarkers at baseline, 6, and 12 weeks. Data were analyzed statistically. Since the intervention is still going on, in this report, we only present the baseline data for both groups. There was no difference at any parameters including age, body mass index, body weight, fat mass, fat-free mass, and bone mass.

10: Blackwell, Stephanie

OBSERVATION OF EMOTION EXPRESSIONS DURING THE ADULT ATTACHMENT INTERVIEW: A CASE STUDY APPROACH

Blackwell, S.

Human Development and Family Studies, Texas Tech University

This study explores whether Adult Attachment Interviews (AAI) can be used to detect facial expressions and body gestures that can be distinguished among participants with different attachment statuses that were judged by the reliable coders of the AAI. Initially AAI's were exclusively audio-recorded and then transcribed fastidiously so that highly trained coders could analyze the verbatim transcripts (Hesse, 2008). In more recent years AAI's have been video-recorded which allows for some different approaches to be employed to potentially enhance understanding of attachment phenomena. For example, video-recording of the AAI allows for emotional expressions to be observed. To date, there is only one published study that reported their examination of facial expressions during the AAI (Roisman, Tsai, & Chiang, 2004). This study focuses on facial expressions as well as more global emotional expressions. The first step in this project involves creating a coding scheme to identify certain markers of emotion expressions by first carefully observing selected tapes and deciding on which questions out of 20 questions in the AAI would be focused in observing in detail for emotion expressions. The next step involves in comparing the coding data with their attachment statuses to explore possible links. Possibilities for future research will be discussed based on the results obtained from this exploratory study.

11: Brewer, Will

EFFECT OF DEER BROWSING ON PLANT COMMUNITY COMPOSITION IN CENTRAL TEXAS

Brewer, W., Schwilk, D., and Rylander, K.

Biology, Texas Tech University

Deer herbivory has significant effects on plant community structures. White tail (*Odocoileus virginianus*) and Axis deer (*Cervus axis*) populations have increased within central Texas in recent decades. Despite this, herbivory effects in Texas have been poorly studied. This population increase has led to increased browsing pressure and, consequently, may have caused a change in plant community composition. In 2005, deer exclosure plots and paired control plots were established to determine the effects of deer herbivory. Previous deer herbivory studies have found that results are often unique to particular plant communities, but in much past work, deer population densities and plant community have been confounded. Therefore, we tested herbivory effects in two adjacent different plant communities: riparian forest and mesquite savanna. Plant communities will vary between riparian woodland and mesquite savanna, accordingly deer herbivory patterns may change. Treatments and controls were established in an unreplicated, blocked design with five replicate plots in each treatment and plant community (N=20). After five years of browsing exposure, we measured species cover. Our results indicate fewer tree species inside controls for both savanna and riparian habitats. Vines occurred in forest exclosures only. Deer browsing decreased overall plant abundance and diversity. Increased browsing pressure, especially on vines and tree saplings and seedlings, has an effect on species richness and diversity on a community wide level. With increasing deer populations changing plant community structures entire ecosystem structures may be altered. Continued community analysis is needed to further understand the effects of increasing deer herbivory in central Texas.

12: Broughton, La' Toya

CURCUMIN INHIBITS CELL GROWTH AND PROLIFERATION OF HUMAN LUNG ADENOCARCINOMA CELLS

Broughton, L., Chen, L., Lu, C., and Gao, W.

Department of Environmental Toxicology, The Institute of Environmental and Human Health, Texas Tech University

Curcumin is a chemical of the polyphenol compound developed from the plant rhizome of *Curcuma longa* L. and has been substantially examined through extensive research as an anticancer drug that modulates multiple pathways. Our previous study indicated that the 50% inhibitory concentration (IC₅₀) of curcumin for A549 was 93 μ M at 24 hour. In addition, curcumin could decrease cell growth and proliferation through prohibiting the initiation of protein synthesis by modulating eIF2 α in A549. The objective of this experiment is to determine the cytotoxicity effect of curcumin on another human lung adenocarcinoma cell line, NCI-H358, while also comparing the difference in response to Curcumin between A549 and NCI-H358. NCI-H358 cells were treated with 0-160 μ M curcumin for 24 h. The cytotoxicity was measured by utilizing MTT [3-(4,5-dimethyl thiazol-2-yl)-2,5-diphenyl tetrazolium bromide] assay. The inhibitory effect of curcumin on NCI-H358 was reliant on dosage. The IC₅₀ of curcumin for NCI-H358 was 78 μ M at 24 h. Ultimately, through the cytotoxicity results, the effects show that curcumin could reduce cell viability of both A549 and NCI-H358. However, NCI-H358 reactions to curcumin occur to be considerably more toxic than those of A549. Similar to A549, protein expressions of eIF2 α was down regulated, while phospho-eIF2 α was up-regulated after NCI-H358 cells were treated with curcumin for 24 h. These findings suggest that curcumin could reduce cell viability through prohibiting the initiation of protein synthesis by modulating eIF2 α in NCI-H358 cells. The different cytotoxic effects between A549 and NCI-H358 could be resulted from other molecular mechanisms besides eIF2 α .

13: Brown, Kevin

CONSTRUCTION OF A HYBRID COMPONENT-BASED SELF-MANAGED SOFTWARE SYSTEM

Brown, K.J.

Computer Science, Texas Tech University

Self-managed software systems have been considered to provide a more reliable system, detecting anomalies autonomously and reconfiguring the system against the anomalies at runtime. Currently, software systems are predominantly being built using hybrid software components, such as commercial off-the-shelf (COTS) components and in-house components. Current approaches to self-management of software systems address COTS components-based self-managed systems or in-house components-based self-managed systems. However, less attention has been given to hybrid component-based self-managed software systems in which self-managed (COTS and in-house) components encapsulating different self-management mechanisms need to communicate with each other. The cardinal problem in producing a self-managed hybrid component-based system is that the COTS and in-house components must interface with each other for inter-component communication. This is due to the fact that the structure of self-managed COTS components differs from that of self-managed in-house components. In this research, a self-managed in-house component is structured into the service layer and the management layer. The service layer provides the services that the component provides, whereas the management layer provides the self-management services to the software component. Meanwhile, a self-managed COTS component is structured into a COTS component and its wrapper. The wrapper provides both an interface to the services that the component provides and its self-managing capabilities. This research implements interfaces in order to communicate a self-managed in-house component with a self-managed COTS component. A software system for an elevator system is detailed as a case study that demonstrates a hybrid component-based self-managed software system. The system was composed of two COTS components (floor and scheduler) and multiple in-house components (elevator). This research produced a methodology for building a hybrid-component based self-managed software system. The hybrid-component based self-managing elevator system that was developed, autonomously self-managed against manually inserted anomalies at runtime in all components effectively. These systems provide an efficient method for performing basic software maintenance autonomously when faults are detected.

14: Brun, Carlos

DETERMINATION OF DYNAMIC WIPING EFFICIENCY OF COTTON-BASED NONWOVEN COMPOSITE WIPES FOR DECONTAMINATION OF TOXIC OIL SPILL

Brun, C., Ramkumar, S., and Sata, U.

The Institute of Environmental and Human Health, Texas Tech University

Recently, human health issues have been reported in conjunction with the Gulf of Mexico's toxic oil spill and plumes of vapor released from the oil. It is extremely necessary to quickly remove toxic oil from the contaminated surfaces, skin and protective equipment used by the volunteers. Utilization of absorbent/adsorbent textile wipes and vapor adsorbent masks can reduce such health hazards posed by oil, associated polycyclic aromatic hydrocarbons (PAHs), and organic vapors. Texas Tech's product Fibertect®, which is a cotton-based three layered wipe, can hold toxic chemical vapors and toxic gases associated with the oil. This research project focuses on evaluation of dynamic wiping efficiencies of various wiping materials including Fibertect®, and builds a platform for a comparative analysis for such materials and wipe designs. This work severs towards elaborating an experimental procedure to determine the dynamic wiping efficiency of various cotton-based nonwoven wipes for chemical spills. Detailed design and fabrication of the dynamic wiping efficiency apparatus was carried out based on ASTM standards D 6702-01 and D 6650 – 01. The results report the dynamic wiping efficiencies for water, p-xylene and motor oil. The dynamic wiping efficiency of cotton-based nonwoven composite wipe for 50 %

capacity motor oil challenge was 63.4 %. 1 m² of cotton-carbon nonwoven composite absorbs up to 5.94 liters of motor oil. The results have proven extremely useful in optimizing the performance of the cotton-carbon based textile wipes for environmental remediation related to toxic oil spill.

15: Buie, Rebecca

ALTERNATE SCORING METHOD FOR THE RBANS FIGURE COPY/FIGURE RECALL SUBTESTS BASED ON INDIVIDUAL ELEMENTS PRESENT WITHIN THE OVERALL FIGURE: A FRONTIER STUDY

Buie, R.R., Schrimsher, G.W., Edwards, M., and O’Bryant, S.E.

Rural and Community Health (TTUHSC), Texas Tech University

Objective: Two subtests within the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), Figure Copy and Figure Recall, measure the ability to accurately duplicate and later recall a 10 element figure. This study tested Elements Present as an alternative scoring criterion focusing on the total elements present versus spatial accuracy and drawing precision.

Methods: Data were analyzed from participants (82 cognitively impaired (dementia or MCI) and 83 control) from Project FRONTIER, a rural healthcare study. The Figure Copy/Figure Recall subtests were scored based on if individual figure elements were present and comparisons made between this elements present scoring method versus the standard scoring procedure.

Results: The Elements Present Figure Recall criteria resulted in higher scores versus the RBANS standard scoring criteria when compared using an ANOVA test, which indicated a significant difference between the cognitively impaired and control participants ($p < .001$). An ANOVA test of the Elements Present Figure Recall and Elements Present Figure Copy scores found higher Figure Recall scores for the control group compared to the cognitively impaired group ($p < .001$). No difference was found between the Elements Present Figure Copy scores and the standard scoring Figure Copy scores from the criteria ($p = .110$).

Conclusions: The diagnostic utility of the RBANS Figure Copy/Figure Recall could be enhanced by a supplemental scoring of total elements recalled.

16: Burrell, Allison

SELF-ESTEEM THREATS: ANXIETY AND SELF-WORTH

Burrell, A., Silva, K.,

Psychology, Texas Tech University

Research shows that people high and low in self-esteem differ in their responses to threats (Heatherton & Vohs, 2000; Dodgson & Wood, 1999). We will examine specific differences in participants’ anxiety following a self-esteem threat. We predict that when feedback shifts state self-esteem to be inconsistent with trait self-esteem, people will feel anxious. To test this, participants will be randomly assigned to receive negative or positive feedback on an anagram task, supposedly designed to predict future success. Participants will then complete measures of anxiety and state self-esteem. We expect that although high and low self-esteem individuals will both show patterns of state self-esteem consistent with the feedback, their affective responses will differ. Specifically, high self-esteem participants will experience more anxiety following negative feedback than positive feedback, whereas low self-esteem participants will experience more anxiety following positive than negative feedback.

17: Calhoun, John

EPIDEMIOLOGICAL STUDY OF THE SPREAD OF A ZOMBIE VIRUS

Calhoun, J.

Mathematics , Texas Tech University

Zombie apocalypses are a powerful literary allegory for modern society, as seen in many popular movies, games and books, but is a zombie apocalypse really possible? My model uses random walks to assess the impact an outbreak would have on a city. A computer simulation was created in order to create a virtual city and outbreak. This version concludes that a virus originating in a single or a few individuals has little chance of becoming massive. Location survivability, the endemicness of the virus, and the impact of city shape on the outbreak are also explored.

18: Campos, David

QUANTIFICATION OF MYCOBACTERIUM AVIUM SUBSPECIES PARATUBERCULOSIS (MAP) FROM INFECTED ANIMALS FED A DIRECT- FED MICROBIAL (DFM) TO REDUCE THE ONSET OF JOHNE'S DISEASE: A MURINE-MODEL TO EVALUATE PROBIOTIC INTERVENTION IN REDUCING GASTROINTESTINAL DISEASE

Campos, D., Kurkure, P., Lackey, R., Brashears, M.M., and Karunasena, E.

Animal & Food Sciences, Texas Tech University

The hypothesis of our study was to determine if the intervention of a DFM (otherwise characterized as a probiotic) in reducing the onset of Johne's Disease (JD), due to MAP. MAP is the causative agent of JD in ruminant animals, an inflammatory disease of the gastrointestinal tract (GIT), and leading to a wasting process from diarrhea and minimal nutrient intake or absorption. Dairy cattle that develop JD, produce less milk production, poor milk quality, and low birth weight calves. Our objective was to determine the concentration of MAP present in mouse tissue, from large intestine and liver (locations of MAP infection) relative to animals fed a DFM versus controls. In our study we evaluated 410 BALB/c mice (205 male and 205 female) for 180 days, with tissue collection every 45 days. Tissue collected included colon, small intestinal tissue, stomach, and liver. Since, MAP is a fastidious slow growing organism our experimental goals were to develop an RT-PCR assay to quantitate the concentration of MAP in intestinal tissues and liver. Previous studies in our lab included the evaluation of large intestinal tissues; here we demonstrate MAP concentrations from the liver, based on granulomas observed through histopathology. Our expected results are that animals fed a DFM will have less MAP concentrations in their tissues compared to animals infected with MAP without intervention. Through the results of this study we would be able to demonstrate the ability of a probiotic (or DFM) in reducing the disease process of an infectious agent (MAP).

19: Chavez, Yuvisela

RELATED TO ABI3/VIVIPAROUS1 (RAV1, RAV2) TRANSCRIPTION FACTORS IN ABIOTIC STRESS RESPONSES OF TRANSGENIC ARABIDOPSIS AND COTTON

Chavez, Y., Mittal, A., Rock, C., and Burke, J.

Biology, Texas Tech University

Abiotic Stresses have major deleterious impacts on yield in crops. Engineering crop stress tolerance to face climate change is a pressing issue to fulfill the basic human requirements of sustainable food, fiber and

fuel. Abscisic Acid (ABA) is a plant stress hormone that functions in seed development, germination, and adaptive responses to stresses such as cold, drought and salt. Basic-leucine zipper (bZIP) ABA-INSENSITIVE5 (ABI5) and B3 domain ABI3/VP1 transcription factors have been discovered genetically and shown to effect responses to ABA. There exist many homologous RAV genes of unknown function which are hypothesized to interact with ABA signaling effectors. We have created transgenic cotton over-expressing Arabidopsis ABI5, RAV1, RAV2, RAV2-Like genes, and transgenic Arabidopsis over-expressing RAV1 and RAV2 under the control of a constitutive 35S CaMV promoter and have shown the transgenes are expressed. Three independent Arabidopsis transgenic lines for RAV1 all showed ABA hypersensitivity to root growth inhibition, suggesting RAV1 functions as a positive regulator of ABA. We have tested the seed germination and root growth stress responses of cotton (Coker 312) on various concentrations of NaCl, mannitol (a non-penetrating solute that mimics drought stress), and ABA. Guided by this baseline data, we will be able to test the role of these factors in conferring stress tolerance, a value-added agronomic trait especially in west Texas worth an estimated \$200m/yr in increased yields and cotton fiber/seed qualities. In future we will cross the transgenic lines together and characterize their phenotypes to better understand these genes' functions and mechanisms of action.

