

The Office of the Provost and Vice President &
the Honors College present

UNIVERSITY SCHOLARS DAY

Featuring
Undergraduate
Research

APRIL 11, 2017

 HONORS
COLLEGE

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**The Office of the Provost and
Vice President for Academic Affairs
&
the Honors College
Welcome you
to**

UNIVERSITY SCHOLARS DAY

University Union, Third Floor
April 11, 2017

- 9:00 a.m. – 3:30 p.m. Check-In
University Union Ballroom 333, Lobby
University Union Small Ballroom, 315, Lobby
- 9:30 a.m. – 3:15 p.m. PANELS
- | | |
|--------------------|----------------|
| 9:30 – 10:45 a.m. | Panels 1 – 5 |
| 11:00 – 12:15 p.m. | Panels 6 – 10 |
| 12:30 – 1:45 p.m. | Panels 11 – 14 |
| 2:00 – 3:15 p.m. | Panels 15 – 19 |
- 1:00 – 2:30 p.m. Awards Competition: Scholars Day Poster and Fine Arts Presentation
Judging
University Union, Ballroom
- 2:30 – 3:30 Plenary Scholars Posters on Display, University Union, Ballroom
- 3:30 – 4:30 p.m. Awards Presentation and Keynote Address
University Union, Ballroom

Welcome: *Dr. Glênisson de Oliveira*, Dean, Texas Academy of
Math and Science and the Honors College

Keynote Address: *Leta Rebecca Cunningham*

Special Awards: *Dr. Rafael Major*, Honors College

UNIVERSITY SCHOLARS DAY PLANNING COMMITTEE

Dr. Glênisson de Oliveira, Dean, TAMS and the Honors College
Dr. Rafe Major, Honors College
Dr. Thomas Miles, Honors College
Dr. Jim Duban, TAMS and the Honors College
Dr. Eric Gruver, TAMS and the Honors College
Diana Dunklau, TAMS and the Honors College
Rene Martinez, Honors College
Debbie Taylor, TAMS and the Honors College
Meaghan Hildinger, TAMS and the Honors College
Rachel Dalton, TAMS and the Honors College

SCHOLARS DAY FACULTY MENTORS

Dr. Jim Duban, Honors College
Dr. Eric Gruver, Honors College
Dr. Michael Thompson, Department of Sociology
Dr. Dina Kapetangianni, Department of Linguistics
Dr. Douglas Root, Department of Biological Sciences
Dr. Lee Hughes, Department of Biological Sciences
Dr. Mark Vosvick, Department of Psychology
Dr. Rebecca Dickstein, Department of Biological Sciences
Dr. Lindsey Moore, Department of Technical Communication
Dr. Joseph Klein, College of Music
Dr. Michael Greig, Department of Political Science
Dr. Jim Meernik, Department of Political Science
Dr. Jennifer Way, Department of Art Education and Art History
Dr. Tom Miles, Honors College
Dr. Catherine Ragland, Department of Ethnomusicology
Dr. William Acree, Department of Chemistry
Dr. Teresa Golden, Department of Chemistry
Dr. Dan Kunz, Department of Biological Sciences
Dr. Shannon Abbott, Department of English
Dr. Kimi King, Department of Political Science
Dr. Richard Dixon, Department of Biological Sciences
Dr. Lior Fishman, Department of Mathematics
Dr. Sreekar Marpu, Department of Chemistry
Dr. Peter Mondelli, Department of Music History, Theory and Ethnomusicology
Dr. Justin Trudeau, Department of Communication Studies
Ms. Linda Mihalick, Department of Merchandising and Digital Retailing
Dr. Diego Cubero, Department of Music History, Theory and Ethnomusicology
Dr. Warren Burggren, Department of Biological Sciences
Dr. Xiaohua Li, Department of Mechanical and Energy Engineering
Dr. Shengli Fu, Department of Electrical Engineering
Dr. Jaymee Haefner, College of Music
Dr. Witold Brostow, Department of Mechanical and Energy Engineering
Dr. Jannon Fuchs, Department of Biological Sciences
Dr. Thomas Parsons, Department of Psychology
Dr. Paul Marshall, Department of Chemistry
Dr. Sheldon Shi, Department of Mechanical and Energy Engineering
Dr. Thomas Cundari, Department of Chemistry
Dr. Michael Barnett, Department of Psychology
Ms. Lesli Robertson, Department of Studio Art-Fibers
Dr. Julie Leventhal, Department of Human Development and Family Sciences

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Announcement of the Scholars Day Research Travel Awards for Best Papers and Posters

Dr. Glênisson de Oliveira, Dean of TAMS and the Honors College, and Dr. Tom McCoy, Vice President for the Office of Research and Economic Development (ORED) at UNT, are pleased to announce that the Office of Research and Economic Development is providing funding for awards to undergraduate students with the best papers and posters presented at University Scholars Day 2017.

Awards will be made within the categories of (1) Natural Sciences, Mathematics, and Engineering; (2) the Social and Behavioral Sciences, Business, Merchandising, Hospitality and Tourism; (3) the Arts and Humanities and (4) Fine Arts and Performance. For papers, the student authors of the first, second and third place papers will receive prizes of \$450, \$350, and \$250, respectively. For posters and Fine Arts/Performances, the first, second and third place winners will receive \$300, \$200, and \$100, respectively. In the case of multiple authors on a winning paper, the students will split the prize among themselves.

Each student award winner will also be eligible to compete for an additional \$500 award for travel to a regional, national, or international professional conference to present their research paper or poster within the year following University Scholars Day. Only ten travel awards will be given, so students are advised to apply for the travel award as soon as their paper is accepted for presentation. Following their presentation at a professional meeting, students will be required to provide a brief summary (250 words or less) stating the title of the work, the authors, and the faculty mentors; the name, place, and date of the meeting; and a brief abstract.

LETA REBECCA CUNNINGHAM, B.A. ENGLISH, 2017

KEYNOTE SPEAKER

Biographical Sketch

Leta Rebecca Cunningham, an essayist and poet, is a senior creative writing student at the University of North Texas from San Antonio, Texas. Her essay “My Mother’s Bread” won 1st place for personal essay at the 2016 Mayborn Literary Nonfiction Conference as well as 1st place in the Humanities Division at UNT’s 2016 Scholars Day Student Conference. She will be attending Pacific University’s Masters of Fine Arts in Creative Writing program beginning this June. You can find her work in Ten Spurs Journal of Nonfiction, LiteraryMama.com, The North Texas Review, and on her travel blog, jesuis-jesuis.com, and you can find her in bed cuddling her dog at almost any time.

UNIVERSITY SCHOLARS DAY 2017
APRIL 11, 2017

PANEL PRESENTATION SCHEDULE

SESSION 1: Information Session, the Toulouse Graduate School
9:30-10:45 Union 333A

SESSION 2: Art History

9:30-10:45 Union 333B

Chair: Dr. Jennifer Way, Department of Art Education and Art History

Tova Anderson, Integrative Studies

Faculty Mentor: Dr. Jennifer Way, Department of Art Education and Art History

Title: Representations of Refugees: a Study of Non-Western, Non-WWII Refugees in the 1950s

Rachel Ford, Department of Art Education and Art History

Faculty Mentor: Dr. Jennifer Way, Department of Art Education and Art History

Title: Iconography of a Musician: Notes on Cross-Cultural Research

Annalisa Giannotti, Department of Art Education and Art History

Faculty Mentor: Dr. Jennifer Way, Department of Art Education and Art History

Title: The Fashionability of Collecting Islamic Art in the United States

Hannah Lindsey, Department of Art Education and Art History

Faculty Mentor: Dr. Jennifer Way, Department of Art Education and Art History

Title: Politics and Art Addressed in 1950s USA

SESSION 3: Sociology

9:30-10:45 Union 333C

Chair: Dr. Tom Miles, the Honors College

Dakota Denton, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Gina Koo and Lali Stanley, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: We Used to be Family; Now We're Strangers: Estrangement between Asian American Parents and their Adult Children

Jazmine McGill, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: Black Students Matter: An Examination of the Intersectionality within the Black College Experience

Rayna Walthall, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: An Outlook on Violence: Open Carry in the Classroom and Gun Violence

SESSION 4: Engineering and Mathematics

9:30-10:45 Union 382A

Chair: TBA

William Liu, Texas Academy of Mathematics and Science

Faculty Mentor: Lior Fishman, Department of Mathematics

Title: Composition of Real Flows

Robert P. Smith, Department of Mechanical and Energy Engineering

Faculty Mentor: Dr. Xiaohua Li, Department of Mechanical and Energy Engineering

Title: Designing a Solar Thermoelectric Generator

Ashima Soni, Department of Electrical Engineering

Faculty Mentor: Dr. Shengli Fu, Department of Electrical Engineering

Title: Emotion Detection from Music Pieces

Jason Yu, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Sheldon Shi, Department of Mechanical and Energy Engineering

Title: Natural Fiber and Aluminum Sheet Hybrid Composites for High Electromagnetic Interference Shielding Performance

SESSION 5: Biological Sciences

9:30-10:45 Union 382B

Chair: TBA

Ashwin Ganesh, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Rebecca Dickstein, Department of Biological Sciences

Title: Exploring the Potential Genetic Interaction between MtSUNN and MtNPF1.7 genes in *Medicago truncatula*

Michael Li, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Douglas Root, Department of Biological Sciences

Title: Characterization of a Novel Europium Chelate for Cheap and Efficient LED Excitation

Jagath Vytheswa, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Jannon Fuchs, Department of Biological Sciences

Title: Effects of Beta-Amyloid on Neuronal Primary Cilia in Alzheimer's Brain

Frederick Wang, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Thomas Parsons, Department of Psychology

Title: Exploring Neuropsychology with Technology: Neuropsychological Testing with a Virtual Clinician

SESSION 6: Information Session, the Honors College

11:00-12:15 Union 333A

Rene Martinez, the Honors College

SESSION 7: Music and Music Theory

11:00-12:15 Union 333B

Chair: TBA

Evan Adams, College of Music, Music Composition, Honors College

Faculty Mentor: Dr. Joseph Klein, College of Music

Title: What is Rhythmic Dissonance?

Michael Cardenas, Integrative Studies

Faculty Mentor: Dr. Catherine Ragland, Department of Ethnomusicology

Title: Cumbia Tejana: Synthesis towards Unification in the Tejano Continuum

Jessica Tucker, Department of Music Performance

Faculty Mentor: Dr. Peter Mondelli, Department of Music History, Theory and Ethnomusicology

Title: The Russian School of Saxophone Playing

SESSION 8: Current Social Issues

11:00-12:15 Union 333C

Chair: TBA

Brittany Blackwell, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: We Have Sex Also: How Culture Influences Sexuality

James Brumley, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: Realizing New Pathways to Acquiring Quality In-Home Hospice Care: An Analysis from the Caregiver Perspective

Emily McCormick, Department of Communication Studies

Faculty Mentor: Dr. Justin Trudeau, Department of Communication Studies

Title: Bare

Nyasha McKee, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: Environmental Racism: Poisoning Minorities one Community at a Time

SESSION 9: Music and Music Theory

11:00-12:15 Union 382A

Chair: Dr. Tom Miles, the Honors College

Helen Marincel, Department of Music History, Theory and Ethnomusicology

Faculty Mentor: Dr. Peter Mondelli, Department of Music History, Theory and Ethnomusicology

Title: Thomas Morley and Clef Codes: A Practical Exploration

Michele Newman, Department of Music History, Theory and Ethnomusicology

Faculty Mentor: Dr. Diego Cubero, Department of Music History, Theory and Ethnomusicology

Title: Metric Dissonance in Asymmetric Meter

Marisa Spengeman, Department of Music Performance
Faculty Mentor: Dr. Jaymee Haefner, College of Music
Title: Louis Spohr and Harp Music of the 19th Century: *Fantasie für Harfe*

SESSION 10: Mathematics and Chemistry

11:00-12:15 Union 382B

Chair: TBA

Sarah Cheeran, Texas Academy of Mathematics and Science
Faculty Mentor: Dr. William Acree, Department of Chemistry
Title: Development of Predictive Abraham Model Expressions for Anhydrous Poly(ethylene glycol) Dialkyl Ether Solvents

Nimit Kalra, Texas Academy of Mathematics and Science
Faculty Mentor: Dr. Lior Fishman, Department of Mathematics
Title: Composition of Real Flows and Efficient Network Routing

Rohit Kopparthy, Texas Academy of Mathematics and Science
Faculty Mentor: Dr. Lior Fishman, Department of Mathematics
Title: On Real Flows and Their Application to a Networking Algorithm

Anchith Kota, Texas Academy of Mathematics and Science
Faculty Mentor: Dr. Sreekar Marpu, Department of Chemistry

SESSION 11: Information Session, the Toulouse Graduate School
12:30-1:45 Union 333A

SESSION 12: Linguistics

12:30-1:45 Union 333B

Chair: Dr. Konstantia Kapetangianni, Department of Linguistics

Levi Acord, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Title: Semantic Change from Sanskrit to Kashmiri

Urvi Amin, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Title: The Effect of Gender on Second Language Acquisition

Christopher Farhoodi, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Title: Quotative Verb Distribution in Stand-Up Comedy

Kelsey Gerrity, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Title: Transgender Identity and Value Reinforcement through Discourse

SESSION 13: War and International Relations

12:30-1:45 Union 333C

Chair: Dr. Eric Gruver, the Honors College

Kyle Allen, Department of Political Science

Faculty Mentor: Dr. Michael Greig, Department of Political Science

Title: Human Security or Geopolitics? The Responsibility to Protect and Russian Military Intervention in Post-Soviet States

Kristen DeWilde, International Studies

Faculty Mentor: Dr. Kimi King, Department of Political Sciences

Title: The Role of Gender in Revenge and Retributive Justice

Joshua Reynolds, Department of History, Honors College

Faculty Mentor: Dr. Eric Gruver, Honors College

Title: "Justice with Victory": A B-17 Navigator in the 95th Bomb Group During World War II

SESSION 14: Biological Sciences

12:30-1:45 Union 382A

Chair: TBA

Jimmy Du and Michael Geng

Faculty Mentor: Dr. Richard Dixon, Department of Biological Sciences

Title: The Analysis of a Novel Lignin Synthesized from Caffeyl Alcohol

Shreyas Srinivasan, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Witold Brostow, Department of Mechanical and Energy Engineering

Title: Enhanced Adhesion of Polypropylene to Copper Substrates

Alan Xia, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Paul Marshall, Department of Chemistry

Title: A Computational Investigation to Construct More Environmentally Viable Substances

Yiguang Zhang, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Thomas Cundari, Department of Chemistry

Title: The Influence of Group-6 Organometallic Chelates on C-H Bond Activation and Methane-to-Methanol Oxidation Cycles

SESSION 15: Information Session, the Honors College

2:00-3:15 Union 333A

Rene Martinez, the Honors College

SESSION 16: Linguistics

2:00-3:15 Union 333B

Chair: TBA

Brittany Canada, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: The Effect of Gender on Second Language Acquisition

Ryan Deering, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: The Semantic Interpretation of English Synesthetic Metaphors

Matthew Lubin, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Vowel Harmony in Khalka Mongolian

Aygul Porsyyeva, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Is Simultaneous Bilingualism Associated with Stronger Working Memory Compared to Monolingualism?