20: Chen, Jeffrey

IMPROVING THE SENSITIVITY AND SPECIFICITY OF DNA ARRAYS

Chen, J. and Vaughn, M.

Chemical Engineering, Texas Tech University

Hybridization of DNA to a template located on a microarray can provide information for gene expression analysis. Combined with genome-based treatments that can be personalized for a specific subset of a population, microarrays can improve diagnostic testing and pharmaceutical therapies. Currently, analysis of DNA array information is hindered by non-specific binding of mismatched strands of DNA. The objective of this research is to reduce the number of cross-hybridized and mismatched DNA, thus improving selectivity of DNA arrays. To do so, we will manipulate the configuration of short-surface attached DNA by varying the intensity and frequency of a surface electric field. We predict that without an electric field, DNA-DNA interactions will be dominated by hydrogen bonding through both Watson-Crick and non-Watson Crick base pairing. However, the presence of local high and low electric fields is expected to alter the interactions of surface tethered DNA and decrease non-specific binding. After analyzing the interactions of surface-tethered DNA, we will be able to apply these characteristics to hybridization and ultimately improve the effectiveness of DNA microarrays in the diagnosis of patients. This investigation requires well-defined DNA for attachment to the microarray surface, so our initial studies focused on the efficient production and recovery of plasmid DNA from E. coli.

21: Chester, Matt

COHABITATION AND DISILLUSIONMENT AMONG NEWLYWED HISPANIC COUPLES

Chester, M.

Human Development and Family Studies, Texas Tech University

Cohabitation in the United States has increased dramatically over a short period of time. Evidence suggests that the relationship between cohabitation and marital dissolution depends on factors like race, ethnicity, gender, and cohabitation history. The goal of this study was to examine whether cohabitation history makes differences in disillusionment, which is a strong predictor of divorce, among newlywed Hispanic couples. We draw on data involving 34 newlywed Hispanic couples. There was no significant difference in disillusionment between husbands and wives. Furthermore, spouses who cohabitated with their current spouse before the marriage did not differ in disillusionment from spouses who did not cohabitate with their

current spouse before the marriage. However, spouses with no cohabitation experience scored lower on disillusionment than spouses who had two or more cohabitation partners. In separate analyses by gender, no differences in disillusionment were found for husbands and wives in regards to cohabitation with the current spouse and the number of cohabitation partners prior to the marriage.

22: Cloutier, Aimee

MOTION CAPTURE EXPERIMENTS FOR DIGITAL HUMAN MODELS

Cloutier, A., Boothby, R., and Yang, J.

Mechanical Engineering, Texas Tech University

Digital human modeling has gained significant momentum due to advances in computer hardware and a growing need for virtual prototyping, and all digital human models need validation through experimental data. The motion capture system is a useful tool for providing these validations. This poster summarizes the ongoing progress of motion capture experiments for the validation of optimization-based digital human models in the Human-Centric Design Research (HCDR) Laboratory at Texas Tech University. An eight-camera motion capture system has been set up in the research lab. Marker placement protocols have been developed based on guidelines and suggestions in literature to highlight bony landmarks and identify segments between joints. Motion capture experiments have been conducted for studies in jumping, standing and seated reach for regular subjects and in walking, sitting to standing, seated reach, and reach with external loads for pregnant women. A posture reconstruction algorithm has been developed to map joint angles from motion capture experiments to digital human models. Results showed that the posture reconstruction algorithm is useful and accurate for transferring motion capture experiment data to joint angles and that marker placement protocol is reliable for capturing all joints. It was also shown that motion capture experiments provide insights for digital human modeling and simulation.

23: Collins, Emily

ASSESSMENT OF THE ACTIVE-SITE REQUIREMENTS OF STEROL C24-METHYLTRANSFERASE RECOGNITION OF C3-MODIFIED STEROL ANALOGS

Collins, E., Howard, A., Pleasant, S., Liu, J., Aly, G., and Nes, W.D.

Biochemistry, Texas Tech University

Sterol C24-methyltransferase (24-SMT) in *Paracoccidioides brasiliensis* (Pb) is responsible for the first stage in the biosynthesis of fungal ergosterol from lanosterol. Inhibitors of 24-SMT may have therapeutic use since this class of enzyme is not synthesized in humans infected by Pb. The specificity of 24-SMT has been investigated by testing substrate analogs of the lanosterol frame modified at C3, including the first examination of a 3-fluorinated sterol (its synthesis is described herein). Kinetic evaluation and GC-MS analysis of the enzyme-generated products revealed that the analogs exhibited distinct differences in catalytic competence from the natural substrate, lanosterol (3 β -OH) which converts to euboricol (24(28)-methylene,24,25-dihydrolanosterol); (relative activity, V_{max}/K_m) 3 β -OH (100%; 31 pmol/min/mg/21 μ M = 100%) > 3-oxo (48%) > 3 β -amino (33%) = 3 β -OMe (20%) > 3 β F (17%) > OAc (10%) > 3H=3 β NH $_3^+$ (no productive binding). The results indicate that the C3-hydroxyl group of the sterol is essential for catalysis and functions as a hydrogen-bond acceptor in contact with a polar amino acid (e.g., threonine or tyrosine) in the enzyme active site.

24: Connolly, Cara

GENDER AND CRIME IN ROMANTIC DRAMA

Connolly, C.

English/Honors, Texas Tech University

In the second half of the eighteenth century, Romanticism emerged as an intellectual, artistic, and literary movement that would emphasize emotionality and idyllic visions of nature, and embrace elements of horror and the supernatural. Stretching into the early nineteenth century, the Romantic period gave birth to powerful dramatic literary works that sought to illustrate the evolving trends in society and its ideologies. For my paper, I will examine the subjects and characters of four dramas, Lord Byron's "Cain" (1821), Elizabeth Inchbald's "The Massacre" (1792), Percy Bysshe Shelley's "The Cenci" (1819), and Joanna Baillie's "De Monfort" (1798), and explore the relationships between gender and crime as reflections of the ideologies and issues of the Romantic period. Furthermore, I will argue that these playwrights strategically created characters and stories, displacing the issues of their contemporary society onto distant settings, in terms of both place and time, as a way to illustrate the ways in which women were treated differently from men. A woman's identity, in the public and private spheres, and thus on the theatre stage, was strictly defined and limited by her roles as a mother and a wife, and in the realms of crime and justice, as a result of the widely accepted ideologies about gender and legislation like the Marriage Act of 1753 that enforced these ideologies, were powerless. With women legally and ideologically bound to the roles and expectations promoted by their society, playwrights like Byron, Inchbald, Shelley, and Baillie sought to illustrate these notions on the stage.

25: Cortinas, Abel

FLOW-ALIGNED GRAPHENE/PVA NANOCOMPOSITE FILMS

Cortinas, A.B. and Green, M.J.

Chemical Engineering, Texas Tech University

Graphene, i.e., single-layer graphite, holds promise for a wide variety of applications because of its combination of excellent mechanical, electrical, and thermal properties. In fact, on the molecular level, graphene is the strongest material ever tested, and it also offers cost advantages over other novel nanomaterials. Given the immense potential of graphene, a major need is the ability to disperse graphene in nanocomposites for property enhancement at low loading levels. Applications include low-density multifunctional materials in the automotive, electronics, aerospace, and medical industries.

In the present study, we disperse graphene in aqueous polymer (polyvinyl alcohol, PVA) solutions and use solution casting to produce a polymer film; in this process, we do not functionalize the graphene or degrade the properties. Instead, we use a stabilizing agent to prevent aggregation. We also study the effects of flow-aligning the solution to induce graphene alignment through both roll-coating and doctor blading. Despite successful composite film formation, processing effects (such as drying, temperature gradients, compatibility between filler and matrix) can induce variations in concentration and thickness profiles; one example is the formation of "coffee rings" due to non-uniform solute deposition. Ongoing work will examine the morphological effects of flow-aligning and cross-linking on these solution-cast films.

26: Courtney, William

EMERGENCY AERODYNAMIC SHUTDOWN OF WIND TURBINES

Courtney, W.T. and Swift, A.

University College, Texas Tech University. University College, Texas Tech University

In certain emergency situations a wind turbine's rotor can begin to spin out of control. This can place large loads on the blades and other components and can sometimes even lead to the complete destruction of the turbine. Therefore, it is of the utmost importance to design fail-safe shutdown systems which can avoid this catastrophe.

Modern utility-scaled wind turbines typically shut down by pitching the blades (changing the angle of the blades to reduce aerodynamic forces) with an electric motor, a method that has been proven to work. However, the reliance on electric motors leaves these turbines vulnerable during periods of power loss.

While electric pitch motors have become the industry standard for emergency shutdown, other concepts which utilize the power of the wind to shut down have successfully been applied throughout history. Among these is the concept of offsetting the rotor's axis in a way which will automatically yaw, or turn, the turbine out of the wind and into safety. This concept has successfully been applied to small wind turbines which utilize a tail vane to align to the wind but has yet to see application in larger machines where tail vanes are not an option.

The focus of this research is on proving this concept, obtaining quantitative data, and drawing conclusions that may prove useful when applying this concept to a larger scale wind turbine. To achieve this, a small-scale wind turbine prototype has been developed and wind tunnel tests have been completed.

27: Daniels, Christopher

SESTRINS ROLL IN THE PARASITE, LEISHMANIA

Daniels, C., Zhang, K., Kumar, A., Pillai, B., and Xu, W.

Biology, Texas Tech University

Sestrins are highly conserved proteins that accumulate in cells exposed to stress, lack obvious domain signatures, and have poorly defined physiological functions. Although, its exact molecular function is currently unknown, current evidence proposes sestrin involvement in the biological processes of mitochondrion degradation, multicellular organismal aging, regulation of oxygen and reactive oxygen species metabolic process, and negative regulation of cell growth. Leishmania is the genus for Trypanosomatid protozoa and is the parasite responsible for the disease Leishmania; spread through sandflies. Currently, there are millions of people infected with these diseases and over 50,000 deaths occur annually. It is believed that the function of sestrin in Leishmania is the activation of AMP-dependent protein kinase, and the inhibition of the Target of Rapamycin (TOR); two protein kinases that serve as key components of a signaling pathway shown to be the central regulator of aging and metabolism in a variety of model organisms. Through the creation of a knock out construct of the sestrin gene, and its insertion into the Leishmania genome, we hope to further study the effects the sestrin gene has on the parasite Leishmania; with particular interest on sestrins roll during mammalian host infection.

28: Darnell, Heather Marie

INTERPRETING THE MUSICAL AND VOCAL STYLE OF THE ITALIAN LULLABY

Darnell, H.

Musicology, Texas Tech University

While recording folk music in Italy during the 1950's, the ethnomusicologist Alan Lomax noted large differences in the melodic and vocal style of lullabies he heard between the more-industrialized Northern Italy and the poorer South. In his article Folk Song Style, he noted that Southern Italian mothers sing lullabies that sound "agonized" and use strained voices, while Northern Italian women sing more openly and have happier melodies. As part of his cross-cultural project on folk song style called Cantometrics, which is based upon the idea that folk song style is a direct reflection of societal structure, he asserted that the sorrowful sounds of the South were due to sexual repression and harsh living conditions of women and that the happy sounds of the north represented a more sexually-liberated, richer society. While much can be gained from Lomax's recordings and analysis, these views neglect the fact that the South of Italy is heavily influenced by Arabic music, while the North is influenced by southern European music, two cultures which use entirely different forms of musical grammar.

Using my analysis of audio recordings and musical transcriptions, I will prove that the differences heard in musical and vocal style in lullabies between regions of Italy are not a reflection of societal structure but are based on musical influences from different cultures. It is hoped that through this paper many of the stereotypes that have defined southern Italian music can finally be put to rest, and a clearer understanding of musical language between the different regions of Italy can be gained.

29: Desobry, Katherine

WITHA FERIN A INHIBITS HYPOXIA INDUCED P38 MITOGEN-ACTIVATED PROTEIN KINASE (P38-MAPK) IN BRAIN ENDOTHELIAL CELLS

Desobry, K., Tripathy, D., Martinez, J., and Grammas, P.

Department of Pharmacology and Neurology, Texas Tech University

A risk factor for the development of Alzheimer's disease is acute or chronic hypoxic insult to the brain. In response to hypoxic conditions, cells of the brain express a cascade of biologically active proteins possibly causing vascular dysfunction and neuronal loss. Current treatments for such conditions are limited, leading to plant-derived compounds gaining usage in research aimed at ameliorating hypoxia-associated vascular dysfunction and neurodegeneration. The objectives of this study were to determine the mechanism of hypoxia-induced cell death in cultured brain microvascular endothelial cells (ECs) and if administration of Withaferin A (WA) increases cell survival. ECs were coincubated with 25 nM WA and exposed to hypoxia (1% O₂) for 4 and 6 h at 37°C. Cell survival was determined by MTT assay and cell death by LDH assay. The expression of p38-MAPK was determined by western blot. To elucidate the mechanism by which WA protects ECs against hypoxic insult, cultures were exposed to hypoxic conditions and coincubated with the p38-MAPK inhibitor SB23580. Our data indicate that exposure of ECs to hypoxic conditions increased cell death and expression of p38-MAPK relative to control. WA significantly inhibited these effects. Treatment with p38-MAPK inhibitor also resulted in a significant decrease in cell death. These data suggest that hypoxia increases cell death via p38-MAPK expression and that WA attenuated these effects by inhibiting that expression. Furthermore, these results suggest that WA could be useful in the treatment of hypoxic insults to the brain and maybe helpful in neurodegenerative disorders where hypoxia is implicated.

30: Dominguez, Daniel

SOLUTION TO THE PHOTON PROPAGATION PARADOX

Dominguez, D., Houk, A., and Grave de Peralta, L.

Physics, Texas Tech University

When two monochromatic, equally polarized, and coherent beams of light cross each other, interference fringes are formed in the crossing region. Thus, a photon propagation paradox arises when attempting to describe how photons can propagate across the minima of the interference pattern, i.e. an area where they are never observed. In this work, we discuss experiments with surface plasmon polariton (SPP) beams [1] using SPP tomography [2] that permit us to resolve the photon propagation paradox. We show that the experiments are consistent with a photon picture where individual photons do not move following the lines of electromagnetic energy flow and do pass through the minima of the interference pattern. We discuss how to observe these photons without destroying the interference pattern. Further consequences of the experiments are discussed. [1] L. Grave de Peralta, "Study of interference between surface plasmon polaritons by leakage radiation microscopy," *J. Opt. Soc. Am. B* 27, 1513 (2010). [2] L. Grave de Peralta, R. Lopez-Boada, A. Ruiz-Columbie, S. Park, and A. A. Bernussi, "Some consequences of experiments with a plasmonic quantum eraser for plasmon tomography," *J. of Appl. Phys.* 109, 023101 (2011).