SESSION 17: Biological Sciences

2:00-3:15 Union 333C

Chair: Dr. Doug Root, Department of Biological Sciences

Victoria Chen, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Teresa Golden, Department of Chemistry

Title: The DNA Inhibition by Metal Contaminates and the Mechanism and Removal of the Contaminates

Gretchen Clark, Department of Biological Sciences

Faculty Mentor: Dr. Dan Kunz, Department of Biological Sciences

Title: The Synergistic Antibacterial Effect of High Intensity Blue Light and Hydrogen Peroxide

Tanya Pothini, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Warren Burggren, Department of Biological Sciences

Title: The Physiological and Behavioral Effects of Polycyclic Aromatic Hydrocarbons on *Beta splendens*

Anthony Vento, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Shengli Fu, Department of Electrical Engineering

Title: Implementing Two Real-time Indoor Tracking Algorithms: A Comparative Study

SESSION 18: Literature

2:00-3:15 Union 382A

Chair: Dr. Tom Miles, Honors College

Kaitlyn Brown, Department of English, Honors College

Faculty Mentor: Dr. Tom Miles, Honors College

Title: To “Carry the Fire:” McCarthy’s Message of Survival and Simplicity in Chaos

Jena Chakour, Department of Anthropology

Faculty Mentor: Dr. James Duban, Honors College

Title: Moral Asceticism: The Shift in Religious Outlook on Theatre in 19th Century America

Leta Rebecca Cunningham, Department of English, Honors College

Faculty Mentor: Dr. Shannon Abbott, Department of English

Title: Unwell

SESSION 19: Marketing and Linguistics

2:00-3:15 Union 382B

Chair: Ms. Linda Mihalick, Department of Merchandising and Digital Retailing

Cassidy Clement, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Halted Speech in Second Language Learners of English

Sarah Muller and Hailey Turner, Department of Merchandising and Digital Retailing

Faculty Mentor: Dr. Linda Mihalick, Department of Merchandising and Digital Retailing

Eryn Mascia, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Adverbs and the 5th Circuit Court of Appeals

ABSTRACTS FOR PANEL SESSIONS

Levi Acord, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Semantic Change from Sanskrit to Kashmiri

This study investigates the semantic changes that words undergo from old Indo-Aryan to Kashmiri. Kashmiri is an Indo European language spoken in India and it is from the Northwestern branch of the Indo Aryan language family. The following research questions will be addressed: What sorts of semantic changes do lexical items undergo from Proto-Indo-Aryan to its modern descendants, specifically in Kashmiri? Is one category of semantic change such as pejoration, amelioration, etc., more prevalent than others? In order to answer these questions, data will be collected from the Comparative Dictionary of Indo Aryan languages, focusing on a subclass of words across semantic domains. More specifically, we will select words which have changed in meaning and are also attested in Sanskrit, Kashmiri, and the intermediate stages, Prakrit and Pali. This type of research has been conducted for many languages, but no such semantic study has been done for Kashmiri, therefore the current study results would advance our understanding regarding semantic change in this language family.

Evan Adams, College of Music, Music Composition, Honors College

Faculty Mentor: Dr. Joseph Klein, College of Music

Title: What is Rhythmic Dissonance?

This paper explores and attempts to create a system of organization, a method of analysis, and possible compositional uses of rhythmic dissonance in musical contexts. A wide variety of source material and approaches are cited and synthesized to create a new point of view on a rarely studied topic. The paper includes several musical examples composed by the author as well as several excerpts taken from the literature, with an emphasis on works composed after 1900.

Kyle Allen, Department of Political Science

Faculty Mentor: Dr. Michael Greig, Department of Political Science

Title: Human Security or Geopolitics? The Responsibility to Protect and Russian Military Intervention in Post-Soviet States

The most recent decade of political instability in post-Soviet states has been shaken with military intervention by a re-emergent Russia. This shift in foreign policy behavior has been accredited by Russia's self-proclaimed responsibility to protect ethnic-Russians and Russian-speakers, wherever they may be. I put this claim to test, and deduce that Russia's responsibility to protect using military intervention in a particular territory is an interactive function of (a) the strength of Russia's transnational ethnic-tie with the territory, as measured by the proportional size of its Russian populations; (b) the intensity of local conflict that threatens these populations; and (c) whether or not these populations face political discrimination. I collect post-Soviet sub-national territory data from 1991 to 2015 and employ logit regression to determine the theory's effect on the occurrence of military intervention. Finally, I forecast the predicted probabilities of future intervention across the post-Soviet states, resulting in a threat analysis of the status quo.

Urvi Amin, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: The Effect of Gender on Second Language Acquisition

Second language acquisition (SLA) is a process that is affected by several factors, among these are age, cultural background, education level and gender. Out of all these factors, gender remains the most controversial as previous studies have found contradicting results and therefore, this study aims to research if gender has a significant impact on SLA and if so, which of the two genders acquires the language better based on their performance on the proficiency test. The process of acquiring a second language takes place over a period of time hence, the purpose of this study is to test the effect of gender on second language acquisition using the quantitative method. The data will be collected through a self-assessment test adapted by the BALLI (Beliefs about Language Learning Inventory) to obtain learner beliefs about acquiring a second language. This test will be followed by a proficiency test that aims to study gender differences in performance, participants' knowledge of the language, and to determine whether learner beliefs correspond to the learners' performance. These tests will take place in a German 1010 classroom at UNT with the participants being the students whose first language is English and are acquiring German as their second language. This research expects to find a significant gender difference while acquiring a second language with female participants outperforming male participants in the proficiency tests.

Tova Anderson, Integrative Studies

Faculty Mentor: Dr. Jennifer Way, Department of Art Education and Art History

Title: Representations of Refugees: a Study of Non-Western, Non-WWII Refugees in the 1950s

My project researched representations of non-Western, non-WWII refugees from the 1950s published in American mass print media. The material I found represented refugees in a political, pragmatic way, often linking their migration to causes, such as Communism. However, without art, photographs, or statistics, these mostly text-based accounts published in newspapers and government documents did not seem to prioritize refugees. This seems to contradict the attention being devoted to refugees internationally, culminating in World Refugee Year, 1959-1960.

Brittany Blackwell, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: We Have Sex Also: How Culture Influences Sexuality

Objectives: Sexuality portrays itself differently in various cultural settings. Something that may seem completely normal to one group of people may be considered deviant in another. These different settings may prohibit individuals within these groups from talking openly about sexuality. The way that a group decides to discuss or not discuss sexuality may have severe outcomes. These outcomes include increases in sexually transmitted diseases and infections, and higher teen pregnancy rates. According to Koutsky (1997), more than half of all people will have an STD/STI at some point in their lifetime. **Methods:** By using secondary data from the General Social Survey, we are able to compute a cross-tabulation in SPSS. The secondary data collected from GSS will be from the years 2010 to 2014. These cross-tabulations will then be used to identify general patterns and relationships. **Findings:** In particular, these cross-tabulations will include various opinions about sexuality and how they combine with variables such as race and ethnicity. **Conclusion:** This study will be used to help identify general patterns and relationships in regards to how different cultures discuss sexuality and the consequences of each.

Kaitlyn Brown, Department of English, Honors College

Faculty Mentor: Dr. Tom Miles, Honors College

Title: To “Carry the Fire:” McCarthy’s Message of Survival and Simplicity in Chaos

The Road by Cormac McCarthy addresses deep issues concerning the human race’s ability to survive. Throughout my research I have discovered that the father and the son’s relationship is not just a representation of survival in the post-apocalyptic world, it is also a representation of how humanity has survived since the dawn of time. The central message of McCarthy’s Pulitzer Prize winner shows the father and son working together to keep each other going, from the son helping his father put aside the past and face reality, to the father encouraging his son to have hope and “carry the fire.” Through their fears of the cannibals, their need for one another, their hope of a better destination, and their faith in God, the father and son push on through the oppressive landscape. The presentation over *The Road* will discuss the father and son’s representation of what drives humanity to endure, and ultimately McCarthy’s message that individuals need one another not only to survive in catastrophe, but also to avoid it.

James Brumley, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: Realizing New Pathways to Acquiring Quality In-Home Hospice Care: An Analysis from The Caregiver Perspective

Hospice care is intended to provide care for terminally ill patients, usually with a life expectancy of six months or less. There are around 1.5 million to 1.6 million patients that are enrolled in some form of a hospice program. Of that number, 66% are individuals who rely on an in-home hospice provider (Dougherty 2015). The hospice patients experience will usually last around six months, while the caregiver’s experience with the care his or her loved one will remain for the rest of his or her life. It is important to better understand strategies for choosing a reliable hospice provider so that the negative experience of losing a loved one in hospice care can be balanced with a positive experience of knowing the patient received the best hospice care available. Through content analysis of online forums designed for caregivers of hospice patients to share their experiences, this paper seeks to find suitable means for terminally ill patients and their caregivers to successfully obtain quality in-home hospice providers. I hope to uncover shared patterns of caregiver experiences, and look for characteristics that may lead to better determinants when choosing a hospice provider.

Brittany Canada, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: The Effect of Gender on Second Language Acquisition

The aim of this research is to examine the current meaning of the word “basic” and determine if or how the word is commonly used among the younger generations. Based on recent observations, the word “basic” with the meaning of ‘essential’ starts out as a neutral connotation then goes from a negative connotation to a more positive connotation. Through a questionnaire with twenty participants of both female and male English native speakers of ages 15-25, we will see if there is a difference in what male or female English speakers perceive of what “basic” means. The questionnaire will also help us understand if the new evolved meaning of “basic” has a positive, neutral or negative connotation to it by scaling their attitudes toward it. There hasn’t been a socio-linguistic analysis on the new meaning of the word “basic” so this research will investigate this social phenomenon and provide a more detailed description.

Michael Cardenas, Integrative Studies

Faculty Mentor: Dr. Catherine Ragland, Department of Ethnomusicology

Title: Cumbia Tejana: Synthesis towards Unification in the Tejano Continuum

This ethnographic study examines the sociocultural dimensions of Tejano society, reflected in the emerging popularity of Cumbia Tejana. In addition to reflecting the various musical identities of South Texas, the cumbia's emphasis on communal dancing allowed for a much wider participation, transcending gender and sexual norm. I aim to explore how the cumbia has become adapted and solidified within the traditional Tejano repertoire (i.e. Ranchera, Waltz, Huapango). This has resulted in the sustainability and longevity of its regional adaptation, leading to an understanding of how a regionally specific style has also reshaped the cumbia. The music's evolution in Tejano music reflects what anthropologist Fernando Ortiz has called "transculturation," that is a simultaneously, transnational, and "authentically" local Tejano expression of culture and identity.

Jena Chakour, Department of Anthropology

Faculty Mentor: Dr. James Duban, Honors College

Title: Moral Asceticism: The Shift in Religious Outlook on Theatre in 19th Century America

I am examining the shifting morality of leisure activities, between Puritanism and Unitarianism, as shown through the publications of the National Christian Inquirer. By using the writings of Unitarian minister Henry Whitney Bellows, discussion from both ascetic and mystic moral outlooks on leisure are available. I will be focusing on theatre, as an exemplar. Bellows, whose decade as the editor of the National Christian Inquirer shaped the discourse, provides a more mystic take of theatre. Through a synthesis of Bellows' sermons, speeches, and published public arguments, I believe I can show the shift from Puritan/ascetic to Unitarian/mystic outlook in 19th century America.

Sarah Cheeran, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. William Acree, Department of Chemistry

Title: Development of Predictive Abraham Model Expressions for Anhydrous Poly(ethylene glycol) Dialkyl Ether Solvents

Because of the importance of environmentally friendly solvent selection due to the prevalence of solvents, my study contributed to this field by focusing on solubility, specifically, mathematical relations allowing researchers to predict solute partitioning coefficients between two immiscible phases- water to organic solvent and gas to organic solvent- as well as the solubility of crystalline nonelectrolyte solutes in organic solvents. butyl diglyme, butyl triglyme and tetraglyme are specific polyethylene glycol dialkyl ethers that are the center of my research. Henry's law constants and infinite dilution activity coefficients were compiled from published chemical and engineering literature for gaseous solutes and organic liquids in butyl diglyme, butyl triglyme and tetraglyme. The published literature values were converted into the partition coefficients using standard thermodynamic relationships. The calculated partition coefficients were correlated mathematically with the Abraham solvation parameter model. Abraham model correlations have been developed for describing solute transfer into butyl diglyme, butyl triglyme and tetraglyme from both water and the gas phase at 298.15 K. The derived mathematical correlations describe the partitioning behavior of organic solutes dissolved in the three anhydrous poly(ethylene glycol) dialkyl ethers to within 0.11 log units.

Victoria Chen, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Teresa Golden, Department of Chemistry

Title: The DNA Inhibition by Metal Contaminates and the Mechanism and Removal of the Contaminates

Thousands of unidentified remains are received by medical professionals cannot be identified due to metal contaminants that inhibit the DNA processing. The project aims to identify the mechanism of ion exchange using SEM and ICP-MS and to create hydroxyapatite for standards. The project found 27Al's equilibrium point, but further research is needed to determine the metal contaminate mechanism and removal.

Gretchen Clark, Department of Biological Sciences

Faculty Mentor: Dr. Dan Kunz, Department of Biological Sciences

Title: The Synergistic Antibacterial Effect of High Intensity Blue Light and Hydrogen Peroxide

High intensity blue light combined with an exogenous photosensitizer is the basis for photodynamic therapy to combat bacterial infections. New research now shows high intensity blue light at 405 nm can activate endogenous photosensitizers without the use of exogenous photosensitizers such as dyes or metal radicals. This research utilizes a combination by using hydrogen peroxide and high intensity blue light in the presence of oxygen to create a synergistic antibacterial effect. The results have shown have shown success with *Streptococcus mutans* and *Staphylococcus aureus*; however, more testing is needed to further standardize quantification of the results. By using a non-mutagenic light and hydrogen peroxide, this new approach to photodynamic therapy could be used for future treatments of bacterial infections, including antibiotic resistant infections.