31: Dunn, Jonathan

PROVENANCE STUDIES IN THE PERMIAN AGED SAN ANGELO FORMATION, NEAR BRONTE, TEXAS: IMPLICATIONS FOR A TRANS-MOUNTAIN FLUVIAL SYSTEM LINKING AFRICA TO TEXAS

Dunn, J.W., Hetherington, C.J., and Holterhoff, P.F.

Geosciences, Texas Tech University

Quartz-rich sandstones in the San Angelo Formation, Coke County, Texas were analyzed to determine the provenance and transport medium of detrital sediments. Hand samples are loosely packed coarse-grained aggregates of rounded to sub-rounded grains of pebble size or smaller. Microscopic observations in thin section show the rocks to have a high porosity, broad distribution of grain shape and size, almost no cement, and a mineral assemblage dominated by quartz, with subsidiary clays and muscovite mica, hematite and minor plagioclase. The heavy and accessory mineral assemblage was volumetrically very small (<0.1 vol.%) and consisted mainly of zircon. On the basis of Folk's classification the samples are quartz arenites. Scanning electron microscope imaging of zircon shows that they have oscillatory zoning indicative of an igneous source and are euhedral to sub-hedral in shape. The architecture of the deposits is indicative of a fluvial stream environment of sediment transportation and deposition. In the Late Paleozoic central Texas was located on the northern margin of the closing Rheic Ocean, during collision between northern Gondwana (Yucatan and South America) with southern Laurentia. The presence of detrital zircon with Pan-African ages in parts of the San Angelo Formation suggests that the studied deposits may represent fluvial, or river deposits of sediment transported from the Pan-African margin to Central Texas during the Middle Permian.

32: Embry, Brittany

SYNTHESIS OF SUPERPARAMAGNETIC NANOPARTICLES USING HIGH INTENSITY ULTRASOUND

Embry, B. and Casadonte, D.J.

Department of Chemistry and Biochemistry, Texas Tech University

This project involves an exploration of the synthesis of superparamagnetic nanomaterials using high intensity ultrasound. These nanomaterials are utilized in a wide variety of applications, including drug targeting, proteolysis, and a type of cancer treatment known as magnetic hyperthermia.

Sonochemistry (the application of high-intensity ultrasound to drive chemical reactions) has a wide variety of synthetic uses. High-intensity ultrasound uses acoustic cavitation. In this process, waves are propagated to the solution and result in the formation of tiny bubbles, which oscillate in response to the sound field. Once the maximum size of the cavity is reached, the bubbles will violently collapse. During the collapse of these bubbles, pressures of 10-1000atm and temperatures of 500-17,500K are created. If precursor materials are present near the site of collapse, nanoparticles are formed due to the extreme heat and pressure.

Superparamagnetic nanoparticles possess unique properties that make them ideal for chemical applications. They possess a high saturation of magnetization, display an absence of magnetic remnance, and have no hysteresis.

We have synthesized the superparamagnetic nanomaterial SmCo₅. CoCl₂ and SmCl₂ are sonicated in a reducing agent, lithium naphthalide. Scanning electron microscopes and energy dispersive X-ray spectroscopy were used to analyze and confirm the presence of SmCo₅. The ultimate goal of this project is for the use of these superparamagnetic nanoparticles in magnetic hyperthermia. The superparamagnetic nanometric SmCo₅ will be injected into the affected area for tumor treatment. It is our hope that application of magnetic inductance will heat the tumor cells, leaving surrounding cells unharmed.

33: Enih, Monique

MY PANTS DON'T FIT BUT MY VALUES ARE IMPECCABLE!

Effects of Self-Affirmation and Threat on Body Satisfaction,

Enih, M., Reich, D., and Abbott, M.

Psychology, Texas Tech University

In a culture that places a premium on women having a "thin" ideal body, women often find themselves in situations where their body image and self-esteem may be threatened. When women experience a threat, they may use self-affirmation to maintain a positive self-image by thinking about another valued aspect of themselves. The present study examined the influence of a threat to body image and subsequent use of self-affirmation on women's self-esteem, body-esteem, and body satisfaction. In total, there were sixty- three undergraduate female participants, some of which filled out the questionnaires in a large group and others did it alone. The experiment used a two-way between-subjects factorial design, where self-esteem threat and self-affirmation are the independent variables. Participants were randomly assigned to the 4 conditions. They were asked to read 1 of 2 hypothetical scenarios (threat, no threat) about trying on pants in a clothing store. Subsequently, they were then asked to self-affirm or not. All participants completed the dependent measures of the Rosenberg Self-Esteem Scale, the Body Esteem Scale, and a one-item overall body satisfaction item. Our hypothesis that self-affirmation will repair general self-esteem after the threat, but that threatened participants will remain low in body satisfaction and (appearance-related) body esteem after self-affirmation, was not supported. Possible reasons for these results will be discussed, as will implications and ideas for future research.

34: Ervin, Tory

CREATING CAPABLE COPERS: CORRELATES AMONG HARSH PARENTING BEHAVIORS AND YOUNG CHILDREN'S DEVELOPMENT COPING STRATEGIES

Ervin, T. and Kulkofsky, S.

Human Development and Family Studies, Texas Tech University

The qualities of children's coping methods have been studied extensively as they relate to children's experiences with non-normative events – namely medical procedures and hospitalizations. While there continues to be a mild amount of emerging literature on the coping patterns of children in relation to everyday stressors, few studies have examined the unique role parents may play in this important skill acquisition.

Utilizing a non-clinical sample of 30 children (male=18), this study seeks to examine the coping methods used by 6-year-old children (M=72.3 months) to cope with everyday stressors in relation to parental reports of harsh discipline practices.

35: Estrada, Mayra

ENZYMATIC ACTIVITY IN BIOFILM AND FREE LIVING CELLS OF BATRACHOCHYTRIUM DENDROBATIDIS,

Estrada, M., San Francisco, M., and Moss, A.

Biology, Texas Tech University

The fungal pathogen *Batrachochytrium dendrobatidis* (Bd) has contributed to the worldwide decline in amphibian populations. Preliminary studies from our lab have demonstrated that Bd has the ability to form a biofilm in vitro. Additionally, our lab has shown that Bd zoospores (planktonic cells) secrete proteolytic enzymes. The purpose of this research was to further purify and characterize two such enzymes, an elastolytic metalloprotease and a DNA degrading enzyme (DNase). The elastolytic metalloprotease was concentrated and partially purified using size-exclusion centrifugation and ion exchange chromatography. The resulting partially purified preparation was tested for elastolytic activity using a fluorescently labeled elastin conjugate as a substrate. DNase activity was compared between planktonic cells and biofilm cells using zymography and DNase methyl green agar plates. The observations described in this study led us to hypothesize that Bd may use secreted proteases to initiate infection of susceptible amphibians. Elastolytic enzymes may be important for degradation of the host extracellular matrix. Additionally, a DNA degrading enzyme may be used for degradation of the biofilm matrix to allow the fungus to re-infect the amphibian. Implications of these observations to Bd virulence and the disease process are discussed.

36: Fenske, John

COMPUTATIONAL STUDY OF AMPHIBIAN PERSISTANCE ON THE SOUTHERN HIGH PLAINS,

Fenske, J.

Mathematics and Statistics, Texas Tech University

Playas are shallow, transitory wetlands that fill after rain events and dry through evaporation. More than 25,000 playas exist in the Southern High Plains, making it the densest region of playas in the United States. The length of time that a playa remains inundated is called the hydroperiod for that playa. Amphibians on the Southern High Plains can survive for extended periods of time during a

drought by burrowing underground, but require the environment of an inundated playa in order to breed and spread to other playas. In the present investigation, amphibian populations were computationally modeled under certain assumptions about amphibian subsistence without precipitation and amphibian population growth. The amphibian populations were modeled assuming the dimensions of the Southern High Plains to be 240km by 340 km. To ascertain the effects on amphibian populations of playa degradation due to certain agricultural practices, the density of playas in the model was varied. At a 50% reduction in the number of playas, the amphibian growth rate over two years decreased by 80%. A stochastic model for both playa hydroperiod and water level was also developed for use in modeling the amphibian populations. This model used a water budget equation to sum the input and outputs to playa storage over time. It was found that the model behaved as expected for changes in input quantities, and that the shape of a playa, including changes from degradation, can greatly affect the playa's hydroperiod.

37: Ferguson, Daniel

DEVELOPMENT AND SCALING OF A MOLECULAR DYNAMICS SOFTWARE PACKAGE: MACROSCOPIC SYSTEMS AND MODELING OF HEAT FLOW

Ferguson, D. and Smith, P.

Mathematics and Statistics, Texas Tech University

Molecular Dynamics (MD) has been used to model systems varying from isolated compounds in the gas phase to the folding of proteins in a vacuum. Recently, some work has been done to apply MD calculations to macroscopic systems to model heat flow. Full solutions to these systems exist, but at this time are impossible to solve do to the complexity of the calculation. To this end, this research is to develop a molecular dynamics software package specifically to model solids on a macroscopic scale, ranging in system size from 10,000 to 100,000 atoms. The code will be written and developed in FORTRAN 90 for serial and parallel environments. By using analytic potentials, such as Lennard-Jones, Morse, and other harmonic oscillators calculations can be simplified. Such approximations are apt as the atoms in a solid, unlike other phases, have restricted movement and therefore will have the same neighbors, allowing for a reduction of calculations. Furthermore, parallel computing will be implemented to decrease computation time. Incorporating OpenMP and MPI are simple ways of parallelizing code, which, along with the implementation of a neighbors list, can be easily used to divide the calculations among processors. Testing will be done to determine scaling as a function of system size and number of processors. The accuracy of the calculation will also be tested by replicating previous work and comparing to experimental values. Testing has begun, And out preliminary results show scaling as a function of system size to be linear.

38: Friedman, Zev

EXTENSION OF THE ASSURANCE POINT (AP) CONCEPT TO CONCURRENTLY EXECUTING WEB SERVICES WITHIN A SINGLE BUSINESS PROCESS

Friedman, Z., Gao, L., and Urban, S.D.

Industrial Engineering, Texas Tech University

With the emergence of the Internet as a powerful communication tool, many businesses have begun turning to distributed computing for performing tasks which can meaningfully be broken into smaller, simpler tasks. This has led to the use of online web services that perform very specific functions and subsequently the creation of the service-oriented computing paradigm. With processes separated by organization and location, ensuring data consistency in a service-oriented environment is a challenge.

One possible solution to this problem comes in the form of Assurance Points (APs), defined in (Shrestha 2010). APs allow for checking of user defined correctness conditions at different points during the

execution of a business process, along with options for recovery actions to take if those conditions are not met. They also serve as intermediate places from which forward recovery can take place without having to reset an entire process when an error occurs. The initial definition of APs did not support process containing multiple concurrently executing threads. The focus of this research has been to extend the AP concept to allow for this type of parallelism.

39: Galindo, Erik

PHAGE SCREENING FOR BIOFILM TREATMENT

Fralick, J., Galindo, E., and Kay, M.

Immunology & Microbiology, Texas Tech University

We are currently attempting to use phage to treat biofilms that have formed in a closed water system. A biofilm is made up of a community of bacteria, usually from diverse species that have affixed themselves to a surface and are imbedded in a self enclosed matrix composed of extracellular polymeric substance (EPS). The biofilm within our system consists of *Caulobacter vibrioides*, *Ralstonia picketti*, *Sphingomonas paucimobilis*, *Cupriavidus metallidurans*, and *Burkholderia multivorans*. It has been shown that bacterial viruses called phage can play a role in lysing the cells within a biofilm by degrading the EPS layer as it functions in its natural habitat. Phage can be isolated from the natural environment of the bacteria which they infect and the species listed in our study come from aquatic and soil habitats. Currently our lab is engaged in isolating and purifying strains of phage capable of infecting the hosts listed and will be screened for use in eliminating biofilms. It will be important to find the appropriate strain of phage in order to neutralize/eradicate the biofilm. Most phage are specific to the bacteria they infect as far as the molecular receptors on the surface of both and this specificity allows the virus to insert its genetic material in the host. The host-range (number of different bacterial strains that a phage can infect) is often determined by the molecular receptors of the phage and bacteria. The uniqueness of the bacteria involved and the specificity of the phage have made this a very challenging project.

40: Gallegos, Cameron

ELECTRICITY AS A NOVEL WAY TO CONTROL INVASIVE AQUATIC INVERTEBRATES

Gallegos, C. and Rogowski, D.

Natural Resource Management, Texas Tech University

Electricity is a common technique used to collect fishes as well as to control their movement (e.g. Asian carp). We are investigating the use of electricity for the potential eradication and or control of two invasive aquatic snails (*Melanoides tuberculata* and *Tarebia granifera*). A Simple device was built to convert 120 volts to more usable voltages. Alternating and direct currents were used at various voltages to determine levels that would halt or prevent snail movements. Preliminary results showed that the snails responded to electricity at low voltages. At around 0.4 v (in water) snails crawled completely out of the water, and at voltages approaching 2 they retreated within their shells. We are attempting to determine a way to control these invasive species using increasing voltages to see what level is required to eradicate these invasive species.

41: George, Jessica

THE INFLUENCE OF LULLABY MASSAGE ON CHILD'S BEHAVIOR

George, J., Hart, S., Jackson, S., and Willingham, M.

Human Sciences, Texas Tech University

It has been found that massage serves to be beneficial in improving the behavior of children. The purpose of the study was to determine whether Lullaby Massage was found beneficial to guardian's ratings of children's behavior at bedtime in addition to teachers rating of children's behavior in the classroom setting (Children Behavior Checklist-Teacher Version). In this study, 30 children from the ages of two to five years were randomly assigned to a massage therapy group or a control group. In the Lullaby Massage therapy group, parents were instructed to read poems coupled with a specific massage movement that took ten to fifteen minutes. In the control group, the parents were instructed to read a book to their children every night for ten minutes. Parent and child participated for seven to ten nights. Due to limited sample size, results are non-conclusive. However, we predicted that scores would improve on child's behavior from the Lullaby Massage therapy group. Further research must be explored in greater detail to provide more potential benefits to parent-child bonding and child behavior.

42: Greanya, Glenn

COMPARISON OF THE FOOD HABITS OF WILD NORTHERN BOBWHITE (COLINUS VIRGINIANUS) WITH PEN-REARED BIRDS RELEASED INTO THE WILD

Greanya, G.

Natural Resources Management, Texas Tech University

The decline of Northern Bobwhite (*Colinus virginianus*) in North America has been well documented, and estimated to be 3% annually, since 1966. Some managers have started using a practice of releasing pen-reared birds to augment their quail population for hunting needs with the hope of long-term survival and population carryover. Unfortunately, the majority of these release efforts result in total loss. Often this loss occurs within a few weeks of release. Most scientists suggest the failure is caused by the birds' inability to adapt to their new environment upon release to the wild. More specifically, some hypothesize that pen-released birds are unable to recognize and consume foods available in the wild. I will evaluate this hypothesis by examining the food use of pen-reared birds released into the wild. Additionally I will compare their food use to that of wild birds on an area where no pen-reared birds have been released. The study area is located in Archer County, Texas. Two thousand pen-reared northern bobwhite were released onto the site during July 2010. I will evaluate food use of these birds, as well as birds taken from sites that do not have pen-reared birds, by examining the contents of crops from hunter-killed birds. Seeds will be identified to species, while other materials will be grouped as either animal matter or vegetative matter. I will report aggregate percent mass and frequency of occurrence of seeds, animal matter, and vegetative matter and compare these metrics among study sites. These results should help managers become better informed concerning the limitations of releasing pen-reared birds. In addition, other means of food supplements can be suggested to help adaptation of pen-reared quail to the wild.

43: Herrera, Krystin

DESIGNING EFFECTIVE WINERY WEBSITES

Herrera, K. and Kolyesnikova, N.

Texas Wine Marketing Research Institute, Texas Tech University

Winery websites have become an important part of the overall marketing strategy. Effective website can help build customer loyalty, develop brand, increase traffic to the tasting room, and encourage direct purchasing. The purpose of the project was twofold: (1) to develop an objective website evaluation framework that will assist the wine business practitioner with creating effective websites, and (2) to measure the effectiveness of Texas wineries websites from multiple perspectives. Fifty-six Texas winery websites were thoroughly examined by 21 undergraduate students at Texas Tech University. Overall the websites were found to cover most of the issues and appear effective in communicating various messages to consumers. However, several features need improvement, specifically in user-friendliness and marketing issues. The study will help wineries better understand the span of options available when designing a website. In addition, the instrument may serve as a checklist for designing more effective websites.

44: Hester, Neil

THE RELATIONS BETWEEN MOTHERS' AND FATHERS' ANXIETY SENSITIVITY AND PARENTING AND GIRLS' ANXIETY SENSITIVITY, DEPRESSION, AND ANXIETY

Hester, N. and Epkins, C.

Psychology, Texas Tech University

Anxiety sensitivity (AS), the fear of arousal associated with anxiety, has been clearly linked with various psychopathological conditions in both adults and children, with different factors of AS (Physical Concerns, Social Concerns, Cognitive Concerns) relating to different psychopathologies (Reiss & McNally, 1985; East, Berman, & Stoppelbein, 2007; Taylor, Woody, & McLean, 1996). However, the nature of the link between parent AS and offspring AS is unclear, with some studies reporting a link between parent AS and offspring AS (as well as anxiety and depression), and other studies reporting no link (East et al., 2007; Mannuzza et al., 2002). We are examining 120 mother-father-daughter family units from a community sample, with daughters between the ages of 8 and 12. Family members are completing measures on their AS, anxiety, depression, parental acceptance-rejection and control, and time spent together. We hypothesize that the amount of time the parent and daughter spend together will moderate the relation between parent AS and child AS, with stronger relations between parent and daughter AS for dyads spending a higher versus a lower amount of time together. We also hypothesize that girls' Cognitive Concerns will mediate the relation between hostile, rejecting parenting and girls' depressive symptoms, and that girls' Social Concerns will mediate the relation between controlling parenting and girls' anxiety symptoms (Francis & Noel, 2010; Scher and Stein, 2003; van der Bruggen, Stams, & Bögels, 2008). Analyses on the above will be conducted on both mother-daughter and father-daughter dyads. Data collection is in progress.

45: Horton, Brian

QUARTZ PREFERRED ORIENTATION AND ITS IMPACT ON THERMAL ANISOTROPY IN SANDSTONE AND QUARTZITE

Horton, B. and Hetherington, C.J.

Department of Geosciences, Texas Tech University, Texas Tech University

Thermal conductivity may be defined as the rate of heat transfer through a material. Many crystalline materials display variable thermal conductivity as a function of crystal orientation; such materials are referred to as thermally anisotropic. Quartz, one of the most abundant minerals in the Earth's crust, is one such mineral. Therefore, the thermal conductivity of quartzite, a rock defined as having >95% quartz, should vary as a function of quartz crystal preferred orientation. If the preferred orientation of quartz in quartzite can be measured, it should be possible to model the thermal properties of the rock and estimate its potential as a latent heat-source for geothermal energy production.

Quartzites with varying preferred grain orientation were sampled along two traverses in central New Mexico. Quartz grain orientation was measured using Electron Back Scatter Diffraction (EBSD). In one traverse, increasing quartz preferred orientation was measured with increasing proximity to a crustal-scale deformation-shear zone. In the second traverse, an increase in crystal preferred orientation was observed with increasing proximity to a large granite intrusion. Using the thermal properties of quartz and the measured quartz preferred orientation, calculations show that the thermal conductivity of the samples should increase with proximity to the shear-zone and the granite intrusion.

An experimental apparatus that measures the variation of temperature versus time in a sample in response to the input of thermal energy will be used to collect data from which actual thermal conductivity values will be calculated. If measured thermal conductivity of quartzite does vary as a function of measured quartz preferred orientation, the results may provide the basis of a model for identifying potential sites for passive geothermal energy plants.

46: Hubbard, Lauren

DEVELOPMENT OF A NEW MECHANICAL SYSTEM FOR CRYOPRESERVATION OF MAMMAL SEMEN

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Cryopreservation (CP) of semen is a common practice in the field of reproduction to allow long-term storage of superior genetic materials. While CP has proven a reliable technique in species such as the bovine, the results are spotty in other species. Currently The most common two ways to CP semen samples is to either employ a method that suspends the sample in static nitrogen mist or to use a dynamic electronic system which pumps increasing amounts of nitrogen around the sample at a controlled rate; the former being relatively inexpensive but producing inconsistent results and the latter being too expensive and complicated for use outside of select facilities. The present study focused on a new method of freezing bull semen using an inexpensive mechanical system to mimic the electronic system described above. In this initial trial 30 straws of bull semen, which had been prepared using standard techniques, were frozen using two mist techniques and the new mechanical system. Samples were then analyzed for post-thaw survival using an automated semen analyzer; focusing on the parameters of motility and forward progression. Results indicate a higher return of total motile cells ($P < .01$) and rapid motile cells ($P < .001$) from the new system while all forward progression parameters remained equivalent ($P = .11$). The data suggest, with

refinement, the new system could be an improved means for CP in the field. Further study is needed with more animals and other species, as well as direct comparison to the electronic system.

47: Hutton, Kelly

EFFECTS OF 25-HYDROXYCHOLECALCIFEROL ON BROILER CHICKEN SKELETAL MUSCLE SATELLITE CELL PROLIFERATION IN VITRO

Hutton, K.C., Vaughn, M.A., Coffey, J.D., Sooter, A.J., Hines, E.A., Turner, B.J., and Starkey, J.D.

Animal Science, Texas Tech University

Skeletal muscle satellite cells isolated from one-day-old chicks (n = 200) were cultured in standard media supplemented with increasing concentrations (0, 5, 10, 20, 30, 40, 50, 60, 70, 80, 90 or 100 ng/mL) of 25-hydroxycholecalciferol (25OHD3) to determine the effect on satellite cell proliferation. Parallel satellite cell cultures were pulse labeled with bromodeoxyuridine (BrdU) for 2 h prior to fixation at 24, 48, 72, and 96 h to facilitate detection of proliferating cells. The number of myogenic (Pax7+) and the number of proliferating cells (BrdU+) were quantified in parallel cell cultures exposed to each concentration of supplemental 25OHD3. Regardless of treatment, an increase in the number of Pax7+ and Pax7+/BrdU+ cells was observed over time (P < 0.05). Interestingly, the number of myogenic and proliferating myogenic cells were not different at 24 and 48 h, but were both significantly greater after 72 and 96 h in culture. These results indicate that the myogenic satellite cell population in the breast muscles of one-day-old chicks underwent a “lag phase” after plating before beginning to proliferate, which lasted between 24 and 48 h. Regardless of culture time point, satellite cell cultures supplemented with 5 ng/mL 25OHD3 had significantly greater numbers of Pax7+ and Pax7+/BrdU+ cells than those grown in unsupplemented media (P < 0.05). Exposure of chick myogenic satellite cells to 25OHD3 stimulated proliferation and could be the underlying mechanism for the increased breast meat yield observed when 25OHD3 is orally supplied in the diet throughout the growing period.

48: Ibarra, Bianca

CASE STUDY: EFFECTS OF A BLEND OF PREBIOTICS, PROBIOTICS, AND HYPER-IMMUNE DRIED EGG PROTEIN ON THE PERFORMANCE, HEALTH, AND INNATE IMMUNE RESPONSE OF HOLSTEIN CALVES.

Ibarra, B. and Ballou, M.A.

Animal and Food Sciences, Texas Tech University

The objectives of the current study were to evaluate the effects of supplementing a blend of prebiotics, probiotics, and hyper-immune dried egg protein on the performance, health, and innate immune responses of Holstein calves during the first 3 weeks of life. Ninety Holstein bull calves (12-36 hours after birth) were acquired. After weighing, peripheral blood was collected and the calves were completely randomized into two treatment groups; the negative control and the Prophylactic treatment. The Prophylactic calves were administered a proprietary blend of prebiotics, probiotics, and hyper-immune egg with their milk replacer. Control calves were fed milk replacer only. Treatment didn't affect the performance of calves. Among the calves that refused milk, Prophylactic calves refused less (P=0.005) over the first four days than the Control group. Enteric morbidity, was more common among Control calves (25.0 to 51.1, P=0.011). However, treatment did not influence either total peripheral leukocyte or differential counts. Furthermore, hematocrit percentages and plasma concentrations of haptoglobin, cortisol, glucose, and urea nitrogen were not different between treatments. Lastly, there were no differences between treatments on ex vivo innate immune responses evaluated at 21 days of age. The data support that a combination of prebiotics, probiotics, and hyper-immune egg protein improve enteric health in a population of calves, and that a prophylactic treatment could be used as an alternative to metaphylactic antibiotic use.

49: Imhof, Blythe

CREATION OF THE COCHRAN COUNTY COMMUNITY-BASED RESPITE PROGRAM: A PROJECT FRONTIER STUDY

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Neurology, Texas Tech University

The population of elderly individuals in America is rapidly increasing due to the aging of the Baby Boomer generation. Consequentially, the number of individuals who suffer from cognitive impairments, specifically dementia, will also increase in coming years. The need for cost-effective respite programs is dire considering that most of these individuals who are suffering from cognitive impairments are cared for by family members, many of whom are spouses that are of the same age and retired. We propose the Cochran County Community-Based Respite Program as a model to alleviate a measure of caregiver stress by providing caregivers with a means of temporary relief from caregiving duties. Drawing from a pool of participants from Project FRONTIER (Facing Rural Obstacles to healthcare Now Through Intervention, Education, & Research), an ongoing rural health research study, we created a cohort of seven volunteers and five caregiver and care recipient pairs to test this model of free respite care provided in the community and by the community. Volunteers received training on interacting with individuals with dementia, and 26 weekly respite sessions were conducted under staff supervision at the local senior center. Participants reported a high level of satisfaction with the program; an evaluation of the program's efficacy in reducing caregiver stress and negative affect is currently underway. The respite program is ongoing and maintained by the community volunteers.

50: Johns, Braden

REDUCING CHOLLA INFESTATION IN SOUTHEASTERN NEW MEXICO

Johns, B. and Cox R.D.

NRM, Texas Tech University

Cylindropuntia imbricata (walking stick cholla) can be a major pest plant on rangelands in the Southwestern US. Treatment options are be limited by the expense of chemical control and the ability of cholla to resprout from stem fragments when treated mechanically. We studied the efficacy of mechanical control during the cool, non-growing season, when such treatment might be most successful. Treatments were applied after the first freeze, usually from November to March, by dragging three railroad irons, horizontally connected to each other by steel cables, behind a John Deer 4440 tractor. We selected pastures treated in 2006 (2 pastures), 2007 (3 pastures), and 2008 (4 pastures), as well as untreated areas (4 pastures), for comparison of treatment effects. Four sample points were established within each pasture, each consisting of three, 50mX4m belt transects arranged at random, but equidistant radial degrees around the central point. Data analysis showed that treated areas averaged 40-50 plants per ha, while untreated areas averaged over 350. Treated areas also had nearly 50% fewer cholla in the <0.5m² size class, indicating that resprouting of scattered stem segments was rare. No difference was observed between areas treated in different years, indicating that effects of this treatment method persist through time. Cholla can be a difficult rangeland pest to control due to constraints on money and time, but, by timing mechanical treatment of cholla-infested rangelands to coincide with the cool, non-growing season, good control may be achieved with little operating costs and substantial success.

51: Judkins, Eileen*SYNTHESIS AND CHARACTERIZATION OF CU(I) PHENANTHROLINE POLYMER PRECURSOR COMPLEXES INVOLVING SUBSTITUTED PHOSPHINES*

Judkins, E. and Casadonte D.

Chemistry and Biochemistry, Texas Tech University

This paper explores the synthesis of [Cu(2,9-dimethyl-1,10-phenanthrolineacrylate) (1,3,5-triaza-7-phosphaadamantane)₂ and its possible polymerization to form the poly-phenanthroline acrylate species. The compound can be prepared either through the reaction of the tetrakis(phosphaadamantane) Cu(I) species with the diimine or through reaction of the bis(diimine) Cu(I) complex with two equivalents of the phosphine. The impetus for the use of phosphaadamantane is to develop water-soluble Cu(I) phosphine systems. The compound can be polymerized to form a polymeric species with an acrylate backbone and pendant phenanthrolines. Photoexcitation of the metal-to-ligand charge transfer band produces a charge separation throughout the assembly which provides the potential for the production of a photocapacitive supramolecular assembly. The compounds are characterized by NMR, UV-Vis absorption, photoluminescence, and X-ray.

52: Laxane, Pallavi*AN INVESTIGATION OF EVENT STREAM PROCESSING TOOLS FOR MEDICAL APPLICATIONS*

Laxane, P. and Urban, S.