Cassidy Clement, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Halted Speech in Second Language Learners of English

Error correction is an integral part of everyday speaking. It is necessary for a speaker to correct his or her errors in order to ensure that the listener is able to be properly understood. This study will expand on Slevc and Ferreira's test of halted speech in native speakers and their test of the perceptual loop theory (2006). I am interested in studying halted speech in advanced L2 learners of English. This study aims to find out if L2 speakers of English have an easier time stopping their utterances on a semantically similar word, a phonologically similar word (2 phonemes), or on a word that is both semantically and phonologically similar. This study will analyze an L2 speaker's ability to error correct when they are forced to halt their speech. I hope to be able to compare the stop times in L2 speakers and in L1 speakers. The participants in the study will be 10 L2 learners of English from the University of North Texas's IELI program and 10 native speakers of English from UNT. If L2 learners can effectively halt their speech as well as native speakers of English, this could mean that L2 speakers and L1 speakers detect errors in the same comprehension system.

Leta Rebecca Cunningham, Department of English, Honors College

Faculty Mentor: Dr. Shannon Abbott, Department of English

Title: Unwell

I am submitting my Honors Thesis project, a 33-page collection of poems and essays titled "Unwell." This collection explores themes of femininity, mental illness, eating disorders, and adolescence. An incomplete, in-progress version of this thesis was presented at last year's

Scholars Day. This year, the collection has doubled in size and is now a polished, professional, and completed product that has been submitted for review as my senior Honors thesis. This thesis has been worked on for the last two years under the guidance of Thomas Miles and Shannon Abbot, through bi-weekly review, edits, and advice.

Ryan Deering, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: The Semantic Interpretation of English Synesthetic Metaphors

This study will examine how metaphors that use adjectives based on basic human senses (e.g. sweet smell) affect semantic interpretation in native English speakers. Previous research suggests this specific type of metaphor causes a negative semantic interpretation when people encounter them. This research will collect and compare English metaphor data with that of previous research done using Japanese metaphors. We will determine if similar negative semantic interpretations are caused by the adjective metaphors themselves. A questionnaire will be given to participants that will include constructed metaphors using the five basic senses and semantic differential scales to rate the interpretations of the participants. This will help us understand whether or not there is some universality in how this type of metaphor is interpreted among speakers of different languages.

Bunyong Dejanipont, Department of Biomedical Engineering

Faculty Mentor: Dr. Mark Vosvick, Department of Psychology

Title: Psychosocial Factors in Self-efficacy of Managing HIV

Abstract for poster or paper presentation: Self-efficacy is predictive of positive health behaviors, including the ability to adhere to medical advice (Brady, 2011). Existing studies suggest that, through clinical interventions, self-efficacy may be manipulatable (Peters-Klimm et al., 2013). Additionally, several psychosocial factors are significantly associated with self-efficacy (Fan & LV, 2016), suggesting that including some psychosocial factors in an intervention may enhance self-efficacy. We hypothesized that forgiveness, life regard and social support account for a significant proportion of variance in self-efficacy for managing chronic disease in people living with HIV (PLWH). Participants (N=69) were HIV-positive and resided in the Dallas/Fort Worth. From a hierarchical regression analysis, we found that our model including forgiveness ($\beta=.22$, $p<.04$), life regard ($\beta=.38$, $p<.00$) and social support ($\beta=.24$, $p<.05$) account for 44% of the variance in self-efficacy (Adj. $R^2=.44$, $F(6,62)=9.74$, $p<.001$). Our findings suggest that PLWH with low levels of forgiveness, life regard and social support may have more difficulty efficaciously managing their HIV.

Dakota Denton, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Objectives: When the printing press was invented in the 1400s it would revolutionize the world. The expansion of news of exceptional events and movements could now be transmitted throughout the masses quicker than ever before, changing the course of history in irrefutable ways. However, in more recent times the legitimacy of our media has been called into question by scholars, intellectuals, and the general public. As the production of overtly biased news coverage, reeking in the reprehensible behavior of some of the most prominent figures, is proliferated throughout society, the unwavering faith citizens had in its accuracy in such tabloid-styled media is begins to dwindle. **Methods:** The purpose of this article is to determine how much control mass media has on the political identity and beliefs of its patrons, while also analyzing the effects exposure of political scandals has on public perceptions.

Expected Findings: There is a strong correlation between reports of government officials wrong-doings

and increases in negative public opinion. There is also a strong correlation between the increase of media exposure on these scandals and a decline in citizen trust of the government, mass media, and the democratic process as a whole. **Conclusion:** Through the use of both quantitative and qualitative methods the research presents a strong correlation between the overexposure and airing of government official's "dirty laundry" and a decline in public opinion, trust, and faith in the government, as well as the media. This overall disapproval in foul play from both sides can be addressed and rectified through the establishment of various transparency techniques listed throughout this article in order to reintroduce the properties of a fair and just system.

Kristen DeWilde, International Studies

Faculty Mentor: Dr. Kimi King, Department of Political Sciences

Title: The Role of Gender in Revenge and Retributive Justice

This paper seeks to assess whether the gender of witnesses at the International War Crimes Tribunal for the Former Yugoslavia plays a role in determining whether one is inclined towards retributive justice systems. The paper finds that female witnesses are more inclined towards forms of justice involving punishment rather than justice for utilitarian purposes, especially when a witness has experienced family-based wartime trauma.

Jimmy Du and Michael Geng, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Richard Dixon, Department of Biological Sciences

Title: The Analysis of a Novel Lignin Synthesized from Caffeyl Alcohol

Much private and government-funded research has been conducted around bioenergy crops in hopes of finding an alternative to the diminishing supply of non-renewable sources of energy. Current methods of bioethanol production produce copious amounts of lignin as a waste product. My project specifically worked with a novel lignin, coined C-lignin, which is significantly easier to extract and process than traditional lignin. C-lignin has the potential for incorporation in products such as carbon fiber and the potential to make bioethanol production more economically efficient and environmentally cleaner. However, C-lignin has been only found in the seed coats of exotic flowering plants and Cactaceae. As a result, inducing these pathways in plants that are widely grown and used in agroindustrial processes has attracted a lot of research interest. The C-lignin pathway fails to draw along O-Methyltransferase enzymes that are integral to the production of G-lignin. My research project strived to understand the O-methyltransferase activity in the lignin biosynthesis pathway, analyze the polymerization of G-lignin in the seed coat temporally by using a Copper-Catalyzed Azide-Alkyne Click Chemistry (CuAAC) Reaction, and isotopically labeling the monolignol precursors of C-lignin to track its formation. Understanding the production of C-lignin is a first step in inducing the pathway into plants that are widely used in agroindustrial processes, such as bioethanol production. By understanding the pathways, further research can be done in the manipulation of the C-lignin pathway, with hopes of performing parallel isolation into the feedstocks of many agroindustrial processes.

Christopher Farhoodi, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Quotative Verb Distribution in Stand-Up Comedy

Stand-up comedy typically involves a complex relationship between comedian and audience that changes and evolves over the course of a performance. Comedians often utilize several linguistic tools such as prosody, sarcasm, and quotatives to mimic every-day discourse and strengthen rapport. Current quotative trends show an overwhelming increase in use of 'be like' as a quotative verb in conversation

that breaches socio-political boundaries (Tagliamonte 2015; Cukor-Avila 2002). This study examines quotative distribution in Netflix stand-up performances filmed and funded specifically for future online viewing at home. Quotative usage in each of the 25 Netflix funded stand-up performances from 2016 will be thoroughly examined and quantified, with quotative verb choice recorded in context of subject, tense, content, and function, as well as age, nationality, and gender of the performer. Quotative distribution will be compared to existing research results relative to age, year, and gender demographics. This study should provide much-needed insight into quotative usage within group and performance environments.

Rachel Ford, Department of Art Education and Art History

Faculty Mentor: Dr. Jennifer Way, Department of Art Education and Art History

Title: Iconography of a Musician: Notes on Cross-Cultural Research

This paper presents an iconographic analysis of musician imagery on ceramics from the Fatimid dynasty, 10th to 12th centuries, with emphasis on Fragment with motif of a musician owned by the Metropolitan Museum of Art, NY, and appearing in *Clay Between Two Seas*, an exhibition held at the Crow Collection of Asian Art in 2016-2017. My research suggests that the image of the musician draws inspiration cross culturally from classical Greek as well as Byzantine pottery.

Ashwin Ganesh, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Rebecca Dickstein, Department of Biological Sciences

Title: Exploring the Potential Genetic Interaction between MtSUNN and MtNPF1.7 genes in *Medicago truncatula*

Symbiotic nitrogen fixation, a process in which plants convert atmospheric nitrogen (N₂) into ammonia (NH₃), is an essential biological process. *Medicago truncatula*, a legume native to the Mediterranean, forms symbiotic relationships with *Sinorhizobium meliloti*, a type of bacteria, in the nodules of the root of the plant to make nitrogen usable by converting it into ammonia. Plants can also uptake nitrate (NO₃) and convert it into ammonia. MtNPF1.7 is a gene which codes for a nitrate transporter from nodules and has other unknown functions. Mtnip-1 mutant plants contain a mutation in their MtNPF1.7 genes which disables it and inhibits nodule formation. Even though nodule formation is important for *M. truncatula*, it can be very energetically expensive for the plants to form excess nodules. In order to prevent excess nodule formation, the plant has a gene called MtSUNN which regulates nodule number. When *M. truncatula* is in the presence of nitrate, the MtSUNN gene inhibits nodule formation. Mtsunn-1 mutant plants contain a mutation in their MtSUNN genes which takes away the plant's ability to auto regulate nodules and causes nodule formation even in the presence of nitrate. Our goal is to explore the possibility of a genetic relationship between the two genes due to their potential overlap in the pathway of symbiotic nitrogen fixation. In order to do so, I needed to find double mutants for both genes in a generation of plants previously crossed in the Dickstein Lab. I genotyped 27 possible double mutant plants in the hopes of gaining a second generation of these plants to experiment on along with wild-type, Mtsunn-1, and Mtnip-1 generations. Of the 27 plants, 14 were homozygous for both the Mtnip-1 and Mtsunn-1 mutations. Therefore, 14 double mutants exist among the population. By analyzing nodule numbers in double mutant plants, we can draw conclusions about the relationship between MtSUNN and MtNPF1.7.

Kelsey Gerrity, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Transgender Identity and Value Reinforcement through Discourse

This study will investigate the way transgender individuals use discourse to construct identity. Previous research has looked at how trans individuals use intonation to fit into their desired gender roles and has briefly covered how trans individuals construct their own gendered terms. However, few, if any, have exclusively covered trans identity construction through discourse. This study will draw on a discursive study that explored the reinforcement of heterosexual gender roles (Coates, 2013). Data will be collected by conducting a qualitative discursive analysis of transgender speech through interviews. By looking at transgender speech, the aim is to see not only if/how trans individuals construct a cohesive identity, but also how individuals may work to define themselves outside the confines of heteronormative values and relationships.

Annalisa Giannotti, Department of Art Education and Art History

Faculty Mentor: Dr. Jennifer Way, Department of Art Education and Art History

Title: The Fashionability of Collecting Islamic Art in the United States

Although collecting Islamic art is often discussed exclusively in the context of Orientalism, this paper argues that fashionability also played a part. In addition to noting the changing role of collectors, academics, and art dealers, I look at Khalil Rabenou and his sale of an Islamic ceramic jar to the Metropolitan Museum of Art, which the Crow Collection of Asian Art included in its recent exhibition, *Clay Between Two Seas*, 2016-2017.

Nimit Kalra, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Lior Fishman, Department of Mathematics

Title: Composition of Real Flows and Efficient Network Routing

Real flows are continuous group actions of $(\mathbb{R}, +)$ on \mathbb{R} . Previously, real flows were studied in isolation. In this paper, we expand on these results and prove new results on the time derivative of real flows and properties of certain classes of functions. We also explore properties of the composition of multiple distinct real flows and show the infinite alternating composition of two distinct real flows is commutative. Moreover, we prove this composition is itself a real flow. We derive a partial differential equation whose solution is a closed-form of this infinite alternating composition. Our results have immediate applications in the stability of large networks. We propose a modification to an important networking algorithm that attempts to mitigate the effects of an unstable router on surrounding routers. By utilizing our partial differential equation result, we lessen the issue of handling router withdrawal. In doing so, we reduce long network convergence times, which decrease network stability and lead to network outages. Our results on individual flows can be used to find more efficient decay functions, the implementation of which in the algorithm would allow more processing power for other vital router tasks.

Gina Koo and Lali Stanley, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: We Used to be Family; Now We're Strangers: Estrangement between Asian American Parents and their Adult Children

Objectives: Family is typically the place where individuals feel a sense of belonging for a lifetime and Asian Americans are typically known for their commitment to strong family relationships. However,

little is known about estrangement within Asian American families. The purpose of this study is to give voice to those who have dealt or are currently dealing with family discord and separation, particularly between Asian American parents and adult children. For this research, we will be conducting approximately unstructured, face-to-face interviews with members of four affected families in the Dallas/Fort Worth Metropolitan area to explore the dynamics of their estrangement. We expect participants to reveal the complex pressures associated with their family relationships including contrasting expectations due to culture, career aspirations and caregiving obligations. This study would be an important step in understanding and giving voice to family estrangement and conflict among Asian American families.

Rohit Kopparchy, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Lior Fishman, Department of Mathematics

Title: On Real Flows and Their Application to a Networking Algorithm

In this paper, we introduced the functions known collectively as real flows and studied several important properties. Initially, we derived specific results pertaining to the real flows or those with partial derivatives that can be identified with a polynomial form. These results showed that such a condition restricts expressible real flows to a very limiting pool. In addition, we also studied the BGP route flapping algorithm, a part of which uses the use of exponential and linear equations. Exponential and linear equations are common examples of real flows, and by using a novel iteration of two separate flows, we proposed a faster way to compute the end result of the algorithm by solving a partial differential equation under more inclusive restrictions for the types of flows used.

Anchith Kota, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Sreekar Marpu, Department of Chemistry

This project aims to expand the boundaries of nanoparticle research by utilizing a novel three-step nanoparticle synthesis procedure to develop organically soluble, plasmonic nanoparticles capable of detecting pressure for biomedical and heavy industrial applications. In recent years, nanoparticles have garnered increasing attention in the scientific community as versatile physical and chemical sensors as well as effective drug delivery agents. However, they are severely limited in their use due to their nature as point-based sensors and delivery agents, thereby making them ineffective for bulk sensing or delivery methods. In order to address these issues of irreversibility and point-based restrictions, nanoparticles must first break the barrier from aqueous solutions to organic media, allowing them to be stabilized in a host of biocompatible films like silicones and hydrogels and thereby optimizing them for performance in the real world as reusable biomedical or industrial sensors. To reach this goal, a novel methodology was put into place, derived from four major components of nanoparticle synthesis: metal ion source, solvent, stabilizer, and catalyst. Gold dimethyl sulfide and silver tetrafluoroborate were used due to their highly plasmonic properties, and dissolved into toluene as a suitable organic solvent. The solution was then heated in the presence of a soybean lecithin-based stabilizer and then exposed to high intensity ultraviolet light before deposition into a silicone film. Positive results were found regarding the creation and deposition of the nanoparticles, particularly gold-based ones. Pressure studies conducted with an in-house constructed pressure cell and a UV-VIS spectrometer indicated that the organically soluble gold plasmonic nanoparticles were sensitive to variations in pressure ranging from 200 psi to 1000 psi, making them suitable for industrial applications.