Industrial Engineering, Texas Tech University

Event stream processing refers to the specification and detection of complex event patterns in an application environment. For a given application, interesting patterns of event occurrences can be used to invoke actions in real time when events are detected. Event processing languages are used to specific event patterns and different tools provide different functionalities. In this research, various open-ended event processing tools will be discussed, along with a comparison and analysis of current systems. The application of event processing in medical applications will be further investigated. Event processing can be highly beneficial in medical scenarios where data can be collected from patients using monitoring devices. Event processing can analyze the data in real time to alert physicians to any situation of concern. This capability is especially useful for remote monitoring, where the patient is located remotely and the doctor is in some other geographic location. Event processing can be used to signal critical patient conditions that need immediate attention.

53: Le, Loc*SM-P80 BASED SCHISTOSOMA MANSONI VACCINE*

Ahmad, G., Zhang, W., Torben, W., Le, L. and Siddiqui, A.

Microbiology and Immunology, Texas Tech University

Schistosomiasis, a major neglected tropical disease, causes morbidity and mortality for approximately 210 million people in 76 countries. Schistosomiasis causes severe internal organ damage elicited primarily from toxins produced by the eggs of the schistosomes. Many control methods have been developed to counter schistosomiasis, including chemotherapy with the drug Praziquantel, public hygiene programs, and education. However, these current solutions are inadequate and do little to prevent reinfection. Sm-p80 is an important protein involved in membrane renewal for *Schistosoma mansoni*, protecting the parasite; it is

expressed throughout the life cycle. For this reason, Sm-p80 is a target for vaccine development. This presentation outlines some of the work being done to develop a vaccine – a long term goal and potentially the most effective countermeasure.

54: Lees, Jess

PEDF NAD PMV-ATPASES ARE MOLECULAR TARGETS IN PROSTATE CANCER TREATMENT

Lees, J.C., Sennoune, S.R., Hashem, J., Bermudes, L., Filleur, S. and Martínez-Zaguilán, R.

Cell Physiology & Molecular Biophysics, Texas Tech University

Prostate cancer is the second leading cause of cancer-related death in Western countries. Therefore, new therapeutic strategies such as gene-, immuno-therapy, or anti-angiogenic therapy are being developed. Pigment Epithelium-Derived Factor (PEDF) is an anti-angiogenic factor and, we have shown that PEDF expression is down-regulated in prostate cancer. We have shown that over-expression of PEDF in hormone-refractory prostate cancer cells decreased tumor growth in vivo. However, the mechanisms underlying most of PEDF anti-tumor action are unclear. To understand the molecular mechanisms underlying these antitumor properties, we evaluated the significance of V-ATPase. In cancer cells, V-ATPases have been shown to be located at the cell surface (pmV-ATPases) and implicated in metastasis and angiogenesis. Therefore, we hypothesize that pmV-ATPases are inhibited by PEDF expression.

To understand PEDF anti-tumor properties, we used human hormone-refractory LNCaP-derivative CL-1 cells and LNCaP as experimental models. We genetically modified CL-1 and LNCaP cells to stably express the fluorescent DsRed Express protein in combination with PEDF. We found that PEDF expression decreases the proliferation of cancer cells. Importantly, PEDF expression in vivo decreases by 70% the development of subcutaneous CL-1 tumors in immuno-compromised mice. We found that the mRNA levels of the a isoforms that target the V-ATPase to the cell surface and the specific activity of pmV-ATPase are decreased when PEDF is expressed. Since, pmV-ATPase has been involved in the resistance of cancer cells to chemotherapeutic drugs, this makes the inhibition of V-ATPases and over-expression of PEDF promising new targets to enhance the cytotoxicity of chemotherapeutic drugs.

55: Lelko, Rebecca

A NEW ALGORITHM FOR SURFACE CONSTRUCTION WHILE PRESERVING CURVATURE

Lelko, R.

Mathematics & Statistics, Texas Tech University

In this research project, we continue the work of Dr. Zeynep Kose (PhD in Mathematics, TTU 2010), and propose a new geometric algorithm for surface construction. The new algorithm is to obtain families of solutions to a Bonnet-Lax system of equations for two dimensional surface deformation while preserving curvature. The motivation for the new algorithm is the work of Simo and Wong (1991) who described an unconditionally stable algorithm for integrating the equations of classical mechanics while preserving momentum and kinetic energy. During this project, we studied the geometric formulation of the theory of mechanics as evolution equations on the Lie Group $SE(3)$ that have certain conserved quantities like momentum and energy. Such equations can describe motion of a freely moving asteroid or a spinning top without energy dissipation, for example. We show the mathematical connection between the equations of classical mechanics and the Bonnet-Lax system of equations for surface deformation. Utilizing this connection, we construct an entirely novel class of algorithms to numerically solve the problem of surface deformation while preserving curvature.

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J. C. Simo and K. K. Wong, "Unconditionally stable algorithms for rigid body dynamics that exactly preserve energy and momentum", International Journal for Numerical Methods in Engineering, Vol. 31, pp. 19-52, 1991.

56: Leopold, Monika

DIACHRONOUS HYPERSOLIDUS DEFORMATION DURING REPEATED MAGMA INJECTION: FIELD OBSERVATIONS FROM THE TILTED WOOLEY CREEK BATHOLITH

Leopold, M. and Yoshinobu, A.

Geosciences, Texas Tech University

We present new field and structural observation from the 158-154 m.y.o (U/Pb TIMS) Wooley Creek batholith, Klamath Mountains, CA. The WCb is tilted to the south and exposes over 15km of structural relief. The intrusion may be divided into a northern deeper gabbroic/diorite/quartz diorite zone, a central, complexly sheeted zone of quartz diorite/tonalite containing abundant mafic magmatic enclaves (MME's), enclave swarms, and disrupted/deformed mafic dikes, and a southern (shallower) zone of minor gabbro, qtz diorite, granodiorite and granite. All foliations are hypersolidus in nature.

Field work in the Cuddihy Basin yields the following observations and interpretations related to the central qtz diorite/tonalite 'host' magma. At least seven distinctive intrusive episodes. (1: early cognate xenoliths; 2: tonalite/qtz diorite host magma; 3: various coarse-crystalline MME's; 4: fine-crystalline mafic dikes; 5: net-veined fine to medium crystalline mafic dikes; 6: folded amp+ bt + pl-phyric dikes; 7: late leucocratic veins) and three distinctive hypersolidus foliation-forming events occurred in the C.B. The oldest foliation occurs in coarse-crystalline cognate xenoliths of qtz diorite contained within the host magma. Foliations are perpendicular to host foliations and are truncated at the margins of the xenolith. The second set of foliations is N-NE trending and occurs within the host magma. Swarms of mafic enclaves are aligned parallel to this fabric and are cut by late fine-crystalline mafic (gabbroic to qtz dioritic) dikes. These dikes vary in orientation and are boudined and/or folded within the hypersolidus foliation plane of the host. Where these 'ribbon dikes' are folded, an axial planar hypersolidus foliation occurs in both the dikes as well as the host, representing the last fabric to have formed.

Presently it is not clear if the fabrics are related to either regional deformation present during emplacement or emplacement related flow. Both are consistent with NS extension and EW shortening. Whether these processes of deformation held constant or varied in strength throughout the time of multiple injections of host magma is still to be determined.

57: Luker, Brittany

EARLY LANGUAGE AND MEMORY PROJECT

Luker, B., Kulkofsky, S., and Ervin, T.

Human Development and Family Studies , Texas Tech University

This study seeks to determine the accuracy and reliability of the event-memories of children in a preschool setting. The children who participated in this study ranged in age from 3-6 years old (m=XX months), and were tested for expressive language abilities via the Expressive One-Word Picture Vocabulary Test (EOWPVT), receptive language competencies through the Peabody Picture Vocabulary Test (PPVT), and memory recall by answering direct questions in an interview conducted by researchers. The results of the

study are discussed in the light of memory retention, vocabulary abilities, and other variables contained within the analyses.

58: Martin, Joseph

SHORT-TERM EXPOSURE TO RADIO FREQUENCY RADIATION APPEARS TO HAVE LITTLE EFFECT ON SPERM CELL FUNCTION

Martin, J., VanGheem, A., and Prien, S.

OB/GYN, Texas Tech University

Microwave spectrum radio frequency fields (RF) are about as ubiquitous as oxygen in today's society; whether from cellular phones, wifi routers, or cellular towers, we are constantly being bombarded with this type of RF exposure. Recently a number of groups have suggested cellular phones are associated with several disease states; however, the potential ill effects of microwave spectrum RF on reproduction are not so well understood or studied. The present study aimed to complement the research already present in the field by examining a piece of spectrum not typically studied, that of the wifi router and its effects on reproductive cells ex vivo. Semen samples were acquired from five human donors. Each sample was divided into a control and exposed aliquot; with the control receiving no RF from a wifi source and the exposed aliquot receiving continuous RF from a wifi source for 24 hr. Samples were evaluated at set time points of 1, 2, 3, 6, 9, 12, 15, 18, and 24 hours using the World Health Organization (WHO) standard for measuring standard semen parameters, of motility, progressive velocity, straightness, and linearity. As expected, all semen parameters decreased over time ($p < 0.001$) regardless of treatment group. However, the data suggests no difference in any of the semen parameters due to RF exposure ($p = 0.392$). Unlike previous studies in other tissues, short-term exposure to RF radiation appears to have little effect on sperm cell function. Further studies are needed to assess long-term exposure on cell function.

59: Mathew, Alison

ARE FUN STORIES REALLY TRUE: CONTEXTUAL INFLUENCE IN CHILDREN'S STORYTELLING

Mathew, A.

HDFS, Texas Tech University

Although adults are able to distinguish between various social contexts and alter their conversations accordingly, the ability of young children to create this cognitive distinction is unclear. In this study, the effect of social contexts on the manner in which four- to six-year-old children retell stories is examined. The children were shown a cartoon and asked to recall its details by an interviewer whose demeanor was either fun or serious, depending on the condition to which the child was randomly assigned. In addition to the tone and personality of the interviewer, the setting of the interview was also tailored to further differentiate between the Fun and True conditions through the use of props. The responses of the children were examined for their Narrative Content and Narrative Skill, criteria which assess the accuracy and proficiency levels of the children's statements. The data indicates that children in the Fun condition provided less accurate information than children in the True condition. This difference could be due to the implied criterion of accuracy which differs between both of these contexts. Children in the Fun condition might feel socially compelled to provide elaborate and engaging stories while children in the True condition might feel compelled to provide more accurate responses. This observed pattern can have substantial legal and educational implications. The results indicate that pre-school-aged children are able to distinguish between serious and casual social contexts and are able to respond according to the implied, social criteria in each of these settings.

60: Mathew, Marylyn

ASSOCIATION OF HBA1C LEVELS AND DEPRESSION SYMPTOMS IN ETHNICALLY DIVERSE RURAL SAMPLE-A PROJECT FRONTIER STUDY

Mathew, M., Johnson, L., and O'Bryant, S.

Rural and Community Health, Texas Tech University

Diabetes is a serious public health issue and roughly 40% of Americans have hyperglycemic conditions. Additionally, it is the third highest ranking health concern among rural Americans. Previous studies have shown that diabetic indicators, such as HbA1c levels, are associated with depression. The present study sought to examine the relation between depression symptoms and glycemic control (HbA1c) in a rural population. Data was analyzed from 582 rural dwelling participants (331 non-Hispanics and 251 Hispanics) sampled from Project FRONTIER. Project FRONTIER is a community-based participatory research project studying rural health in West Texas. Depression symptoms were assessed using the Geriatric Depression Scale and its four sub-factors (Dysphoria, Meaninglessness, Apathy, and Cognitive Impairment). HbA1c levels and age were entered into the models as predictor variables with the Geriatric Depression Scale sub-factors as the outcome variables. Follow-up analyses were split by ethnicity. For non-Hispanics, there was a significant relationship between HbA1c levels and dysphoria ($B=0.23$, $p<0.05$) and cognitive impairment ($B=0.16$, $p<0.05$). For Hispanics, no significant relationships were found between HbA1c levels and GDS sub-factors. The current findings demonstrate that HbA1c levels are associated with specific symptoms of depression and this link is only significant for non-Hispanics. As diabetes is a major issue in rural America, it is important that researchers investigate diabetes related topics in rural settings so evidenced-based relevant practice guidelines can be generated.

61: Matthey, Alexander

SYNTHESIS AND HIGH RESOLUTION TRANSMISSION ELECTRON MICROSCOPY STUDY OF GALLIUM MANGANESE NITRIDE NANOCRYSTALS

Matthey, A., Marathe, A., and Zhang, X.

Mechanical Engineering, Texas Tech University

We report for the first time synthesis and structural characterization of GaMnN nanocrystals. A DC-arccharge system was used to synthesize the nanocrystals. High resolution transmission electron microscopy (HRTEM) characterization showed that nanoparticles are spherical in shape with diameters between 39 – 66 nm. GaMnN nanocrystals have a wurtzite structure with a composition of 50:50 Ga to Mn ratio.

62: McDonald, Priscilla

NEW ASIC ARCHITECTURE DEVELOPMENT FOR ENERGY HARVESTING

McDonald, P., Reddy, D., and Bayne, S.

Computer and Electrical Engineering , Texas Tech University

This paper describes the evaluation and the development of an ultra-low power ASIC that can supply lifelong energy by scavenging natural energy sources, and transform the energy into output voltages ranging from 1.8v – 4.0v. A piezoelectric generator and antenna are used to extract natural resources. The two transducers are tested individually for efficiency using an energy harvesting module. In addition to the transducers, a sub-system is designed and tested for each transducer. A rectifier and DC-DC converter is

used to rectify and regulate the output of the piezoelectric generator. The antenna's output connects to a charge pump to rectify and increase the output voltage. The integration of the transducers and sub-systems into a programmable ASIC allows the system to scavenge energy despite its location. In addition to adapting to different locations, the ASIC is interchangeable with various loads that have input voltages ranging from 1.8v – 4.0v. The overall design of the ASIC involves many phases of testing to ensure that the system created complies with the ultra-low power requirement.

63: Medlin, Kandace

THE DYNAMIC RELATIONSHIPS BETWEEN MOTOR SKILL COMPETENCE AND PHYSICAL FITNESS AND OBESITY

Medlin, K.

Exercise and Sports Science, Texas Tech University

Physical activity and fitness habits are developed in childhood and adolescence (Malina 1996). Stodden et al. hypothesized the development of motor skill competence is a causal mechanism promoting physical activity, fitness, and obesity. The proposed mode (see figure 1) indicates that the relationship among motor skill competence, physical activity, fitness, and obesity will strengthen across time. This study examined the strengths of the relationships between motor skill competence and health related fitness and motor skill competence and obesity among children from early (4-5 years), to middle (7-8 years), to later (10-11 years) childhood. The Fitnessgram was used to measure upper body muscular strength, leg strength and power, upper body muscular endurance, and abdominal strength/endurance. Body composition was measured using percent body fat and estimated by body mass index, and motor skill competence was measured using product scores and TGMD2. Regression analyses indicated the amount of variance in fitness and obesity explained by motor skill competence increased across age groups. These cross-sectional data indirectly support the Stodden et al., model hypotheses. In addition, the motor skill assessment that most predicts fitness is dependent upon the age and a gender of the child. The relationship between motor skill competence and fitness is stronger than previously reported data, which may be related to motor skill assessments. Further research is needed to assess the reliability and validity of motor skill assessments.

64: Merry, Nathaniel

URANIUM CARTELIZATION, WHO ARE LIKELY CANDIDATES TO JOIN/FORM A URANIUM CARTEL?

Merry, N. and Giberson, M.

Energy Commerce, Texas Tech University

In the early 1970's, a 'Uranium Club' was formed to create a price floor for Uranium. The creation of the floor was successful and soon the price of uranium was soaring as the so called "club" had transformed into a cartel. Needless to say the nuclear power industry was distraught and the cartel, upon exposure, was dismantled. Recent increasing interest in the expansion of nuclear power production raises the question of whether another uranium cartel could emerge. By acknowledging the consumption/ production practices of all of the countries in the world and assuming that each country is sovereign and inexorably in control of their own resources, countries that stand to gain from cartelization, with respect to uranium, can be spotted. Those countries that stand to gain can be seen as possible targets for membership if a cartel were one to form. The analysis does not take into account the political atmosphere of any country, and thus does not constitute as a predictor of cartel participation. It is, however, an analysis of who has incentive to partake in collusive behavior in the form of a cartel.

65: Moreland, Mason

OOPHAGY IN BOMBINA ORIENTALIS

Moreland, M. and Bernal, X.

Biology, Texas Tech University

Oophagy, or egg consumption, is a form of intraspecific competition that may enhance the fitness of one individual at the cost of another. Numerous genera of poison arrow frogs engage in oophagy as tadpoles, in which the females will lay infertile eggs in the axils of bromeliads to feed their larvae. Adult anurans may also eat conspecific eggs. The salamander *Taricha torosa* exhibits cannibalistic oophagy, often by females. Sex-specific oophagy, which is the cannibalistic consumption of eggs by only one sex, is known in the fire-bellied toad, *Bombina orientalis*, where males consume eggs. Although in most frogs males have access to eggs during the breeding season, oophagy by adults seems to be rare and has been reported only in about eight species of anurans. The evolutionary forces and proximate mechanisms behind this behavior have not been investigated in amphibians. Here we will examine the hypothesis that oophagy is a strategy to reduce larvae competition. We will breed pairs of the toads in small enclosures, remove one of the individuals immediately after egg laying and expose the remaining individual to small batches of their own eggs and eggs of other pairs. We will examine the number of eggs consumed from each batch by each sex. A higher consumption of non-related eggs would support the hypothesis that oophagy reduces competition. Our results will determine whether oophagy is driven by selective pressures to reduce competition with conspecific larvae, ultimately providing insight into the mechanisms driving the evolution of this behavior.

66: Nelson, Andrew

SUSTAINABLE INDUSTRIAL DEVELOPMENT

Driskill, D. and Nelson, A.

Architecture, Texas Tech University

In the U.S. alone the construction industry is responsible for 11 percent of the CO2 emissions. In response to this problem, The American Institute of Architects has issued the 2030 challenge that establishes the goal for all architecture to be carbon neutral by the year 2030. This study will conceptualize a zero carbon footprint for a typical industrial park. Land strategically located at the entrance to the Lubbock International Airport, which is currently producing cotton, is used as the site for two possible design plans. One plan complies with the industrial development zoning ordinances, the other is a mixed-use industrial park designed using sustainable principles. A basic carbon footprint calculator is used to determine the amount of carbon emitted through the construction process. National averages for transportation and annual energy consumption will then be determined. These two values are combined to give an overview of the predicted total carbon footprint. The comparison between these two will show benefits of the mixed-use development plan through the difference in carbon footprint. The footprint will be used to set the carbon goal required to be saved and generated through the design of the architecture located within the development to obtain a zero carbon footprint.

67: O'Neal, Caitlin

INFLUENCE OF BLOOD SAMPLE STORAGE TEMPERATURE AND LATENCY UNTIL ANALYZED ON VARIOUS EX VIVO INNATE IMMUNE RESPONSE ASSAYS IN HOLSTEIN HEIFERS

O'Neal, C., Ballou, M., and Hulbert, L.

Animal Science, Texas Tech University

Objectives were to determine effect of storage temperature and amount of time lapsed until whole blood was analyzed for ex vivo innate immune responses. Whole blood was collected into 2 ten mL heparinized vacutainers from 8 Holstein heifers, approximately 1 year old. One vacutainer from each heifer was placed on ice (ICE) and the other was put in an ice chest without ice (NI). Samples were analyzed at 2 (baseline), 4, 6, 8, 10, and 24 h after time of collection. Data was analyzed by ANOVA with the fixed effects of heifer, storage temperature (ST), time, and the interactions of heifer x ST and ST x time. ICE samples had more leukocytes than NI samples. All of the samples decreased total leukocytes from baseline measurements at 10 and 24 h for ICE and NI samples, respectively. Neutrophils in ICE didn't change over time, but NI samples were lower at baseline and increased over time. NI samples had more neutrophils at 8 h compared to baseline. Hematocrits were lower in ICE samples and were above baseline samples at 24 h. More TNF- α was released after NI blood samples were stimulated with lipopolysaccharide than ICE samples. NI sample neutrophils expressed less L-selectin than ICE samples, except at 24 h after collection. At baseline, ICE samples had a greater neutrophil oxidative burst than NI samples. There was no difference in oxidative bursts ST between 4 and 10 h; however, at 24 h ICE samples had less intense oxidative bursts. These data show that storage temperature and time until analyzed influences ex vivo innate immune responses and should be controlled for in the experiment design.

68: Oostveen, Emily

THE EFFECTS OF NANO IRON OXIDE ON EISENIA FETIDA

Oostveen, E. and Canas, J.

Environmental Toxicology, Texas Tech University

Iron oxide nanoparticles, one of the most promising nano-metal oxides known, are used for a variety of applications including magnetic data storage, targeted drug delivery and catalysis. While nano iron oxide has a low toxicity in humans, increased use could lead to environmental exposure. Using Eisenia fetida (earthworms), acute toxicity will be assessed with mortality as the end point. Two acute toxicity tests will be conducted for 14 d: a filter paper contact test and a sand acute test. Earthworm weight will be recorded at the beginning and end of each exposure period. Results from the acute toxicity studies will be valuable in the ecological risk assessments of nano-metal oxides.

69: Ortega, Juan

PRODUCING XENOPUS OOCYTE PLASMA MEMBRANE VESICLES (PMVs) FOR BIOCHEMICAL AND PROTEIN STUDIES

Ortega, J. and Jansen, M.

Cell Physiology and Molecular Biophysics, Texas Tech University

Xenopus oocytes are widely used for heterologously expressing plasma membrane proteins and especially ion channels. However, it is difficult to obtain pure plasma membranes for biochemical and high throughput electrophysiology methods. Being able to obtain these pure plasma membranes containing

heterologously expressed proteins would greatly facilitate numerous biochemical and electrophysiological techniques for the study of ion channels and transporters. Ion channels and transporters are involved in a vast variety of diseases. A better understanding of these proteins will help in developing optimized treatment strategies. Our central hypothesis is that *Xenopus* oocytes can be used to produce plasma membrane vesicles (PMVs) containing heterologously expressed ion channels that are suitable for different assays. Intact, defolliculated oocytes were micro-injected with mRNA, and incubated overnight to allow for protein translation. Subsequently, the vitelline membrane was dissected away under a microscope in hypertonic solution. Oocytes were then transferred to a hypertonic or “blebbing” solution and incubated overnight at 60° F. We observed that oocytes produced large quantities of PMVs within 24 hours; we confirmed the presence of proteins that were translated from the injected mRNA. Future experiments aim at investigating whether these PMVs can be routinely used for Western blotting or patch-clamp experiments. At this point it seems feasible to use *Xenopus* oocytes as a relatively inexpensive source for the straightforward production of protein containing PMVs for studying ion channels and transporters.

70: Phillips, Jack

GROUNDWATER SELENIUM IS ASSOCIATED WITH LOWER DEPRESSION SCORES: A PROJECT FRONTIER STUDY

Phillips, J.A., O'Bryant, S.E., Mauer, C., Edwards, M., Mattevada, S., Johnson, L., Gong, G., and Hall, J.

F. Marie Hall Institute for Rural and Community Health, Texas Tech University

Objective

The physical and psychosocial impacts of depression and anxiety can impair the day-to-day lives of affected individuals. Exposure to environmental factors, such as the trace element selenium, can play a substantial role in cognitive and psychological functioning. However, little research has been conducted concerning long-term, low-level exposure to selenium present in groundwater. This Project FRONTIER study assesses the intake of selenium via groundwater and its potential effects on depression and anxiety in rural inhabitants from West Texas.

Methods

Participants were 435 rural-dwelling individuals, ages 40 and above, participating in an epidemiological study called Project FRONTIER (Facing Rural Obstacles to healthcare Now Through Intervention, Education & Research). Assessments consisted of a standardized medical examination, clinical labs, neuropsychological testing, and psychological testing. Utilizing the Environmental Systems Research Institute (ESRI, 2009) ArcGIS (release 9.2), we were able to analyze exposure to selenium based on geographic location of participants' residences.

Results

Higher selenium levels were significantly related to lower scores in the Total GDS-30 scores ($p < 0.001$) as well as factor scores of Dysphoria ($p < 0.001$), Meaninglessness ($p < 0.001$), Apathy ($p < 0.001$), and Cognitive Impairment ($p = 0.01$). Selenium levels were not significantly associated with BAI total scores. However, higher selenium levels were associated with significantly lower scores on the BAI Autonomic subscale ($p = 0.01$).

Conclusions

The significant negative relationship between selenium levels and total and factor GDS-30 scores as well as BAI Autonomic factor scores merits further investigation into the possibility of groundwater-based selenium supplementation for the prevention of depression-related symptoms.

71: Pleasant, Stephanie

PURIFICATION AND PROPERTIES OF CHOLESTEROL AND RELATED STEROLS

Pleasant, S. and Nes, W.D.

Chemistry/Biochemistry, Texas Tech University

As an approach to mastering new skills in experimental science in a project supported by the NIH-Plains Bridges to the Baccalaureate program, the senior author investigated the sterol metabolome of brown algae and the composition of a sample of commercial “cholesterol” and “lanosterol” by GC-MS. The sterol fractions obtained from the starting materials were chromatographed on aluminum oxide columns eluted with a step-wise gradient of diethyl-ether in hexane or aluminum oxide impregnated silver nitrate columns eluted with cyclohexane in toluene. For fractions that continued to be mixtures of sterols, the materials were further chromatographed by HPLC. Commercial “cholesterol” was mostly cholesterol with a few percent of oxidized remnants. The major sterols of brown algae were determined to be isofucosterol and fucosterol. On the other hand, the composition of the commercial “lanosterol” was shown to be a mixture of four sterols, lanosterol, 24,25-dihydrolanosterol, agnosterol and 24,25-dihydroagnosterol with lanosterol at approximately 45% of the total sterols in the mixture. These studies afforded a set of pure compounds of variant constructions that will be used as starting materials in the synthesis of drugs targeted at parasites causing third-world diseases and in mechanistic enzymology projects.

72: Powell, Emily

ASSESSING the ROLE of TUMOR PROTEIN D52 in MURINE TUMOR CELLS by siRNA-BASED EXPRESSION KNOCK DOWN

Powell, E.J., Bright, J.D. and Bright, R.K.

TTUHSC Microbiology and Immunology, Texas Tech University

Tumor protein D52 is involved in tumor cell proliferation, transformation, and metastasis, and has been shown to be over-expressed in tumor cells. The goal of this study was to knockdown murine D52 (mD52) expression in a murine kidney sarcoma (mKSA) tumor cell line. Initial experiments verified that expression of MAP-Kinase could be knocked down in mKSA, proving the reliability of our technique. Four different siRNAs were used to knockdown mD52 expression in mKSA, each representing a different sequence targeting the mD52 message. mKSA was transfected with each representative siRNA and incubated for 48 hours at 37 °C. Controls consisted of cells transfected with an irrelevant control siRNA, mock transfection (no siRNA), and cells alone (untreated). Additionally, the four siRNAs were combined to determine if we could get more efficient knockdown with a pool of mD52 siRNAs versus a single siRNA. Transfected cells were harvested and total RNA was isolated. RNA concentration was determined by absorbance at 260/280 and integrity checked by agarose gel electrophoresis. cDNA was synthesized by reverse transcription and used in real time PCR reactions. From these data we determined percent knockdown of mD52 expression in mKSA cells. The four siRNAs were compared to the irrelevant control siRNA or cells alone to calculate percent knockdown. Each siRNA knocked down mD52 expression with varying degrees of effectiveness ranging from 0 to over 50% knockdown. Our future studies will include further optimization by varying incubation times, siRNA concentrations and evaluation of mD52 expression knockdown on tumor cell function and phenotype.

73: Quigley, Jacqualene

THE EFFECTS OF CAUSAL LANGUAGE ON CHILDREN'S MEMORY

Quigley, J., Kulkofsky, S., and Tovar, K.

TIEHH, Texas Tech University

Previous research shows that children tend to assent to misleading questions (i.e., questions that suggest something happened when it had not). Research also shows that presenting information in a causally connected way improves children's recall and recognition. In the present study we investigated whether causal language also improves children's answers to misleading questions.

Participants were 3-8-year-old children. Each child was read a short story. There were three different story conditions, causal, non-causal non-embedded, and causal non-embedded. The causal condition included information in the story that used causal language, for example, "She ate apple slices because she likes to eat food that's good for her." In the non-causal embedded condition the causal language was removed but the information was still embedded in the story, for example, "She ate apple slices. She likes to eat food that's good for her." In the non-causal non-embedded condition the causal information was presented before the story was read. Following a one-day delay, children were asked 16 questions, 6 of which were misleading. The number of misleading questions children got correct was counted.

Preliminary findings suggest that the effect of story condition was different for younger and older children. For younger children, those in the causal condition performed better than the children in the two non-causal conditions. For older children, those who were in the causal condition also performed best but the performance in the non-causal embedded was between the two other conditions. Thus, causal language appears to have an impact on children's memory.

74: Ray, Rachel

ISOLATION AND MEASUREMENT OF MITOCHONDRIAL MEMBRANE POTENTIAL IN APOPTOSIS

Ray, R., Martinez, M., and Pappas, D.