Michael Li, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Douglas Root, Department of Biological Sciences

Title: Characterization of a Novel Europium Chelate for Cheap and Efficient LED Excitation

The use of fluorescent probes in microscopy applications is prominent in a wide variety of fields, including biomedical research, drug diagnostics, and optical imaging for early cancer detection. However, microscopy applications using conventional fluorophores often result in unclear images due to background fluorescence. Furthermore, standard excitation sources are expensive to use and maintain. A practical alternative to standard light sources, the Light Emitting Diode (LED), is both cheaper and more efficient, but incompatible with conventional fluorophores.

To address this issue, I characterized an efficient europium chelate compatible with LED excitation (360-370nm). To synthesize the chelate, I used 7-Amino-4-(trifluoromethyl)coumarin (c151) covalently attached to DTPA (diethylenetriaminepentaaceticacid) dianhydride, to which europium (III) ions were chelated. I characterized the synthesis reactions of varying ratios of c151 and DTPA and discovered that the reaction proceeded at a rate of 1000 times faster than previously indicated. I also conjugated the chelate with an antibody (igG), and the chelate-antibody complex showed excellent compatibility with LED excitation at 370 nm, including a signal to noise ratio increase of 260 times over conventional light excitation. Optimization of the LED excitation could potentially further increase the SNR by 40-fold, increasing the detection limit by nearly 10000 times, subsequently improving the clarity of images in microscopy applications.

Hannah Lindsey, Department of Art Education and Art History

Faculty Mentor: Dr. Jennifer Way, Department Art Education and Art History

Title: Politics and Art Addressed in 1950s USA

A gap that exists within the historiography of American art at mid-century leaves out key elements to explain the symbiotic relationship between the political climate, social relationships, economy, and hierarchy of the art community. The lack of scholarship on this topic is apparent in modern databases, which emphasize an exclusionary canon. The canon is a condensed reflection of the nationalism and “Americanness” taking place during this period, which contributed to a one-dimensional understanding of post-war American life in relation to art.

William Liu, Texas Academy of Mathematics and Science

Faculty Mentor: Lior Fishman, Department of Mathematics

Title: Composition of Real Flows

Real flows are continuous group actions of $(\mathbb{R}, +)$ on \mathbb{R} . Previously, real flows were studied in isolation. In this paper, we expand on these results and prove new results on the time derivative of real flows and properties of certain classes of functions. We also explore properties of the composition of multiple distinct real flows and show the infinite alternating composition of two distinct real flows is commutative. Moreover, we prove this composition is itself a real flow. We derive a partial differential equation whose solution is a closed-form of this infinite alternating composition.

Matthew Lubin, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Vowel Harmony in Khalka Mongolian

This research study will examine vowel harmony in Khalka Mongolian, the standard language of Mongolia. Khalka Mongolian has a complicated vowel harmony system based on frontness, roundness,

and level of advanced tongue root (Jurev et al. 2005). More complications arise when analyzing Mongolian due to a number of exceptions to this rule the language has for its morphophonology. This study aims to describe the vowel harmony system in Khalka Mongolian with respect to the exceptions that the system abides by analyzing examples found in corpora and social media. Then, the data will be transcribed using the IPA (International Phonetic Alphabet) and translated, with a focus on revealing the vowel harmony within the words. This study aims to disambiguate the complexity of the vowel harmony in the language.

Helen Marincel, Department of Music History, Theory and Ethnomusicology

Faculty Mentor: Dr. Peter Mondelli, Department of Music History, Theory and Ethnomusicology

Title: Thomas Morley and Clef Codes: A Practical Exploration

In the late 16th century, composers in Europe often wrote music using what scholars such as David Wulstan refers to as “clef codes.” Certain combinations of clefs would indicate that the music was to be transposed in performance, often by a 4th or 5th. Thomas Morley, however, a prominent composer and theorist of the era, is one of the few who disagreed with a downward transposition of music written in such a manner, saying that doing so caused the music to lose its liveliness. In this paper, I will examine the practical performance implications of the transposition argument, comparing the music of Thomas Morley to that of his contemporaries in England. Specifically, I will explore the differences of sound caused by transposition or lack thereof, and will elucidate its benefits and disadvantages, especially for modern secondary students or other amateur singers.

Eryn Mascia, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Adverbs and the 5th Circuit Court of Appeals

This study deals with the intersection of linguistics and legal doctrine. Legal scholars have theorized much about whether or not adverbs are too ambiguous for effective legal writing, but there has been little concrete data collection to support any given advocacy. This research seeks to determine whether or not there will be a difference in number of cases reversed on appeal when the case concerns a statute or code that utilizes an adverb in its construction. I will examine 2016 civil and criminal decisions published by the 5th Circuit Court of Appeals and compare the number of number of reversals and affirmations in cases that do not involve a statute or code written with an adverb with those that do utilize an adverb. The anticipated result is a higher rate of reversal when the statute being interpreted relies on adverbs in its construction. The data collected is intended to not only benefit those who write the laws, by providing research that may increase efficacy of their work, but will hopefully give those who work with the law, and citizens who must obey the law a better understanding of how the inherent ambiguities of language can affect the boundaries of the legal system.

Emily McCormick, Department of Communication Studies

Faculty Mentor: Dr. Justin Trudeau, Department of Communication Studies

Title: Bare

Since submitting my application to present and research, I have accomplished quite a bit. Having finished chemotherapy in November I wrote an hour long production, titled "Bare". The production explored the conflicting narratives of woman, performer and patient in order to implore the question, how do we derive power from vulnerability? "Bare" featured a cast of four individuals wearing neutral white masks and all black clothing. These individuals spoke only when creating soundscapes and moved throughout the stage embodying a multitude of things. Through shadow work, they symbolized the

cancer, consuming the innocent. Other times, they embodied different characters throughout my life or patients in the chemo room. The bodies set the environment, climate, and scene for every part of the show as we had no set pieces. We had the pleasure of taking “Bare” to the Patti Pace performance festival at Louisiana State University as well as perform on campus February 22nd through the 23rd. In addition to these performances, St. Jude’s have been in contact as they would like to bring the show to their events as a fundraiser strategy. I will also be discussing the show in my TEDxUNT talk, “The Upside Down”. On April 11th, I will have a well composed poster with a compilation of items and photos from my show. I am also happy to provide a video, essay, and my script.

Jazmine McGill, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: Black Students Matter: An Examination of the Intersectionality within the Black College Experience

Far too often the needs of Black college students and other ethnic minorities are left unattended to or are addressed by inefficient and ineffective practices and policies whose underlying values are constructed from a White world view. We are educated in an environment that is built around the cultural preferences of Whites because of the system of ethnic stratification that exists in the United States. We have to start realistically addressing the fact that the cultural attitudes, preferences, practices, and needs of these two groups are often incompatible with one another (Obasi 2010). This study examines how ethnicity combines with other aspects of a Black college students’ social identity to impact their perceptions of the college experience within a White context through the use of in depth interviews in a qualitative study. I will examine the commonalities and differences between the experiences of individuals that share common identity traits as well as by adapted acculturation strategy. It is my hope that this study leads to higher awareness of the sociodiversity in the Black community, and that it sheds light on the need for predominantly White institutions to institute policies and practices that effectively address our needs.

Nyasha McKee, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: Environmental Racism: Poisoning Minorities one Community at a Time

Scholars such as Keller have focused on the problem of Environmental Racism which he defines as: “inequitable exposure to pollution based on socio-economic status” (Keller 1995).” This study seeks to understand the problem faced by low-income minorities who are facing environmental racism whose voices are not being heard, despite living with toxic waste, pollution, dirty water, and other dangerous conditions. These hazardous conditions lead to devastating health problems and sometimes can lead to death. I plan on using secondary data to explore factors that drive key outcomes in my research topic. I expect to find the rate at which minorities face negative environmental conditions compared to non-minorities and the extent to which government entities may be failing to adequately address such issues. I may also find a link between environmental inequality to other forms of inequality, such as in health and education. My research seeks to improve the public’s understanding of environmental racism and the role of government.

Sarah Muller, Department of Merchandising and Digital Retailing

Faculty Mentor: Dr. Linda Mihalick, Department of Merchandising and Digital Retailing

Team-members Hailey Turner and Sarah Muller achieved a 3rd place finalist position competing in the National Retail Federation Foundation Student Challenge Competition in January 2017. Each was

awarded a \$1500 scholarship. The business case competition was designed to demonstrate creativity and business acumen in a retail environment. The project required creating a business plan for STORY, an innovative retailer that takes the point of view of a magazine, changes the selection like a gallery and sells merchandise like a store. Competing teams selected their themes from emerging retail trends of Travel, Made in America or Sensory. Hailey and Sarah selected Travel, creating a pitch that included a mock website, a 20-page formal presentation, a budget, a 90-second pitch video and suggestions to incorporate social media and in-store events. It showcased why and how their STORY should be executed. The team received support from the Digital Retailing and Merchandising faculty, including NRF faculty advisor and mentor Linda Mihalick as well as an assigned industry mentor from KPMG. Key industry executives served as judges throughout the 3 round judging process that included over 20 teams from universities across the US. STORY CEO and founder Rachel Shechtman participated in the final judging round.

Michele Newman, Department of Music History, Theory and Ethnomusicology

Faculty Mentor: Dr. Diego Cubero, Department of Music History, Theory and Ethnomusicology

Title: Metric Dissonance in Asymmetric Meter

Although musicians often use the word “dissonance” in a harmonic context, music theorists have applied the term to the study of meter. The current approaches to metric dissonance cannot explain all aspects of meter that are present in the canon of western music. Asymmetric meters, which have been increasingly applied to the music of the twentieth and twenty-first century, cannot easily be explained through these current methods. Therefore, the development of a system to evaluate metric dissonance that includes asymmetric meter is necessary. This paper examines the analysis of metric dissonance that arises in the use of asymmetric meters. The first half of this paper will review the two primary theories of metric dissonance and explain their shortcomings in their ability to analyze asymmetric meter. The second half of this paper will provide three example analyses to expand upon the current theories.

Aygul Porsyyeva, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Title: Is Simultaneous Bilingualism Associated with Stronger Working Memory Compared to Monolingualism?

Up until now, an extensive research has been conducted on cognitive advantages of bilingualism. However, majority of them focused on young children (below age 16). Therefore, this study is primarily interested in working memory benefits of bilingualism in people who have passed puberty. The sample group is going to be two groups of monolingual and simultaneous bilingual (bilingual from an early age) adults between ages 18-25. They will be asked to take two online cognition test by the Cambridge Brain Sciences (<http://www.cambridgebrainsciences.com/>) where their performance will be recorded. The experiment expects to find at least some level of (if not greater) better working memory in bilinguals compared to their monolingual opponents.

Tanya Pothini, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Warren Burggren, Department of Biological Sciences

Title: The Physiological and Behavioral Effects of Polycyclic Aromatic Hydrocarbons on *Beta splendens*

We set out to determine the effects that PAH exposure has on the *Beta splendens* aggression levels, and whether or not those effects would be permeant, and the epigenetic effects that a behavioral change would have. The behavioral changes of vertebrates after oil exposure is not a well-documented

subjected, but it is very prevalent to the balance of an ecosystem. Our results showed that the aggression levels went down, and then slowly begin to rise again. These results suggest that the beta males may have been adapting to the PAH exposure. We still have to run additional trials to confirm the findings, however this says a lot about all vertebrates in the ecosystem. Oil spilling is a major problem that affects many of the world's organisms, and little is known about the long term behavioral effects. The concept of animal personalities is a new field in science, but is fast becoming very important, since an animal's behavior is a reflection of its physiology. Understanding an organism's behavioral response to PAH exposure is a major mile stone in understanding the overall, and maybe even trans-generational, effects that oil spills have on an environment.

Joshua Reynolds, Department of History, Honors College

Faculty Mentor: Dr. Eric Gruver, Honors College

Title: "Justice with Victory": A B-17 Navigator in the 95th Bomb Group During World War II

An oral history of Texan who served as a navigator in the Army Air Corps in World War II. The paper will discuss his involvement with the Belgian Resistance movement prior to his capture by the Germans in 1944.

Robert P. Smith, Department of Mechanical and Energy Engineering

Faculty Mentor: Dr. Xiaohua Li, Department of Mechanical and Energy Engineering

Title: Designing a Solar Thermoelectric Generator

Global appetite for energy grows at a significant rate. Current energy generation technologies cannot be relied upon to meet this escalating curve efficiently or in an environmentally safe manner. Renewable energy generation is crucial to sustainably meeting this need. Thermoelectrics utilize a temperature difference to induce a voltage, or conversely, a temperature difference from a voltage. A solar thermoelectric generator (STEG) utilizes a hot thermal reservoir created by solar radiation. A low-cost STEG was constructed and tested in the summer of 2015 then refined for a second device in the summer of 2016. Simple changes doubled the temperature difference across the thermoelectric module, increasing the voltage and power generated. The amount of power generated was approximately 12% of a photovoltaic cell of the same area, but improvements can supplement renewable energy generation. This device has been refined and inspired a hybrid model that combines STEG with PV cell.

Ashima Soni, Department of Electrical Engineering

Faculty Mentor: Dr. Shengli Fu, Department of Electrical Engineering

Title: Emotion Detection from Music Pieces

My paper was originally written for a summer research report for the TAMS Research scholarship of \$3000. It is a twelve-page paper that underscores the connection between artificial intelligence and emotion detection within music pieces. My research focused on determining features within a music piece that indicated the emotion aroused by the music from an audience. The paper discusses the step-by-step process of my research and the result produced. It displays each step of program I created in MATLAB to extract features such as pitch, tone, frequency, etc. that could help in clarifying the emotion detected from the music. It also examines the future implications of the success of emotion detection in music.

Marisa Spengeman, Department of Music Performance

Faculty Mentor: Dr. Jaymee Haefner, College of Music

Title: Louis Spohr and Harp Music of the 19th Century: *Fantasie für Harfe*

My performance will contain a solo harp performance of Louis Spohr's *Fantasie für Harfe in C minor*. As my research has mostly concerned Louis Spohr and his wife Dorette Scheidler's influence on harp music and performance of the 19th century, there will also be an oral presentation explaining the significance of this piece and its background. The mechanical differences between the modern harp and that of the 19th century will also be discussed, as this difference has become extremely relevant to my research.

Shreyas Srinivasan, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Witold Brostow, Department of Mechanical and Energy Engineering

Title: Enhanced Adhesion of Polypropylene to Copper Substrates

Varying concentrations of maleic anhydride (MAH) were grafted onto three types of polypropylene (PP) in the presence of dicumyl peroxide (DCP). Pull-off adhesive strength from a copper substrate, tensile Young's modulus, and tensile strain-at-break were determined and SEM observations made as a function of the MAH concentration for each PP. One of the PPs used provides quite a high peak of the adhesive strength at the MAH concentration of 3 wt.%, along with the Young modulus and strain-at-break sufficient for the use as a coating for copper wires and cables.

Jessica Tucker, Department of Music Performance

Faculty Mentor: Dr. Peter Mondelli, Department of Music History, Theory and Ethnomusicology

Title: The Russian School of Saxophone Playing

This paper focuses on the Russian School of Saxophone Playing and what makes this a unique and autonomous school. The body of the paper consists primarily of the first English translation of "The School of Saxophone Playing" by Alexandr Rivchun, and commentary on the pedagogical similarities and differences between this text and equivalent texts in the French and American schools.

Anthony Vento, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Shengli Fu, Department of Electrical Engineering

Title: Implementing Two Real-time Indoor Tracking Algorithms: A Comparative Study

My project dealt with Indoor Localization. Indoor localization has attracted tremendous research interest recently because of its potential for various applications such as target promotion, emergency relief, and victim rescue. In this paper, two android applications are optimized and developed for indoor localization based on Bluetooth signals from Bluetooth proximity beacons. First, an android application using a novel approach on triangulation is created. Second, an android application using a wireless fingerprinting map of Euclid distributions is developed. Both Android applications locate users in the Department of Electrical Engineering at the University of North Texas using real-time signals. Results from the two android applications and algorithms are analyzed in order to see if there is an effective model for indoor localization using Bluetooth signals. Finally, extensive experiment results show that the use of Bluetooth signals is an accurate yet imprecise means for localization.

Jagath Vytheeswa, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Jannon Fuchs, Department of Biological Sciences

Title: Effects of Beta-Amyloid on Neuronal Primary Cilia in Alzheimer's Brain

This paper describes correlations between the shape and size of primary cilia in human brains and the incidence of Alzheimer's. This project also marks the first time that the primary cilium has been

observed in the human brain, through novel immunohistochemical procedures. The findings presented in this paper open the door for possible drug targets for Alzheimer's Disease, along with various avenues to investigate other neurodegenerative diseases in the human brain.

Rayna Walthall, Department of Sociology

Faculty Mentor: Dr. Michael Thompson, Department of Sociology

Title: An Outlook on Violence: Open Carry in the Classroom and Gun Violence

Research shows that more guns produce more gun violence (Lemieux 2014). In August 2016, Texas public universities began implementing “Open Carry” – a bill that allows students to carry concealed handguns on campus. In the wake of numerous mass shootings in the United States, many feel that more guns on campus can produce dangerous consequences while others feel that allowing students to keep concealed handguns on campus may help to prevent a mass shooting. This study will examine Texas university students’ attitudes on this policy. We will be conducting online and in-person surveys that will ask students to explain their opinions about their university's gun policies, in the context of their demographic and social backgrounds., as well as explain their opinions on the topic. These surveys should provide data from a broad and diverse population of University Students and gain key insights behind students’ attitudes towards the important topic of access and use of firearms.

Frederick Wang, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Thomas Parsons, Department of Psychology

Title: Exploring Neuropsychology with Technology: Neuropsychological Testing with a Virtual Clinician

This paper is a report and discussion of the ecological validity of different neuropsychological testing methods. The traditional method of using paper and pencil to administer neuropsychological assessments has little ecological validity and has many other inconsistencies. With a program known as Avatar-Administered Neuropsychological Test (AVANT), several neuropsychological assessments are administered by a virtual clinician in order to remove inconsistencies and further explore the validity and effectiveness of administering neuropsychological tasks through a computerized software or virtual clinician.

Alan Xia, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Paul Marshall, Department of Chemistry

Title: A Computational Investigation to Construct More Environmentally Viable Substances

A seventeen-page research paper encompassing the various analytical and computational data extracted through the experiment.

Jason Yu, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Sheldon Shi, Department of Mechanical and Energy Engineering

Title: Natural Fiber and Aluminum Sheet Hybrid Composites for High Electromagnetic Interference Shielding Performance

Using natural fiber mats, aluminum sheets and epoxy resin, hybrid composites were fabricated through vacuum assisted resin transfer molding (VARTM) process. With novel sandwich structures, these hybrid composites contain natural fiber-based shells and ultra-thin aluminum sheet core. The hybrid composites offered excellent electromagnetic interference (EMI) shielding performance with good mechanical properties inherited from aluminum sheets and natural fiber-based composites, respectively.

Furthermore, the shell material (natural fiber-based composites) provides protection of the aluminum sheets from exposing to atmosphere directly to prevent being corroded. In this study, the EMI shielding effectiveness, microstructure, flexure property, tensile property, and internal bonding strength of the hybrid composites were examined. The excellent EMI shielding performance and good mechanical properties enable the new hybrid composites to be used as engineering materials in the EMI protection fields.

Yiguang Zhang, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Thomas Cundari, Department of Chemistry

Title: The Influence of Group-6 Organometallic Chelates on C-H Bond Activation and Methane-to-Methanol Oxidation Cycles

Natural gas, a ubiquitous fossil fuel, holds great promise as a clean-burning energy source. Methane, the primary component of natural gas, releases more energy per mass than any other hydrocarbon fuel and holds the potential to surpass gasoline as the premier transportation fuel. Large-scale methane usage, however, requires the compound to be converted to liquid methanol. Because current commercial methods of methane to methanol (MTM) conversion are complicated, energy-intensive, and environmentally harmful, the development of an alternative and economical MTM conversion process remains an area of great interest for hydrocarbon research. Drawing inspiration from the α -subunit of ethylbenzene dehydrogenase (EBDH), an enzyme found in denitrifying bacteria with mechanisms for oxidizing higher hydrocarbons to alcohols, this study proposes a six-coordinate Group-6 metal complex as a promising, non-precious metal catalyst for MTM conversion. The organometallic chelate studied takes the form of $[M(LC)_2(LT)O]1-$ (LC = ethylene-dithiolate, cis-2,3-butylene-dithiolate; LT = H, OH, NO₃, CN; M= MoVI, CrVI, WVI). This study focuses on the influence Group-6 metal centers, cis-ligands, and trans-ligands have on the thermodynamic affinity of MTM oxidation cycles, with emphasis on activation barriers of C-H bond activation and subsequent hydrogen atom abstraction (HAA) of methane. Analysis of average differences in relative free energies reveals small trans-ligand influence on catalyst performance, and additional analysis of ethylene-dithiolate C-C bond lengths throughout the reaction coordinate reveals the redox innocence of the bidentate cis ligands, emphasizing the small influence the selected ligands have on reaction mechanisms. Overall, this study determines the center metal to play the primary role in C-H bond activation by metal complexes, with secondary roles played by cis-ligands, trans-ligands, and neutralizing reagents as proton donors. Based on the results of this study, Cr-based catalysts arise as the most promising candidates for direct MTM conversions.

ABSTRACTS FOR RESEARCH POSTER

Ellen Anderson, Department of Psychology

Faculty Mentor: Dr. Michael Barnett, Department of Psychology

Title: Fearing the Future, Fearing Death: Optimism, Pessimism, and Death Anxiety among Older Adults

Background: Previous research has found that optimism is associated with death anxiety among older adults (Krause, 2005) and that pessimism predicts death anxiety among younger adults (Davis, Miller, Johnson, McAuley, & Dinges 1992). The purpose of this study was to investigate whether optimism or pessimism is a better predictor of death anxiety among older adults. **Method:** Participants consisted of older adults ($N = 272$; 73% female) age 59-95 living in independent retirement communities in the southern U.S. Older adults in independent living completed the Multidimensional Fear of Death Scale (MFODS; Hoelter, 1979) and the Life Orientation Test-Revised (LOT-R; Carver & Scheier, 2003).

Results: Hierarchical multiple regression analysis found that female gender and pessimism were positively associated with death anxiety, while optimism was not associated with death anxiety.

Discussion: Consistent with previous research (Dattel & Neimeyer, 1990; Depaola, Griffin, Young, & Neimeyer, 2003), women had higher death anxiety than men. Also consistent with previous research showing that pessimism is a better predictor of physical and mental health outcomes than optimism (Robinson-Whelen, Kim, MacCallum, & Kiecolt-Glaser, 1997, Barnett & Anderson, in press), pessimism was a better predictor of death anxiety than optimism. Perhaps, given the inevitability of death, limiting negative expectancies is more salient than having positive expectancies.

Maribel Barrera, Department of Chemistry

Faculty Mentor: Dr. William Acree, Department of Chemistry

Title: Solubility of Sorbic Acid in Organic Mono-Solvents: Calculation of Abraham Model Solute Descriptors from Measured Data

Experimental mole fraction solubilities are reported for sorbic acid dissolved in methanol, ethanol, 1-propanol, 1-butanol, 1-pentanol, 1-hexanol, 2-propanol, 2-methyl-2-propanol, 2-pentanol, diisopropyl ether, methyl tert-butyl ether, tetrahydrofuran and 1,4-dioxane at 298.15 K. Results of the experimental measurements, combined with a published water-to-octanol partition coefficient and published solubility data for sorbic acid dissolved in acetone, ethyl acetate and acetonitrile, were used to calculate Abraham model solute descriptors for the sorbic acid monomer. The calculated solute descriptors were found to describe the measured solubility and partition coefficient data to within 0.10 log units. The calculated solute descriptors can be used to predict sorbic acid solubilities at 298.15 K in additional organic solvents in which sorbic acid is expected to exist predominately in monomeric form.

Fatemah Behnia, Texas Academy of Mathematics and Science

Title: Characterization and Application of $[\text{Cu}(\text{MeCN})_4]\text{BF}_4$ for Synthesis of Copper Nanoparticles

The poster will demonstrate the properties and use of Tetrakis(acetonitrile)copper(I) tetrafluoroborate, $[\text{Cu}(\text{MeCN})_4]\text{BF}_4$, in the synthesis of copper nanoparticles. The synthesis and characterization of the copper(I) precursor in aqueous solution is followed by its elaborate application in the synthesis of stable, non-toxic, copper nanoparticles which have anti-microbial and anti-biotic applications. In order to minimize the toxicity of the copper particles, water was chosen as the solvent and ascorbic acid (Vitamin C) was used as the reducing agent. The poster will demonstrate my results from the testing of this aqueous copper-ascorbic acid system in conjunction with various stabilizing agents and different methods to yield stable particles in solution. This includes methodology and data showing the intricate

battle to avoid oxidation of the particles and characterization of the synthesized particles in terms of stability and size by methods of uv photo-spectroscopy, dynamic light scattering, and IR-spectroscopy. Although there is an ongoing effort to control and tune the size of the particles, the resulting micron-sized copper metal particles which are stable in aqueous solution demonstrate the promise of this project.

Molly Beaufait, Department of Studio Art-Fibers

Faculty Mentor: Ms. Lesli Robertson, Department of Studio Art-Fibers

Title: UNT Natural Dye Garden Recipes

This poster will be focusing on my research on the UNT Natural Dye Garden, specifically the information required to relocate the garden onto the new art building's rooftop garden area. This includes over 15 plants and data on each plant including size, planting time, harvesting time, sun exposure, water requirements, dye production, etc., as well as previously collected information from the current Dye Garden pertinent to the transfer. The poster outlines what the Dye Garden will need in its new location to be efficient and productive, as well as research on each individual dye plant in order to provide the most informative and educative source for those planning the new garden.

Shashank Bhavimane, Texas Academy of Mathematics and Science

Title: Computer Model of the Solar Wind: H⁰-H⁺ Elastic Collisions, Charge Transfer, and Transport Cross Sections

The poster explains a computer simulation of the solar wind as it propagates through the Solar System. It incorporates the various elements that were used in building the model such as the differential cross section for hydrogen proton scattering, as well as the charge transfer that marks the end of the simulation for one trajectory. It displays the average trajectory of a hydrogen proton through space, thus providing a better idea of how the solar wind travels in the Solar System.

De'Amber Bullard, Department of Sociology

Title: Let's Talk Fear: A Sociological Analysis of Guns and Fear on College Campuses

This poster will present results from a sociological study, conducted under the guidance of Dr. Helen Potts, to explore how student gun ownership and attitudes toward concealed carry legislation are associated with fear on college campuses.

Madison Burrell, Department of Studio Art—Fibers

Title: The UNT Natural Dye Archive

This poster displays my work and research I did to help create the UNT natural dye archive.

Meagan Burt, Department of Political Science

Title: Online Expression of Ezidi Identity During Islamic State Conflict in the Sinjar Region

Ethnic identity changes, especially during conflict. However, how that identity changes is subject to significant debate. Ethnic identity may harden, becoming stronger within a group, or soften, becoming secondary to a more state-based identity. The Kurdish rhetoric toward Ezidi includes state-building and nationalizing characteristics, while there has been a pushback from some Ezidi who prefer to identify as a separate ethnoreligious group. This research seeks to examine the evolving ethnic identity of the Ezidis in Northern Iraq by means of their social media activity during Islamic State fighting and control

in the Sinjar region. The study draws from Twitter posts dated August 2014 to December 2015 to determine if Ezidi users identified more with the Kurdish 'state' or with the Ezidi ethnoreligious group throughout the IS occupation and subsequent Kurdish control of their religious sites in Sinjar, with consideration given to the location, social media presence, and frequency of posts by the Ezidi Twitter users.

Bryan Burton, Department of Biological Sciences

Title: An Extensive Analysis of the Bacteriophage BryanRecycles

Bacteriophages are the most abundant life forms on Earth. It is important to study bacteriophages to better understand infection and coevolution. Bacteriophages can be used as a therapy to treat bacterial infections. In our attempt to discover more potentially useful phages, our research group isolated phages from soil samples collected from a variety of locations. The bacterial strain *Streptomyces griseus* was used as a host to isolate the bacteriophage from a soil sample collected in Denton, Texas. The bacteriophage was named BryanRecycles. The phage has been sequenced and is being annotated. BryanRecycles is in the subcluster BD1. BryanRecycles is smaller than an average phage, containing 50,066 base pairs. BryanRecycles is a promising phage that needs to be further analyzed to discover more intricate features.

Eryn Butler, Department of Human Development and Family Sciences

Faculty Mentor: Dr. Julie Leventhal, Department of Human Development and Family Sciences

Title: Building a Community: How Marching Band Can End Human Trafficking

The paper is based off my experiences in Romania last summer, and my plans to travel back there this summer to help put an end to human trafficking through my own design of a prevention program. The Romanian Youth Program (RYP) mimics the structure of marching band (which is something they may not really have in the same way in Romania) by providing opportunities for peer led activities and mentorship. The experience of marching band in the US is structured to where every individual is vital to the success of the activity, and can be mentored and a mentor in return. The marching band structure emphasis is on the creation of a strong sense of community, which is vital in the prevention of human trafficking, as aforementioned. Therefore, the RYP will be planned around a similar foundation that focuses on providing opportunities for inter community connection, and peer mentorship.