Chemistry and Biochemistry, Texas Tech University

Widespread apoptosis in cardiomyocytes results in damage to the heart, contributing to heart disease. In this work, the detection of early stage apoptosis by a membrane potential assay is demonstrated. Mitochondrial depolarization was monitored by Mitro Tracker Red upon induction of apoptosis by staurosporine. Two different cell lines (Jurkat and Hut 78) were lysed via homogenization, and fluorescence images were taken and determined that the dyed mitochondria remained intact. Ultimately primary corine cardiomyocytes will be lysed and separated by the use of microfluidic electrophoresis (MCE) in order to detect loss of membrane potential. In addition, the construction of microfluidic devices made of poly(dimethylsiloxane) (PDMS), and poly(methyl methacrylate) (PMMA) are demonstrated and are vital in the application of MCE. This work is the precursor to further studies that include the effects of ischemia/reperfusion injury in primary porcine cardiomyocytes. These cells will also be stained and separated by MCE, and the effects of ischemia/reperfusion on apoptosis induction will be elucidated.

75: Rodriguez, Jonathan

FORMALIZATION AND VERIFICATION OF ASSURANCE POINTS BY MEANS OF COLORED PETRI NETS

Rodriguez, J., Gao, L., and Urban, S.D.

Industrial Engineering, Texas Tech University

As the use of web services continues to grow, the need for better recovery methods for software processes increases as well. A method that has been introduced to address recovery in service composition is the use of Assurance Points (APs). Using the idea of checkpoints and user-defined constraints, APs use integration rules as a way to check correctness conditions and to invoke backward and forward recovery actions, using APs as intermediate rollback points within a process.

Although the concept of APs has been introduced, APs have not yet been formalized. This research focuses on using Colored Petri Nets (CPNs) to model the semantics of Assurance Points and its recovery functionality for rollback, retry, and cascaded contingency. The graphical notation and exact mathematical definition of CPNs make it a suitable tool to model information systems, verify whether the design operates correctly, and eliminate dead paths in a process flow. As part of this research, CPN models were first designed and tested for a service composition and recovery model. The models were then extended to define and verify Assurance Point semantics and to demonstrate AP recovery functionality by simulating errors and observing recovery response to errors. The CPN specification provides a formal definition of Assurance Points that clarifies the semantics of the recovery actions in the context of the service composition model.

76: Saadidin, Matt

SUSTAINED EXPRESSION OF INSULIN BY IMMUNE-PRIVILEGED SERTOLI CELLS

Saadidin, M., Kaur, G., Pasham, M., and Dufour, J.M.

TTUHSC Department of Cell Biology and Biochemistry, Texas Tech University

Sertoli cells (SC) are immune-privileged cells that survive after allo- or xeno-transplantation, suggesting that they may function as a vehicle for cell therapy. Previously, we transduced neonatal porcine SC with a recombinant adenoviral vector containing furin-modified human proinsulin cDNA and transplanted them into diabetic SCID mice, resulting in a short-term decrease in blood-glucose levels. The adenoviral vector used is ideal for efficient expression of the gene of interest; however, it does not integrate into the host genome, which could explain the transient insulin expression and subsequent rise in blood-glucose levels. Thus, the goal of our current study was to achieve long-term, stable expression of insulin in SC. Using a mouse SC line (MSC) as a model, we transduced these MSC cells with a recombinant lentiviral vector containing furin-modified human insulin. In vitro insulin expression by these MSC cells was observed for at least 11 months. These MSC cells were then transplanted as allografts into diabetic BALB/c mice, with 100% graft survival at 20 days post-transplantation (PT) and 66% graft survival at 50 days PT. Insulin mRNA was detectable up to 20 days PT; however, insulin protein was not detected at any time point. Currently, we are analyzing the day 50 PT grafts for insulin expression. These results suggest that SC can be altered to produce insulin for a sustained period of time while surviving as allografts. In future experiments, we desire to manipulate SC to secrete insulin at levels high for long-term normalization of blood-glucose levels in diabetic mice.

77: Salles, Jennelle

ASSESSMENT OF ABNORMAL CRANIAL THICKENING IN LATE PLEISTOCENE ABORIGINAL THROUGH THE EVALUATION OF POSSIBLE PATHOLOGICAL FACTORS

Salles, J.

Anthropology, Texas Tech University

Abnormal cranial thickening in a Late Pleistocene individual, referred to as WLH50, appears to be of pathologic origin. The remains of WLH50 include a portion of a femur, an elbow, and a large portion of the skull sans the face. The skull of this individual exhibits an extensive network of diploic bone between a nearly absent inner cranial table and an extremely thinned outer cranial table. The excessive thickening of the diploic bone within the cranium of this individual has been recorded, on average, to be 6.45 mm thicker than the normal cranial thickness characteristic of this time and region. Many anemias have been considered, as well as other various conditions that have previously been reported to be causal agents of porotic hyperostosis. Other diseases that exhibit a marked increase in diploic volume, such as Paget's disease and Leontiasis Ossea have also undergone review, however, many of these miscellaneous conditions have been ruled out due to morphological inconsistencies. In order to assess the pathologic nature of WLH50's diploic network expansion in the cranium, CT scan data, cranial measurements and digital photographs are critically examined and compared to documented examples of similar morphologies.

78: Sanchez, Jasmine

AN EVALUATION OF PRESCHOOL-CAREGIVERS' SELF-EFFICACY AND ATTITUDES

Sanchez, J.

Human Development and Family Studies, Texas Tech University

Although there is a common misconception that childcare providers are nothing more to our children than that of a babysitter, their contribution to children's development could be vital to children's future capabilities. Findings from the current study will benefit children who are in childcare facilities by understanding the importance of the provider's role within the child's life. The study will focus on teacher's perceptions on their attitudes as well as self efficacy levels related to their own skills and the impact of their work. The study will also take into consideration caregivers' level of training and their attitudes towards furthering their education within their field. This will allow us to determine if training is associated with high or low levels of self-efficacy. Participants were recruited from local daycare facilities as well as students from the Human Development and Family Studies classrooms. Students (n=70) from Texas Tech University as well as community childcare providers (n=70) were invited to participate. The survey they completed includes a measure of Teacher and Personal Efficacy, demographic questions of age, ethnicity, gender, and educational background.

79: Sandy, John

SINGLE PHOTON MEASUREMENT OF SURFACE PLASMON POLARITON EXCITATION

Sandy, J., Dominguez, D., Henry, P., and Grave de Peralta, L.

Physics, Texas Tech University

The goal of our experiment is to create and detect Surface Plasmon Polaritons (SPP) using extremely low intensity light such that SPP excitation is achieved using single photons. This is accomplished using an

experimental apparatus which utilizes a laser-intensity varying system, a PMMA on gold on glass sample, and a Single Photon Counting Module (SPCM). We image the characteristic SPP propagation ring using a typical CCD camera and find the corresponding peak intensities using single photon excitation methods and the SPCM.

80: Scott, Ann Marie

SELENIUM INHIBITS THE GROWTH OF THE OPPORTUNISTIC PATHOGEN, PSEUDOMONAS AERUGINOSA

Scott, A.M., Haley, C., Mosley, T., Reid, T., and Hamood, A.

Ophthalmology, Texas Tech University

Infection with multi-drug resistant (MDR) pathogens presents a major challenge to physicians and a continuous threat to their patients. The main causes for the emergence of MDR pathogens are the indiscriminate use of antibiotics and the novel antibiotic resistance mechanisms. Therefore, extensive worldwide research efforts are focused on identifying alternative antimicrobial agents. We recently showed that selenium (Se) inhibited the development bacterial biofilms on medical devices. In this study, we tried to determine if Se solution inhibits the growth of planktonic cells of *P. aeruginosa*. Overnight cultures were diluted in a nutrient broth containing variable concentrations of Se (in form of selenocystamine solution) and grown for 16 hours to an optical density (OD600) of 0.02-0.03. The *P. aeruginosa* strain PA01 growth was inhibited at concentrations as low as .0125% Se. We obtained similar results with the three other *P. aeruginosa* virulent laboratory strains PA14, PAK, PA103, as well as *P. aeruginosa* isolates obtained from infected wounds. Selenocystamine also interfered with the development of PA01 biofilm. Initial viable count analysis (by determining the colony forming units/ml) confirmed these findings. These results suggest that: Se is a potential therapy for *P. aeruginosa* infections and can interfere with biofilm formation. Whether Se is effective against other gram negative pathogens is yet to be determined.

81: Shanks, Lindzi

THE AIRBORNE DISORDER: COMMUNICABILITY AND STIGMA IN MENTAL DISORDERS

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Psychology, Texas Tech University

Stigma towards mental disorders is prevalent in society (Phelan, 2005). Are mental and medical disorders stigmatized in the same way? Participants (N=92 undergraduates) answered a series of questions to assess their level of stigma towards mental disorders which probed 5 elements of stigma: personal blame for the disorder, genetic influences, sympathy for someone with the disorder, the amount of risk someone with the disorder poses, and the amount of personal contact a person is willing to have with someone who has a disorder. Participants also rated the extent they believed the disorders had a single causal factor that generated the symptoms of the disorder (i.e., an essence) that makes it a real disorder. They also rated whether the underlying causes of the disorders were biological, psychological, or environmental in nature. Participants also rated the level of communicability and controllability of each disorder. Participants completed this procedure for 12 mental and 12 medical disorders. Medical disorders communicability was positively correlated with stigma. Surprisingly, in mental disorders communicability was also positively correlated with stigma. Furthermore, we found communicability was positively correlated with controllability and a psychological and environmental basis in mental disorders. Interestingly, for mental disorders communicability was negatively correlated with biological basis. Lay individuals perceive certain mental disorders to be communicable through personal contact. This belief is correlated with stigma. Why communicability beliefs arise is a question for future research. Understanding how these beliefs form is an essential step to undermining those beliefs through anti-stigma campaigns.

82: Silva, Kelcie

SELF-ESTEEM THREAT: ANXIETY AND SELF-WORTH

Silva, K. and Burrell, A.

Psychology, Texas Tech University

When high self esteem participants are exposed to a self esteem threat (vs. boost) they will experience lower self worth and high anxiety, whereas low self esteem participants experience lower self worth and low anxiety. We believe this because research shows that participants high in self-esteem are liked less by interaction partners following a self-esteem threat than are participants low in self-esteem; and negative feedback can elicit anxiety in high self esteem participants whereas positive feedback can elicit anxiety in low self esteem participants (Heatherton & Vohs, 2000; Dodgson & Wood, 1999; Festinger, 1957). Participants will be randomly assigned to a negative or positive feedback condition prior to completing measures of anxiety and self-worth. An anagram task will provide the positive and negative academic feedback. We expect that high self-esteem participants will react positively to positive feedback and negatively to negative feedback, while low self-esteem participants will react negative to positive feedback and neutral to negative feedback.

83: Smith, Courtney

THE EFFECTS OF CHILDREN ON MARITAL QUALITY AMONG HISPANIC NEWLYWED COUPLES,

Smith, C.

HDFS, Texas Tech University

The aim of the current study is to examine whether there are differences in marital quality among newlywed Hispanic couples depending on the presence of children with current spouse before the marriage and the presence of from a previous relationship. Thirty-four couples were recruited through marriage licenses from the county office and an ad place into a local Hispanic newspaper. Husband and wives did not significantly differ with regard to their responses to any marital quality measures. A series of t-tests revealed couples who entered marriage with a child from the current relationship did not differ significantly from couples who entered marriage with a child from a previous relationship with regard to various measure of marital quality. However, spouses with children from a previous relationship had higher scores on consensus than those couples without children from a previous relationship. Additional analysis revealed that husbands who entered marriage with children from their current spouse compared to husbands who entered marriage with children from a previous relationship reported less satisfaction in their marriage. Moreover, husbands with children from a previous relationship reported higher consensus than husbands who had no children from a previous relationship. Interestingly, those findings were not found for wives in regards to the presence of children with the current spouse or with children from a previous relationship.

84: Snow, John

MONITORING ACTIVE PHAGE INFECTIONS ON CLINICALLY-RELEVANT MATURE ESCHERICHIA COLI BIOFILMS USING A LUX CHEMILUMINESCENCE MARKER

Snow, J., Kay, M., and Fralick, J.

Microbiology, Texas Tech University

The presence of antibiotic-resistant bacterial infections, especially chronic wound infections, continues to be a major problem plaguing hospitals worldwide. Up to 85% of chronic bacterial infections involve a

biofilm. Biofilms are made up of communities of bacteria that have affixed themselves to a surface and/or each other and are embedded within a self-produced matrix of extracellular polymeric substance (EPS). Biofilm cells are approximately 1000 times more resistant to antibiotics than are their planktonic counterparts. One potential method of treatment against these antibiotic-resistant biofilm infections is the use of bacterial viruses or phage therapy, using biofilm-specific bacteriophages to lyse and destroy targeted bacteria. Phage therapy has been found to be much more effective when a mixture of phages (a phage cocktail) is added, due to genetic recombination effects between the various phages. Mature 48-hour lux-transformed bioluminescent *E. coli* biofilms were infected with various combinations of specific phages and screened using bioluminescence detection equipment for effects on population size and metabolic activity in our experimental model.

85: Stull, Sierra

SONOCHEMICAL PRODUCTION OF BIODIESEL FUELS

Stull, S. and Casadonte, D.J.

Chemistry and Biochemistry, Texas Tech University

Our group has recently been exploring the use of ultrasound in the formation of biodiesel fuel (BDF). Specifically, conditions necessary to optimize the synthesis of BDF using high-intensity ultrasound irradiation are being examined. Recently, high-intensity ultrasound has been used in accelerated and facile formation of BDF. Although traditional processes require several hours to produce biodiesel fuel, the use of high-intensity ultrasound can produce BDF from castor oil in as little as five minutes. This is presumably due to enhanced mixing and cavitation energy provided to the system upon sonication. Low-frequency ultrasound can be used to make BDF and high-frequency ultrasound can be used to separate glycerol and soap from the BDF.

This project involves a study of alternative biodiesel production methodology using ultrasound. Particularly, we are exploring the action of solid-acid catalysts in the sonochemical production of BDF. Recently, we have had success using a ZnO-based catalyst system for the formation of biofuel from castor oil, without the concomitant production of fatty acid soap. We are also exploring the use of Lewis acid catalysts (e.g., SnCl₂, FeCl₂, and AlCl₃), the use of ethanol rather than methanol as a feedstock, and the sonochemical scission of longer-chained methyl or ethyl esters for the formation of usable biofuel for automobiles as well as value-added lighter molecular weight biofuels for use in the aviation industry. The facilitated synthesis of BDF's using Lewis-acid catalyzed reactions will be discussed, along with the relative advantages of using a true catalytic reaction in production of BDF.

86: Subedi, Sishir

A STUDY OF THE IMPE1 GENE AND ITS ROLE IN CEPHALIC FURROW FORMATION IN THE DROSOPHILA EMBRYO

Subedi, S. and Thomas, J.