David Chaparro, Texas Academy of Mathematics and Science

Title: Akermanite Merwinite and Bioceramics Using Strontium

By substituting Strontium instead of Calcium in certain biocompatible crystal structures, an alternative, safer biocompatible ceramic is possible to be synthesized. We also examined alternative synthesis methods, such as microwave synthesis in lieu of traditional ceramic synthesis.

Nathan Contreras, Texas Academy of Mathematics and Science

Title: A Novel Method for Automatically Generating Keyphrases in Scholarly Articles

The abundance of online scholarly material has created demand for keyphrases that effectively describe the contents of scholarly articles. Our novel supervised keyphrase extraction method combines features from existing extraction methods with new citation-focused features. With these features, our method selects keyphrases for an article that match human-selected keyphrases up to 3.5 times more often than comparable extraction methods.

Landon Cowan, Department Behavior Analysis

Title: A Comparative Evaluation of Reinforcer Assessments

The poster will describe the results of a preliminary investigation on two different methods of measuring responding during a reinforcer assessment. Reinforcer assessments evaluate the functional strength of a stimulus by measuring the number of responses a participant makes under increasing requirements. High-potency reinforcers are identified as those stimuli that maintain a large number of responses under lean reinforcement schedules (e.g. 80 responses for one reinforcer delivery). However, there are other dimensions of a response, besides the frequency, that may be correlated with reinforcer strength. In particular, response effort has been suggested as a dimension of responding, but this has not been measured in respect to reinforcer identification. One way to measure response effort is to measure the force that an individual will emit under increasing force requirements. This investigation compared the force of a button press and the number of button presses that participants emitted under increasing schedule requirements.

Samuel Cowan, Department of Studio Art—Printmaking

Title: New Technologies in Fine Art Printing

The poster will detail the process behind editioning prints for visiting professor Jeffery Dell, under the guidance of my mentoring professor Lari Gibbons. This includes the use of UNT's fabrication lab laser cutter to develop a matrix, working with oil based inks and synthetic Yupo 'paper', and developing a method of printing that is exactly repeatable within the constraints of the project to yield the best results when creating multiples of the work. The poster will include photographs of the work, as well as a variety of trial proofs that were necessary for ensuring desired results in the final print. Artifacts/examples of the materials used to make the print may also be made available.

Corbin Deaton, Department of Kinesiology

Title: Reoccurring ACL Injuries in Martial Arts

This poster will observe how various ACL injuries occur in martial arts. It is one of the most popular type of injuries in various styles of martial arts. I will describe the biomechanics of how this often happens, and the different ways there can be healing, and prevention.

Isabel Delwel, Department of Biological Sciences

Faculty Mentor: Dr. Lee Hughes, Department of Biological Sciences

Title: Latency Period of Spectopatronm Infected *Streptomyces griseus*

Bacteriophages are viruses which infect bacteria. The isolation of bacteriophage (phage) and its subsequent study is imperative for the furthering of genomic studies and using phage as tools. In a controlled lab setting at the University of North Texas, a latency period experiment was conducted on *Streptomyces griseus* infected with the phage Spectopatronm. A latency period for a phage is the time between the phage infecting a host before lysing the host cell. In order to complete the experiment, a culture of *Streptomyces griseus* was infected with Spectopatronm at a 10:1 multiplicity of infection (MOI). A viral titer assessment was then conducted at 0, 30, 60, 90, 120, 150, 180, 210, and 240 minutes post-infection. After the viral titer assessment, the results were analyzed to evaluate phage lysed out of bacterial cells at the various time periods. In the future, I would like to use this data to complete more complex experiments, such as analyzing transcriptomes Spectopatronm or phage within the same cluster.

Weston Dunham, Department of Political Science

Title: Is Talk Cheap? Analyzing Governors' Responses on Immigration in the Face of Terror

In the wake of the Paris Attacks in November of 2015, nearly three quarters of United States Governors public denounced or supported U.S. refugee and asylee programs, primarily under the guise that individuals in these groups posed a credible threat to the security and safety of Americans. However, it is legally accepted that immigration, and therefore refugee and asylee resettlement, is a federal mandate and not under the prevue of state governments. Despite this, it seems as though the words and policies of these governors has a relationship with the numbers of refugee and asylee cases referred to resettlement agencies in their states. This poster briefly summarizes our analysis of this relationship and theorizes reasons for its existence based on existing literature on the matter and statistical analysis of resettlement data.

Williams Espericueta, Department of Behavior Analysis

Title: The Edge of Fear: Effects of Increasing Threat on Fear and Decision to Avoid.

The Centers for Disease Control and the National Institute for Mental Health report anxiety disorders are the most common mental illness in the United States, affecting 40 million adults (18%). Anxiety disorders include panic disorder, generalized anxiety disorder, post-traumatic stress disorder, phobias, and separation anxiety disorder and are more prevalent in women than in men. Avoidance is a prominent behavioral characteristic and diagnostic feature of anxiety disorders. The need for effective treatments for fear, anxiety and avoidance remains a high priority and one important first step is the development of laboratory research models of avoidance. Accordingly, this investigation used a computerized approach-avoidance task to examine how increasing threat influences choices to approach reward and avoid threat. A group of participants first learned that higher levels on a vertical bar were associated with an increasing probability of a large money loss. During the approach-avoidance (AA) task, we gave participants a choice between (1) approaching a monetary reward as threat increased and (2) avoiding the threat entirely. Our main results showed (a) as the threat level increased people chose the reward less and less and switched to avoidance, (b) the threat level where people switched from choosing reward to avoiding differed and (c) a physiological measure of fear increased substantially near where people switched. This study demonstrates an important relation between increasing threat and approach-avoidance decision making. Our data show that people have a subjective threshold for threat and will give up pursuing a reward and engage in avoidance when a threat is sufficiently large. It will be important for future research to examine whether anxiety disorders are associated with greater avoidance on this task.

Breanna Ferrara, Department of Studio Art-Fibers

Faculty Mentor: Ms. Lesli Robertson, Department of Studio Art-Fibers

Title: Creating Archived Inspiration: The Mother Load Project

This poster will highlight creative work done in collaboration with Lesli Robertson, Principal Lecturer Fibers Program. Through this research fellowship I worked with Lesli and her collaborator, Natalie Macellaio, on their project, The Mother Load. This Poster will include the following: an overview of this project, with a focus on my role in working with archived audio interviews; the approach to developing edited audio for publishing online and selection of audio software for future use; and the approach of working with Natalie and Lesli on selecting and editing content from audio interviews recorded from 2012- 2015. Highlights from several published artist including observations on the process of working with their interviews ae also included.

Katherine Gallemore, Department of Finance

Title: The UNT Food Pantry Supply Chain and its Logistics

This poster will give a background on food insecurity experienced by UNT students. It will also examine a detailed description of an interview with the dean of students about the food pantry. The variables of the student survey will be discussed as well.

Ashwin Ganesh, Texas Academy of Mathematics and Science

Title: Exploring the Potential Genetic Interaction between MtSUNN and MtNPF1.7 genes in *Medicago truncatula*

Symbiotic nitrogen fixation, a process in which plants convert atmospheric nitrogen (N₂) into ammonia (NH₃), is an essential biological process. *Medicago truncatula*, a legume native to the Mediterranean, forms symbiotic relationships with *Sinorhizobium meliloti*, a type of bacteria, in the nodules of the root of the plant to make nitrogen usable by converting it into ammonia. Plants can also uptake nitrate (NO₃) and convert it into ammonia. MtNPF1.7 is a gene which codes for a nitrate transporter from nodules and has other unknown functions. Mtnip-1 mutant plants contain a mutation in their MtNPF1.7 genes which disables it and inhibits nodule formation. Even though nodule formation is important for *M. truncatula*, it can be very energetically expensive for the plants to form excess nodules. In order to prevent excess nodule formation, the plant has a gene called MtSUNN which regulates nodule number. When *M. truncatula* is in the presence of nitrate, the MtSUNN gene inhibits nodule formation. Mtsunn-1 mutant plants contain a mutation in their MtSUNN genes which takes away the plant's ability to auto regulate nodules and causes nodule formation even in the presence of nitrate. Our goal is to explore the possibility of a genetic relationship between the two genes due to their potential overlap in the pathway of symbiotic nitrogen fixation. In order to do so, I needed to find double mutants for both genes in a generation of plants previously crossed in the Dickstein Lab. I genotyped 27 possible double mutant plants in the hopes of gaining a second generation of these plants to experiment on along with wild-type, Mtsunn-1, and Mtnip-1 generations. Of the 27 plants, 14 were homozygous for both the Mtnip-1 and Mtsunn-1 mutations. Therefore, 14 double mutants exist among the population. By analyzing nodule numbers in double mutant plants, we can draw conclusions about the relationship between MtSUNN and MtNPF1.7.

Stormie Garza, Department of Biomedical Engineering

Title: Study of a Lightweight Lower Extremity Exoskeleton for Rehabilitative Gait

Knee osteoarthritis is a common cause of disability in people over 65, including symptoms such as decreasing movement ability, instability, and pain. The purpose of this research is to create a lightweight and durable lower extremity exoskeleton that is comfortable for senior citizens suffering from knee OA. We propose a passive, lower extremity exoskeleton composed of a system of mechanical components that closely model human gait kinematics in order to provide necessary compensatory power and stability for elderly patients. Given the needs of the patient, the interfacing between device and human patient is focused on comfort. The materials under investigation include titanium and aluminum for the lateral supports, along with elastic and neoprene for interfacing. The elastic straps provide a simple device mounting mechanism, while the neoprene establishes a comfortable fit onto the body around the waist and upper leg, without impeding on range of motion.

Allison Haskell, Department of Biological Sciences

Faculty Mentor: Dr. Lindsay Moore, Department of Technical Communication

Title: Mechanistic Knowledge and Public Opinion of GMOs

My poster will summarize the research I have done for my honors thesis called, Mechanistic knowledge and public opinion of GMOs with Dr. Lindsay Moore in the Technical Communication Department. My poster will include background research on the field of science communication and the public opinion of GMOs. I will display the results of my survey regarding the effectiveness of mechanistic knowledge as an education tool, and include my conclusions about public opinion and knowledge of GMOs.

Kathryn Hays, Department of Psychology

Title: Emotional Labor for Negative Emotions Predicts Compassion Fatigue among Hospice Nurses

Compassion fatigue, which is emotional and physical exhaustion caused by the long term demands of care giving, was measured along with a number of emotional labor and affect variables to predict compassion fatigue in a sample of hospice nurses. Multiple regression analyses found positive associations between compassion fatigue and negative emotional labor and affect variables. These results suggest that, for nurses providing end-of-life care, managing negative emotions may play a key role in compassion fatigue.

Bailey Hering, Department of Public Relations

Title: The Christ-like Narrative in Video Games

In many forms of media, the characters presented fit neatly into 'archetypes', or roles, such as the hero or villain. One common archetype present for the protagonist of many forms of media is that of the savior, and the personal story of these savior-like characters tends to follow the narrative of Jesus Christ. In this paper, I intend to display the effects that this Christ-like narrative has on the stories and plots of video games, a form of media that allows the consumer to interact with its story. I will define the various archetypes at play within these stories and how they apply to the individual tales of a selection of video games.

Elizabeth Higgins, Texas Academy of Mathematics and Science

Title: Development of Abraham Model Correlations for Enthalpies of Solvation of Organic Solutes Dissolved in 1,3-dioxolane

This poster is an account of summer efforts to produce the first published mathematical expression for estimating enthalpies of solvation for solutes dissolved in 1,3-dioxolane.

Brittney Jackson, Department of Psychology

Faculty Mentor: Dr. Tom Miles, Honors College

Title: Horses Helping Humans: An Evaluation of Equine-Assisted Therapy as a Treatment for Substance Use Disorder

Substance abusers have a long journey of recovery ahead of them. On the bright side, research is beginning to show that this journey may have the potential to become easier with the help of horses. More specifically, horses can help, not only substance abusers, but also people with Autism, PTSD, and other physical injuries to their health in a sense through matching their emotions. In this study, I will draw upon the sparse literature to argue that equine-assisted therapy is not only an effective treatment for many disorders, but that it is also beneficial to substance abusers specifically. I plan to design

questionnaires to administer prior to treatment and after treatment to assess the effectiveness of equine therapy on people with substance abuse problems. However, it is not easy to recruit participants for such a study, so there are a few limitations that may be introduced into this experiment. Future research in the field should not only focus on expanding sample sizes, but also on quantifying the data more, as most of the past research has consisted of qualitative interviews.

Youngwoo Jang, Department of Chemistry

Title: Spectroscopic and Electrochemical Analysis for the Sequential Electron Transfer Process in Dornor2-Donor1-Acceptor Photosystems

Charge stabilization in electron donor-acceptor photosystems achieved by the utilization of multiple donors is exhibited in the tetrathiafulvalene:fluorinated zinc porphyrin-fullerene (TTF:F15PZn-C60) conjugates. Quenching of the fluorescence emission of the F15PZn, and cathodic shift of its oxidation potential in the dyad indicated electron transfer. Furthermore, UV-visible absorption and fluorescence emission titrations with pyridine appended TTF demonstrated its coordination and interaction with the F15PZn macrocycle.

Bihan Jiang, Texas Academy of Mathematics and Science

Title: Intelligent Design of Green Ionic Liquid Solvents for Pre- and Post-Combustion Removal of Nitrogen and Sulfur Containing Emissions

In the past few decades, global consumption of fossil fuel resources such as petroleum, coal, and natural gas, has increased sharply due to their availability, reliability, and price. However, these fossil fuels are largely contaminated with various nitrogen and sulfur compounds, which not only lower the fuel value of the resources but contributes to large-scale acid rain formation. Gas absorption, a method in which a gas mixture is bubbled through a liquid to dissolve components of the mixture, is commonly used to remove these undesirable compounds. In the past, alkylamines have been used in gas scrubbing to remove compounds such as H₂S and CO₂, but they pose various drawbacks, including insufficient carbon dioxide capture and degradation of costly materials. In my research, I study ionic liquids (ILs) to identify stable and environmentally friendly alternatives to conventional amine scrubbing. In my research, I work primarily with the Abraham Solvation Model. The Abraham Solvation Model is an established method for calculating the efficacy of a compound as a solvent. Using primarily the model, I designed a large number of environmentally friendly ionic liquids by virtue of cation and anion for the purpose of gas capture. I also developed a predictive model that can easily and accurately calculate for solubility parameters of various ILs. Finally, I focus on extending the study on ionic liquid design, examining methods of designing cations by virtue of functional groups. With my method of intelligent solvent design, I can quickly compute the solubility of untested ILs and determine the optimal structure of compounds for gas separation and sequestering. My model can also aid in broader ionic liquid design, as it can be applied to a multitude of different industries, from fossil fuel gas separation to pharmaceutical developments to hazardous industrial solvent replacements. Overall, my results provide several new tools for structural analysis and design of ionic liquids, furthering the overall work made in the field of solution chemistry and environmental conservation.

Braden Jones, Department of Professional and Technical Communications

Title: Eighteenth- and Nineteenth-Century Literature as Scientific Outreach

How do scientists communicate their research in a way that is academically publishable while also reaching the wider audience of the masses? This question has become more important over the last decade as funding for scientific endeavors has become more privatized (with large-scale governmental

programs like NASA being completely defunded) and more federal grant awards funded by boards of directors who are not specialists in scientific fields. In addition, controversial scientific subjects such as climate change, stem cell research, and immunizations have become political issues that operate almost completely outside the scientific arena. From scientists such as Neil DeGrasse Tyson to Carl Sagan, the answer to the problem of scientific outreach seems to be to re-think the medium and the message of traditional scientific writing. We have done extensive research from the eighteenth and nineteenth century science writers who depended upon literature and literary devices to communicate their research. These fathers of science conveyed their research and philosophies to audiences made primarily of non-scientists. I want to present my poster in such a way that by employing literature of the long eighteenth century to the teaching of science writing to STEM majors not only deepens their understanding of the history of science but also demonstrates the history of the interdisciplinarity of science and literature.

Connor Kennedy, Department of Biochemistry

Title: Retinal Specializations of the *Apogon rueppellii*: A Study in Cell Density, Morphology, and Structures in the Retina

Purpose: Specialized visual systems in the retina of the *Apogon rueppellii* allow the species thrive in a nocturnal, reef, estuary environment. Methods: By taking a retinal whole mount from the right eye of the species, and translating the structure to a topographical map, as well as analyzing retinal ganglion cell counts and photoreceptors, visual streak and area centralis are noted at 4 major locations. Results: These structures were identified with cell density calculations (overall 506933 ± 4731 cells), total retinal area (139 mm²), area viewed under P40X for estimations (0.0532 mm²), and the average cell density across the retina (3647 cells/mm²). Conclusions: This data showed the 4 major structures in the eye to explain their location and function coupled with other morphological data from the fish to explain its powerful vision in a world of darkness.

Mikayla Kim, Department of English

Title: Canons in Community: The Cathedral of Eleventh-Century Exeter and Its Bishop

My poster explores the unique religious community of Exeter in the eleventh century under Bishop Leofric. The documents from Leofric's scriptorium indicate that he organized specific materials to mold his canons' minds as they worked, prayed, and studied during the season of Lent. I situated many of my claims in the yearly rhythms mandated by The Rule of St Chrodegang, which Leofric included in his scriptorium. Another resource was a singular hymnal written in hand of one of the canons that likely sung from it. Leofric commissioned its production in his Exeter scriptorium, including a unique set of hymns that were likely sung during this period of penance. These continental hymns, to be sung during the evening period of prayer Nocturns, stick out as a singularly customized manuscript when compared to other extant hymnals of the same period. During this time of penance, the canons would have personally utilized Leofric's sizable scriptorium, which included the Anglo-Saxon poetry collection commonly and appropriately termed the Exeter Book. In addition to its mind-bending riddles, this book posits biblical themes of penance and self-sacrifice situated in the familiar cultural ties of Anglo-Saxon lords, thanes, and monsters.

Kate Landers, Department of Geography

Title: Cooling Down the City: How Cool Pavements Mitigate the Urban Heat Island

This poster will dissect the urban heat island effect and examine cool pavements as a way of regulating the urban heat budget, reducing sensible heat fluxes, and improving human comfort in the city. Cool

pavement's™ main purpose is to reduce the heat produced by urban pavements by implementing strategies that increase albedo and evaporation. I will conduct a review of existing literature and demonstrate the importance and relevance of the urban heat island and cool pavements. I will define and describe the structure and function of urban pavement and how it relates to the urban heat island. In addition, I will draw conclusions about the interactions between humans and the environment in an urban state.

Michael Lee, Texas Academy of Mathematics and Science

Title: Multi-Principal Alloys: A Paradigm Shift in Alloy Design

The poster will detail my work with Professor Rajarshi Banerjee over my experiment on high entropy alloys. The poster will detail an abstract, Hypothesis, materials, procedure, data, results/conclusions, and SEM images.

Amy Li, Integrative Studies

Title: Isolation and Characterization of *Streptomyces xanthochromogenes* Phage Daudau

Through the SEA-PHAGES program at UNT, the bacteriophage Daudau was identified and isolated from an enriched soil sample from Arlington, Texas. A bacteriophage is a virus that infects a bacterial host. Daudau was replicated and isolated using the bacterial host *Streptomyces xanthochromogenes*. The purpose of this research is to isolate and annotate a phage to compare it with other phages for future research. After the isolation process was completed we obtained a gel electrophoresis picture, and also obtained an electron microcopy picture and found it to be a lytic phage. Daudau belongs to the BD2 subcluster. There are only 15 total isolated BD2 Phages and only 2 in Genbank's database. There is a total of 87 genes coded for this phage's genome. The total GC content is 67.1%. There is a total of 50602 base pairs (bp) in this genome. Daudau is also similar to the phages R4 and ELB20. To annotate the phage's genome, we used tools such as, PECAAN, Phamerator, Genemark, DNA Master, and BLAST tools from NCBI and Phagesdb.

Chihyo Lin, Texas Academy of Mathematics and Science

Title: Moving Psychology into the Digital Age: Neuropsychological Testing Using a Virtual Clinician

Psychological assessment and diagnosis are traditionally done by paper-and-pen or computerized assessments with little ecological validity. Virtual reality or simulated assessments can provide environments that better simulate the real world. In this study, participants were given the list learning task by a human researcher as part of the traditional CVLT neuropsychological test, which measures episodic verbal learning and memory. Another series of tests based on the traditional CVLT was administered by a simulated clinician through the Avatar-Administered Neuropsychological Testing (AVANT) program. An analysis of the data resulted in good convergent validity between the AVANT List Learning and Memory task and the CVLT List Learning and Memory task, which indicates that the AVANT program can accurately measure episodic verbal learning and memory just like the CVLT can.

Amber Lu, Texas Academy of Mathematics and Science

Title: Signed Path Matrices and Oriented Hypergraphic Generalizations

Every hypergraph can be represented by some matrices. By studying these matrices, we solve several problems in data structure analysis and provide combinatorial interpretations of these results. Previously, a path counting theorem was known for k -regular graphs. In this paper we generalize and extend the theorem to count paths in all oriented hypergraphs, and consequently show its applicability for both

signed and unsigned graphs. We explore the bipartite model of a hypergraph and study the relationships between the adjacency, incidence, and Laplacian matrices of the aforementioned graphs. In the process we show the ubiquity of the square root of the Laplacian matrix, and use the combinatorial interpretation of this result to introduce the idea of a fractional walk. We also analyze and provide an interpretation of the matrix-tree theorem in the context of hypergraphs, and explore the methods of counting trees in signed graphs. Our path counting theorems allow efficient computation of the minimum number of connections needed to guarantee a majority of positive connections between nodes. This gives our results immediate applications in many fast growing fields such as social networking, mobile computing, and data analysis. Furthermore, it has applications in structural design, such as in VLSI systems and neurological modeling, as hypergraphs are ideal for modeling large, complex technological and social systems where multi-relationships are prevalent.

Roman Madoerin, Department of Chemistry

Title: What Chemical Distinctions between Heroin and Fentanyl Determine How the Drugs Affect the Brain Differently?

Fentanyl and Heroin both are opiates that trigger the same receptors in the brain, but fentanyl is significantly more potent. Fentanyl is also deadlier, as the toxicity for fentanyl is much closer to a typical dosage than the toxicity of heroin compared to a typical dose. Fentanyl is also fatal to humans with only skin contact in some cases. Drug users that have been exposed to both heroin and fentanyl have described the "high" from fentanyl as significantly more intense and longer in duration than a "high" from heroin use. Prior research has indicated that while the blood-brain barrier may limit the amount of heroin that passes through, the chemical structure of fentanyl allows it to pass through the barrier virtually uninhibited. This poster will propose a method to run both fentanyl and heroin through a high performance liquid chromatograph with a single quadruple mass spectrometer detector. To simulate a chemical interaction with the brain, a specialized column will be used in the experiment. The poster will also explore the chemical differences as well as prior research on both drugs.

Vineel Mallepalli, Texas Academy of Mathematics and Science

Title: Analyzing Thermoelectric Properties of Common Fillers in Epoxy Resin Matrix Composites

With the recent size reduction of high-density integrated circuits, heat dissipation has become a major factor concerning the viability of integrated circuit packaging. This research analyzes the thermoelectric properties of composites involving different filler material and filler amounts dispersed in an epoxy resin matrix to decrease the filler weight percentage currently used and discover which composites produce the desired properties.

Anna Middleton, Department of Chemistry

Title: Electrochemical and Spectra Studies of Pyrazinacenes

Electron transfers within a molecule are the basis for a good donor-acceptor system. For a donor-acceptor system to exist, an electron rich component and electron deficient component must be present. These systems are of importance when regarding non-renewable energy sources, specifically solar energy. If a donor-acceptor system with a high efficiency is found, then more electrical power can be produced from solar rays. This lessens the dependence on non-renewable sources, such as coal and fossil fuels, which would reduce the carbon footprint on the earth. In this experiment, the proton donor-acceptor systems between nitrogen-based heterocyclic rings are analyzed. These compounds are in the family of acenes, which are aromatic compounds made up of typically five- or six-membered rings that sometimes contain heteroatoms of sulfur or nitrogen. Pyrazinacenes are specifically the aza analogues of

acenes. The symmetry and substituents within the compound directly affect the efficiency of said donor-acceptor systems. The secondary amine groups present within each molecule disrupt conjugation, causing a partially charged dipole in the multi-ring aromatic system. The interaction between the secondary amine and the other conjugated nitrogen are what fuel this system. Using electrochemistry, the extent of this charge and its effect on the proton donor-acceptor system will be further defined.

Catherine Moulder, Department of Chemistry and Department of Mathematics

Faculty Mentor: Dr. T.R. Cundari, Department of Chemistry

Title: 5d Metal(IV) Imide Complexes. The Impact (or Lack Thereof) of d-Orbital Occupation on Methane Activation and Functionalization

Density functional theory is used to characterize the transfer of nitrene to methane from 5d metal complexes, $(OH)_2M=NMe$ ($M = W, Re, \text{ or } Os$). Oxidative addition is favored versus hydrogen atom abstraction and [2+2] mechanisms by late and early d-block metals, respectively. The C–H activation barrier is determined by frontier orbital interactions, which are preferred over thermodynamic and structural factors. Stabilization of an amide intermediate, produced via hydrogen migration, is a key differentiator among metals, suggesting better methane functionalization routes.

Robert Nance, Department of Biological Sciences, Honors College

Faculty Mentor: Dr. Tom Miles, Honors College

Title: Alzheimer's Disease and Type 3 Diabetes

Is Alzheimer's disease Type 3 Diabetes? Do the parallel abnormalities between Alzheimer's disease (AD) and Type 2 Diabetes Mellitus (T2DM) suggest that Alzheimer's disease is highly influenced by Type 2 Diabetes Mellitus or an independent form of diabetes? In this study, I compare the abnormalities between AD and T2DM to gain enough evidence to support the hypothesis that AD is Type 3 Diabetes.

Nitya Nandagopal, Texas Academy of Mathematics and Science

Title: Aromatic/Boron Carbide Composite Films: Emerging Materials for Enhanced Neutron Detection

Metacarborane or orthocarborane-derived boron carbide films have been of long standing interest for neutron detection applications. These films, however, are generally poor semiconductors. Aromatically-doped boron carbides have recently become of interest due to their enhanced semiconducting properties. This study focuses on aromatic-doped boron carbide films of metacarborane and aniline or pyridine formed by plasma-enhanced chemical vapor deposition (PECVD), and how their properties have displayed characteristics that are favorable for neutron detection. These films were analyzed using X-ray photoelectron spectroscopy (XPS), variable angle spectroscopic ellipsometry (VASE), and first-principles density functional theory (DFT)-based electronic structure calculations. The data found showed reduced band gaps, and a better electron-hole separation, which suggest that aromatic-doped boron carbide p-n junctions are possible for neutron detection or other applications.

Thomas Nelson, Department of Business Analytics

Title: An Analysis for Smartphone Trends

When comparing social media posts made by phone manufacturers or by the general public regarding the products, do we get one version of the truth, or is there a discrepancy? Smartphones are an important part of today's society beginning with the release of the iPhone in 2007 and new models continue to be released annually. In 2015, it was estimated people spent an average of three hours per day on their smartphones and is expected to increase as more applications continue to change the way we live. To

conduct research, I will use the official Twitter page of major smartphone manufactures (@AppleSupport, @SamsungMoble, @googlenexus) to find tweets advertising their products and compare those tweets to those made by general public through Hashtags (#iPhone, #Nexus, #GalaxyS7). Viewing thousands of tweets, I will collect data from Twitter using the Twitter Application Program Interface (API) and the R package TwitteR. I will extract topics using SAS Enterprise Miner and perform text cleanup operations by writing a custom Excel code to visualize the relationship between topic and brands using correspondence analysis. With this project, I hope to help consumers make informed decisions when purchasing smartphones in the future.

Brandon Ohl, Department of Materials Science and Engineering

Title: Anisotropic Nature of Raw, Radially Strained, and Radially Strained and Aged Steel Pipes

We determined the degree to which the strength of steel pipe differs in orientation. We tested pipe that had undergone different processing techniques, which might cause the pipe to be stronger in some directions than others. To test the strength of the steel in various orientations in a cylindrical pipe required mini-tensile testing. In addition to collecting data, the project required us to determine which mini-tensile processing method leads to the most accurate data. Results: Determined that tensile bars produced by EDM (Electric Discharge Machine) and CNC (Computer Numerical Control) are consistent. Chemical polishing to remove the recast layer from EDM samples proved to be ineffective, although hand polishing at 1200 grit worked. The pipe is approximately 10% stronger in the hoop direction than in the axial direction. This allows companies to more accurately determine the strength rating of steel pipes.