Cell Biology and Biochemistry, TTUHSC, Texas Tech University

Cephalic furrow formation is a unique phenomenon observed during early embryogenesis in *Drosophila melanogaster*. At the beginning of gastrulation, certain cells at the anterior of the cellular blastoderm invaginate. During this process, the initiator cells shorten and move into the interior of the embryo along with the adjacent columnar cells. Throughout invagination these cells remain connected as an epithelium. The genes that regulate the position of the cephalic furrow have been identified. However, the control mechanism for invagination of the blastoderm cells remains unknown. Our aim is to understand the basic control mechanisms behind cell shape changes and tissue movements by studying how genes control cellular processes during furrow formation. Our lab has shown that mutations in several genes cause

abnormalities during furrow formation. One of these genes is Ecdysone-inducible gene early 1 (ImpE1), a protein-coding gene involved in imaginal disc eversion. Our lab has found that embryos from a *Drosophila* stock carrying the transposon-induced mutation PBac{WH}ImpE1f03112 show slow furrow invagination compared to wild-type embryos. By using the inverse PCR technique, we confirmed the location of the PBac(WH) transposable element in the second intron of the ImpE1 gene. This suggests that the defect in cephalic furrow formation in these embryos is caused by the mutation in the ImpE1 gene. We investigated the expression of the ImpE1 gene during white pupa stage using semi-quantitative PCR. The expression of ImpE1 gene in the mutant white larva was found to be about seven times less than the wild type white larva. Currently, we are comparing the expression of ImpE1 transcripts during major stages of early development of the embryo. We are also studying the characteristics of novel ImpE1 protein.

87: Tran, An

MOTHER-CHILD ELABORATIVE REMINISCING AS AN APPLIED INTERVENTION IN THE COGNITIVE AND SOCIO-EMOTIONAL DEVELOPMENT OF LOW-INCOME CHILDREN

Tran, A., Kulkofsky, S., and McCarty, M.

HDFS, Texas Tech University

The achievement gap between children from high and low-income families is an important issue to address in the U.S. public education system. Elaborative reminiscing among mother-child dyads has been linked to positive developmental outcomes in mathematics and reading abilities. The purpose of this pilot study is to investigate whether elaborative reminiscing by individuals other than mothers can be applied as an intervention to improve low-income children's cognitive and language abilities. Eight 3 to 5 year old children attending a Head Start program were randomly assigned to a narrative reminiscing or control condition. The design of the study consisted of a pretest that assessed narrative and vocabulary skills, six 15-minute sessions over six weeks, and a posttest. In the control condition, the experimenter played board games with the child during each session. In the intervention condition, the experimenter prompted the child to recall past events following a structured protocol. Event statements are (unique) statements a child makes describing the past event. In the intervention condition, children made 6.5 more event statements at post-test (M = 40) than at pretest (M = 34), whereas in the control condition, children made 12 fewer event statements at post-test (M = 14) than at pretest (M = 26). Thus, the intervention did seem to help children recall past events. Many mothers in low-income households do not have the time or knowledge to engage in elaborative reminiscing with their children. This study shows the feasibility of an intervention that applies the principles of elaborative reminiscing.

88: Trivedi, Urvish

THE IMPORTANCE OF RELATEDNESS IN MAINTAINING COOPERATION AND VIRULENCE IN CHRONIC WOUND INFECTIONS

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Surgery, Texas Tech University

The ability of pathogenic bacteria to exploit their hosts depends upon the production of virulence factors, whose expression are predominantly controlled by cell-to-cell signaling, or quorum sensing (QS) in *P. aeruginosa*. Previous studies have shown that QS signals (or autoinducers) are used by bacteria to coordinate cooperative behaviors and that QS can be exploited by individual cells (cheats) that avoid the cost of either producing or responding to signal. We have previously shown that such exploitation occurs in vivo, reduces relatedness and increases diversity within infections, and ultimately influences virulence in murine wound models. Given that QS is important during infection, yet is subject to exploitation, we examined how such behaviors can be maintained in these environments. We postulated that the most likely

explanation is ‘kin selection’ because if neighboring cells tend to be close relatives, they will have a shared interest in honest communication and cooperation. In this study we tested the importance of kin selection with respect to virulence and how relatedness between cells influences the progression and outcome of infection. We used an in vivo experimental evolution approach by infecting two groups of murine chronic wounds with isogenic *P. aeruginosa*. The bacterial populations were then propagated through several rounds of infection under conditions that would promote either high or low relatedness. We then monitored QS phenotypes of individuals in the populations. We predicted that QS signaling and or response to signaling would decrease in low compared to high relatedness populations. In agreement with our prediction, we observed that after 4-7 rounds of infection, the high-relatedness groups were completely comprised of QS cooperating (signaling and responding) *P. aeruginosa* cells. In contrast, after 6 rounds of infection, the low-relatedness groups were almost exclusively comprised of cheats (non-signaling), and infections were much less virulent. These data support the hypothesis that high relatedness favors QS and virulence in *P. aeruginosa* infections. Our results help explain (1) how cooperative behaviors such as QS can be maintained during infections and (2) why QS cheats are often isolated from clinical infections.

89: Venhaus, Dustin

COMPETITION BETWEEN SHEAR FORCES AND CHIRAL FORCES IN CHOLESTERIC LIQUID CRYSTALS

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Chemical Engineering, Texas Tech University

Our research is focused on simulating the alignment dynamics of cholesteric liquid crystals; this work is motivated by data from recent experiments on carbon nanotube/DNA solutions. Liquid crystals are typically fluids containing rodlike molecules that may form ordered (i.e., crystalline) phases while remaining in a liquid state. Typical liquid crystals are “nematic,” meaning that the rods are randomly dispersed but point in the same direction; a “cholesteric” liquid crystal is similar except that there is a natural spiraling (helical) twist in the direction of the aligned molecules. The purpose of our research is to quantify the microstructural and rheological response of these liquid-crystalline phases to flow.

We utilize a Landau-de Gennes expression for microstructure dynamics of a rodlike system, similar to the DNA/carbon nanotube experimental system. The model is composed of a coupled system of partial differential equations (PDEs) that is analytically insolvable; prior studies focused on only simple cases of orientation evolution due to the numerical difficulties. Our work uses the finite element method to solve PDEs in arbitrary geometries (through the use of COMSOL software). The finite element method approximates solutions to solve the PDE on a 2-D or 3-D grid. Our model captures the effects of four forces: (1) flow, which represents the drag of the solvent on the rods; (2) intermolecular interaction, which induces alignment; (3) elasticity, which minimizes gradients in alignment; (4) chiral terms, which induce a twist in the direction of alignment.

Our results show that for low shear rates, chiral and elastic forces prevent the system alignment from changing. At intermediate shear rates, the direction of alignment may “tumble” for hundreds of shear units before being arrested by the chiral and elastic forces. At high shear rates, the effects of chirality are negligible. We also found that boundary conditions make a substantial difference on the appearance of the cholesteric phase. These findings can be tested against experimental rheological data on nematic and cholesteric systems.

90: Venkataraman, Ashwin

BACTERIAL GENOME ASSEMBLY

Venkataraman, A., Youn, E., and Dowd, S.

Computer Science, Texas Tech University

DNA sequencing is to determine the correct order of the nucleotides in a piece of DNA. Current DNA sequencing technologies break up the genome into many random fragments. These fragments are created using restriction enzymes which randomly split the larger chromosome into smaller fragments of random size. These fragments form contigs which is a single and continuous DNA sequence. Our genome assembly project starts from contigs. The small fragments are sorted into clusters based on sequence similarity and formed into contigs. Because the sheer number of contigs is still enormous the contigs themselves are also clustered to form supercontigs. The supercontigs can then be used for genome searching and gene comparison.

To put the contigs into a super-contig, they must be searched for sequence similarities between contigs. The contigs are compared against each other using a sequence length of 150 and searching through the first and last pieces of each contig to a length of 5000. The contigs are compared in forward and reverse directions. The 150bp pairwise sequence alignments are done using the Needleman-Wunsch global alignment. The alignment returns a score. If the score is high enough and the contigs are already in other clusters, the clusters are merged; if not then they are formed into a new cluster. The clusters can then be listed or displayed onto the screen to see which fragments are useful to form supercontigs.

91: Ward, Charles

GREENSTONE ROCKS IN THE MIMBRES VALLEY, CENTRAL NEW MEXICO: GEOLOGICAL SIGNIFICANCE AND ARCHAEOLOGICAL PROVENANCE

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Geoscience, Texas Tech University

The Mimbres Valley in New Mexico was a center of the Mogollon culture between ~1200 BC to ~1200 AD. Within the Mogollon lithic toolkit were hafted greenstone axe heads that were ceremonial items. If the provenance of greenstone materials can be identified, then archaeological models for exclusivity and specialization of greenstone tools and their trade between Mogollon communities can be developed. One potential greenstone source is a transect of ~1.65 Ga mafic to ultra mafic rock near the city of San Lorenzo. Samples have evidence of an igneous mineral assemblage that included plagioclase, clinopyroxene, orthopyroxene, olivine, and amphibole. Many samples also have localized schistose domains and evidence of hydrothermal veining. Metamorphic minerals include chlorite, epidote, amphibole and quartz. Major and trace element discrimination diagrams indicate the magmas were similar to current day MORB magmas, but have some arc affinities. However, spider diagrams of chondrite and MORB normalized trace element concentrations show a spread of values between MORB and OIB, particularly for the more mobile large ion lithophile elements. This suggests that post-crystallization hydrothermal affects may have altered the concentrations and distributions of some elements. Ternary discrimination diagrams however identify the rocks as has having a MORB-type source, but additional data is required to distinguish between normal or enriched MORBs. However, it may be concluded that there was an extensional tectonic regime in the region at ~1.65 Ga contrary to current models for regions geologic evolution. The diversity within samples can provide a lithologic baseline against which properties of greenstone tools with well constrained provenance can be compared, this will provide information on where raw materials for tool fabrication were sourced in the Mimbres valley.

92: Warden, Anastasia

P. AERUGINOSA QUORUM SENSING SIGNALS INHIBIT THE DEVELOPMENT OF S. AUREUS BIOFILMS: ANALYSIS USING A THREE-DIMENSIONAL WOUND BIOFILM MODEL

Kaufmann, G.F., Janda, K.D., Lowery, C.A., Dertien, J., Colmer-Hamood, J.A., and Hamood, A.N.

Microbiology and Immunology, Texas Tech University

One of the serious challenges that the health care system faces is the management of infected chronic wounds including diabetic foot ulcers, non-healing surgical wounds, and pressure ulcers. These wounds are usually colonized by different pathogens including the opportunistic pathogens *Pseudomonas aeruginosa* and *Staphylococcus aureus*. At different infection sites, bacteria exist within specific protective structures termed biofilms. Biofilms are difficult to eliminate and are resistant to different antibiotics. Within the infected wound, bacteria utilize different strategies to compete for the limited space and nutrients. Recent research has shown that *P. aeruginosa*'s quorum sensing signals, such as acylated homoserine lactones 3-oxo-C12-HSL and 3-oxo-C14-HSL, as well as their tetramic acid degradation products C12-TA and C14-TA, have innate antimicrobial activity. Thus, we hypothesize that *P. aeruginosa* might use these molecules to eliminate other competing bacteria. In this study, we utilized the newly developed three-dimensional wound biofilm model (3-DWBM) to compare the effectiveness of C12-TA and C14-TA in eliminating *S. aureus* biofilms. The main constituents of the 3-DWBM, which mimics the conditions within the infected wound, are collagen and serum. The biofilms were visualized by confocal laser scanning microscopy. *S. aureus* expressing the green fluorescent protein produced a well-developed biofilm that extended within the collagen layers of the 3-DWBM. When applied at the initiation of the biofilm, C14-TA, but not C12-TA prevented the development of *S. aureus* biofilm. However, C14-TA failed to interfere with biofilm development when applied 4, 8, or 24 hours after biofilm initiation. Daily application of C14-TA for 7 days reduced the thickness and depth of the *S. aureus* biofilm. Additionally, quantitative analysis of the biofilms using the MetaMorph program showed that the observed reduction is significant. Neither C12-TA nor C14-TA affected the development of *P. aeruginosa* biofilms. These results suggest that: (1) the 3-DWBM is a suitable model to examine biofilm development by different bacterial pathogens; (2) C14-TA interferes with the development of *S. aureus* biofilms but is ineffective in eliminating already established ones, and (3) C14-TA is a potential therapy against *S. aureus* biofilms within chronically infected wounds.

93: Willingham, Meagan

EFFECTS OF LULLABY MASSAGE ON CHILDREN'S SLEEP

Willingham, M., Jackson, S., and Hart, S.

Human Development and Family Studies, Texas Tech University

Massage has been found helpful toward improving children's sleep. The aim of the study was to determine benefits of Lullaby massage to amount of time to fall asleep, hours slept at night, nap behavior, and nap length. 30 normally functioning children ages newborn to 5 years, were randomly assigned to massage therapy group or control group. Parents in the massage therapy group followed the Lullaby Massage poem book. The Lullaby Massage poem book integrates children's poems with massage movements that follow the poem. The massage was given every night for seven to ten nights. Parents in the control group read 15 minutes of a story book to their child every night for seven to ten nights. The same variables were measured at baseline and post-treatment points. These measures were; amount of times child awake at night, if child slept through the night, child's time to fall asleep, child's hours slept at night, child's nap behavior, child's nap length, and caregiver's hours slept at night. Due to limited sample size results based on qualitative data on sleep are non-conclusive. Further research is needed to explore in greater detail some potential benefits to massage

94: Zimmerer, Natalie

REFINEMENT OF A MOUSE MODEL TO STUDY THE INFLUENCE OF MATERNAL BODY CONDITION ON EMBRYO CHEMISTRY

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Cryopreservation is currently the only method for long term storage of embryos. The procedure interrupts cellular function and allows the embryos to remain viable for 5 years and beyond. Many factors influence successful cryopreservation of the embryos. A previous study from this laboratory showed a significant difference ($p < 0.001$) when embryo weights between mice of different body conditions; a mouse homozygous for a genetic defect that causes obesity, and a heterozygous and lean mouse of the same strain, were compared. This study was limited due to the inefficiency of embryo production in the obese mouse model. The present study examined the effect of increasing weight on the number of embryos harvested. Embryos from a single genetic line (C57BL/6N^{CrL}-Lep^{rdb-lb}/CrL – pound mice) were harvested according to TTUHSC-IUCAC protocol 86135. This allowed comparison of the weight of embryos from obese mice of different weights: 30, 40, and 50g. Embryos were collected from 4 mice in each treatment group and weighed using the previously described modified specific gravity technique. The three experimental groups exhibited substantially different weights ($p < 0.001$). Even at these increased maternal weights, embryos weights trended to decrease as maternal weight increased ($p = 0.063$). The data continues to suggest maternal weight may influence embryo composition, particularly lipid content. Additionally it was observed that collection of embryos improved when using an alternative method of obtaining embryos from approximately 40 g mice (~2X normal). This technique should supply adequate embryos for future cryopreservation studies to determine the influence of maternal body composition on embryo survival.