Maria Otero, Department of Behavior Analysis

Title: Audio/visual discrimination in children with autism

Children diagnosed as being on the Autism Spectrum have difficulty learning to associate a spoken or written word with a picture or with other written words. Analyses in the archival literature have shown that children that fail to learn these tasks are often lacking some of the more foundational skills on which this kind of linguistic learning might be built. The foundational skills include the ability to identify whether words and pictures are the same or different, to scan all of the available stimuli to make correct choices and to attend to the stimuli presented to them, among others. The goal of the proposed research is to develop a diagnostic battery to assess these foundational skills. These tests will increase our ability to predict how well the students will do in a given task based on the presence or absence of these foundational skills. If successful, the results will allow us to better match tasks to children's capabilities and improve our outcomes as well the children's experiences with our therapeutic procedures. I will help design and conduct the tests. We plan to present our findings at regional and national conferences and in work published in the archival literature.

Kelsey Oudshoorn, Department of Psychology

Title: Examination of the Relation between Multiple Traumas, Depression, and Distress Tolerance

The experience of multiple potentially traumatic events (PTEs) relates to depression and distress tolerance difficulties. The dose-response effect theorizes a detrimental mental health effect of experiencing several PTEs, while the stress inoculation theory suggests that multiple PTEs may increase resiliency to psychopathology. In our study, we examined the effect of multiple PTEs (Stressful Life Events Screening Questionnaire; SLESQ) on depression (Patient Health Questionnaire 9; PHQ-9), and distress tolerance facets (Distress Tolerance Scale; DTS) of tolerance, absorption, appraisal and regulation. Our sample included 282 participants seeking mental health services (M age = 36.30 years;

57.10% females). Results of correlation analyses indicated a significant positive correlation between number of PTEs and depression severity ($r = .30, p < .001$), indicating that a greater number of PTEs related to increasing depression severity. Further, we found a significant negative correlation between number of PTEs and the total DTS score ($r = -.16, p = .013$); and specifically with the DTS subscales of absorption ($r = -.16, p = .012$), appraisal ($r = -.20, p = .001$), and regulation ($r = -.15, p = .012$). Thus, a greater number of PTEs related to greater distress tolerance difficulties (being absorbed by stressful events, difficulty in accepting distress, and coping ineffectively when experiencing negative affect). Results overall support the dose-response effect and prompt clinicians to comprehensively assess the number of PTEs and their impact to enhance the effectiveness of trauma-focused treatment.

Sanjna Prasad, Texas Academy of Mathematics and Science

Title: Effects of Thyroid Hormones on the Development of Endothermy in King Quail Hatchlings

Thyroid hormones are important for regulation of bird metabolism and development of endothermy in birds. We treated king quails in both hatchling and egg form with triiodothyronine (T3) to create hyperthyroidism in the birds. Then, we ran the treated birds in a metabolic chamber in order to calculate the metabolic rate of birds with hyperthyroidism. These calculations from the runs allowed us to see how hyperthyroidism affected the bird's development (i.e metabolism, breathing, hormone concentration in tissues, etc.) as they transitioned from egg to hatchling.

Yang Qi, Department of Electrical Engineering

Title: Field Programmable Gate Arrays Printed Circuit Board Design

While working on my undergraduate research project with Dr. Fu in the Department of Electrical Engineering at UNT, I conducted a design of Printed Circuit Board (PCB) for Field Programmable Gate Arrays (FPGA). Nowadays, the embedded systems are wildly implemented in people's life, such as the computer systems on vehicles, sensor networks, and wireless communication systems. As the core of embedded systems, microprocessors are widely used, and engineers are seeking microprocessors having faster processing speed, higher clock rate, lower power consumption, and better multitasking handling performance. Meanwhile, FPGA is the best choice as shown in the current industry and market. In addition, while developing embedded systems, engineers are bringing out a PCB design to have a solid circuit base. In this project, this PCB has been designed for the drone carried ACL platform, which is the latest wireless communication system that have been developing in Dr. Fu's lab to achieve the goal of implementation of FPGA in the system. In fact, the size of the PCB is regulated, so it can be placed in the ACL platform on the drone; since the drone may work in a bad weather, the reliability of the PCB in different environmental conditions is considered; and the electrical components in the embedded system is another important requirement being considered, such as Global Position System sensors, Electrical compass, antennas, and Nano station. Moreover, the actual performance of the PCB is the key of design, the processed signals don't have interferences with each other, the electrical nets don't have short or open connections, and power supply is stable and accurate on voltages. Above all, this project conducts a high-density PCB that is precise and reliable for the implementation of FPGA on embedded systems.

Ian Rapp and Olivia Jones, Department of Medical Laboratory Science

Title: Isolation, Purification, and Annotation of Diane, a *Streptomyces xanthochromogenes* Bacteriophage

This poster outlines the processes and results of the isolation, purification, and annotation of a novel bacteriophage. This data was acquired during the fall 2016 and spring 2017 semesters in accordance with the UNT SEA-PHAGES program. A soil sample was collected and then used to isolate a novel

phage, later named Diane. DNA was eventually extracted from a concentrated phage titer and the genome was locally sequenced. The genome was auto annotated using DNA Master and then manually reviewed using PECAAN, revealing 79 genes. 40 of these genes had recognizable functions. This research was supervised by Dr. Lee Hughes, Swapan Bhuiyan, and Sonya Layton.

Jesus Reyes, Department of Business Analytics
Title: Honors Students and E-book Acceptance

This poster presents findings of a survey about e-book acceptance that was distributed to Honors students in the Spring of 2017. Using constructs from the Technology Acceptance Model, we hope to better understand the acceptance of e-books by this group.

Michael Reyes, Department of Psychology
Title: Examination of Possible Variants of Psychopathy Their Association to Brain Abnormalities

Much research has been conducted on psychopathy yet there is so little consensus within the research community. I evaluate the idea of subtypes of psychopathy and attempt to find brain differences within subtypes in order to classify psychopathic individuals with more specificity.

Zoroliz Rivera, Integrative Studies
Title: EDM/ Rave Culture and Marxism

I look at six main components of Electronic Dance Music Culture and apply Marxism. The main components I looked at in detail are PLUR, the music and DJs, the clothing, festivals, drug use in raves, and flow arts. I look at each component and apply Marxism to it specifically to see if the subculture is actually as free as it proclaims itself to be, or if it deal with the same exploitative ideals, expressed in Marxism, as other mainstream cultures.

Andrew Robertson, Department Mechanical and Energy Engineering
Title: Processing and Analysis of PBAT-PCL Composite Foams.

The poster will explain the process used to form PBAT-PCL composite layered foams in addition to photographs from the microscopy done on composite foam. This will show the changes the composite undergoes when going through the foaming procedure. Furthermore, the poster will include Finite Element Analysis, performed through the ANSYS Software, showing the predicted mechanical properties the foam exhibits.

Lourdes Rodriguez, Department of Psychology
Title: Making a Biased Jury Decision: Psychosocial Influences in the Steven Avery Murder Case

The Netflix documentary *Making a Murderer* made national headlines by chronicling the conflict between Steven Avery and the Manitowoc County legal system. Due to the controversial nature of the case, this event was used to evaluate several variables that may influence judgment on decisions of a defendant's guilt or innocence. These proposed influential factors include demographic, perceptual, and psychosocial characteristics of the individual acting as a juror. The majority of participants rated Avery as innocent. Results support prior research suggesting that variables may influence jurors' judgments in murder trials.

Martha Ruvalcaba, Department Speech and Hearing Sciences

Title: Effects of Tetraethylammonium on Zebrafish Auditory Evoked Potentials

This poster tests the effects of tetraethylammonium on potassium channels in Zebrafish through Auditory Evoked Potentials.

Stephanie Samuel, Department of Biological Sciences

Title: Differential Temporal Activation of Oxy- and Deoxy-Hemodynamic Signals in Optical Imaging using Functional Near-Infrared Spectrometry

The purpose of this research is to study brain circuitry in the motor cortex to identify motor control. Each part of the cortex is involved in moving different parts of the body. By analyzing the prefrontal cortex, which is involved on executive function, through the recording of movement when undergoing a task related activity, the motor and prefrontal cortex appear to be activated. In this experiment we are honing in on the process in the decision making to move left or right. By analyzing how that decision making process passes onto the cortex to initiate the movement. The onset of movement is determined thru peaks of oxy and deoxyhemoglobin. An increase of oxygen extraction is seen when the blood volume drops, and is detected prior to movement.

Shaun Sanders, Department of Physics

Title: Thyroid Hormone Effects on Heart Growth in *Anas platyrhynchos domestica*

This poster describes the study on the genes involved in Pekin duck (*A. platyrhynchos*) heart growth. Its focus is on the role of hypothyroidism and whether the heart is increasing in size due to hyperplasia or hypertrophy.

Thomas Sanders, Texas Academy of Mathematics and Science

Title: Installation of a Van de Graaff Accelerator and Optimized Construction of Associated Beam Lines

Poster will summarize Summer 2016 efforts spent installing a Van de Graaff particle accelerator and building of an optimized beam line at UNT's Ion Beam Modification and Analysis Laboratory (IBMAL) under the guidance of Dr. Duncan Weathers, UNT Dept. of Physics.

Shelby Santoscoy, Department of Studio Art-Fibers

Faculty Mentor: Ms. Lesli Robertson, Department of Studio Art-Fibers

Title: The UNT Natural Dye Garden, Looking Forward

My poster will display the research I have done for the UNT Natural Dye Garden. I was part of a larger group applying for this scholarship, and I was in charge of creating recipes for a book we created for the Dye Garden. I will discuss my research and process of getting together old recipes as well as creating new ones. This research is important to the University because when the new art building is built we will have a book of history and recipes for the garden so that future students will have the information they need to continue to grow the garden and help the Fibers program.

Sarah Sarder, Department of Journalism

Title: Sexual Violence on College Campuses

This poster will demonstrate how UNT students perceive sexual violence, how it can affect individuals who are survivors, and what the university is doing to combat the problem. It will include research conducted at UNT on the topic, as well as personal accounts from survivors of sexual assault.

David Saul, Department of Biological Sciences

Title: A Microbial investigation of Brass Instruments

The purpose of this study was ultimately to see what type of things are lurking in one's instrument and to educate middle school band students about hygiene. **Methods:** Non-selective microbial swabbing was performed on three trombones and one trumpet belonging to a middle school band director. Two agar plates were swabbed for each of the instruments. One of the trombones (2016 Yamaha Xeno) had never been played before, while the other two trombones (1982 Bach 42B and 1989 Bach 12) and the trumpet (1930 King Cornet) had been played significantly over the years. The trumpet had not been cleaned for many years, and the two trombones that had been in use had only been cleaned a few months prior to swabbing. After swabbing each of the instruments, the agar plates were incubated at 38 degrees Celsius for five days. After incubation, the plates were then analyzed for microbial growth. **Results:** Moderate amounts of mold, Staphylococcal species, and microtoxins were found on the agar plate from the 2016 Yamaha Xeno trombone that had never been played before. On the plate swabbed from the 1930 King Cornet, mold, Staphylococcal species, and microtoxins were found, although there were only a few colonies present. The plate from the 1982 Bach 12 trombone also only had a small presence of Staphylococcal species and mold. The plate from the 1989 Bach 42B trombone contained the largest amount of microbial colonies and was completely covered with molds, Staphylococcal species, and microtoxins. **Conclusion:** Microbial species were ultimately found in all of the instruments tested. The agar plates from the instruments that had been played the most without being cleaned contained the largest amount of microbial growth. While it is common knowledge that microbes are present all around us, it is important understand that many of these pathogens are opportunistic and if they appear in concentrations that are too high then there is potential for serious health problems. In cases where musicians have fallen ill due to instrument hygiene problems, high concentrations of either microtoxins or fungal species were found in their instruments. Future research needs to be conducted to determine the proper protocol for how musicians can regularly sanitize their instruments in order to minimize the concentrations of harmful pathogens.

Gabby Segal, Department of Mathematics, Honors College

Title: Melanin Concentrating Hormone and its connection with Autism

Researchers identified differences in behavior and cognition between individuals with visible differences in melanin expression, including hair and iris color. Some of these differences associated with lighter and darker melanin expression (hypo- and hyper-pigmentation) parallel core behaviors present in Autism Spectrum Disorder (ASD), and researchers have recently reported a possible over-representation of darker melanin expression in a sample of children with ASD (Callahan & Swierczynski, 2016). Melanin Concentrating Hormone (MCH) could play a key role in explaining many of the unique behaviors present with ASD, including verbal and nonverbal communicative and social deficits, and repetitive and restrictive behaviors. MCH may also explain strong correlations previous research has presented in regards to ASD such as maternal weight, season of birth, depression and stress. We examine articles that detail the effects of MCH on the brain and body to determine a possible relationship between MCH and the core deficits of ASD, and discuss implications for future research

and therapeutic intervention.

Brandt Smith, Department of Biological Sciences

Title: Developmental Phenotypic Plasticity of Ventilatory Patterns and Metabolic Function of the American Alligators (*Alligator mississippiensis*)

In this study, we investigated the impact of developmental hypoxic on ventilation and metabolic function of America alligators two years post hatching. The poster shows preliminary data as collected thus far as well as our initial analysis.

Robert Smith, Department Mechanical and Energy Engineering

Title: Designing a Solar Thermoelectric Generator (STEG) Mk. II

Evolution of the STEG project introduced by mentor, Dr. Xiaohua Li, in the spring of 2016. The device was intended to be a low-cost, portable charging station for batteries like those powering remote sensors. Poster features comparison between the 2016 and 2017 devices (design changes, temperature, and voltage outputs) and plans for next stage of development.

Jewon Sohn, Texas Academy of Mathematics and Science

Title: Laser Engineering of Ti 6Al-4V Stent for Enhanced Blood Flow Kinetics

An innovative design and fabrication technique are conceived to speed up the blood flow, thereby preventing the sticking of the platelets to the stent wall and reducing the constriction of the stent. By laser-based physical texturing for geometric impressions of the inner surface, I expect to decrease the sticking of the platelets, extend the life time of the stent, and potentially prevent a revision bypass surgery.

Ajay Srinivasan, Texas Academy of Mathematics and Science

Title: Anti-Corrosive and Wear-Resistant Polymeric Coatings with Enhanced Adhesion to Metal Substrates

Metals are integral components in almost every structure, machine, or electrical device. They are valued for their conductivity and mechanical strength, but they are very susceptible to corrosion from acids or oxidation from the surrounding air. This corrosion makes metals brittle, causing them to malfunction. Chemical degradation can be mitigated by coating chemically inert polymers onto metallic surfaces, but the polymers that could serve such functions have low surface free energies, and do not adhere with metals. Therefore, the polymers must undergo treatment to activate their surfaces. However, traditional methods, such as flame treatment and corona treatment may be unsafe, expensive, and harmful to the strength of the polymers. The use of a coupling agent, Maleic Anhydride, has been investigated as a cheap, environmentally friendly, and easily implemented method of surface treatment to enhance the adhesion of polymer coatings while still maintaining mechanical properties. The grafting of maleic anhydride onto the tested polymers greatly improved their adhesion to their copper substrates. Before, grafting, the coatings exhibited no adhesion whatsoever, but after grafting, some coatings reached fracture strengths that rivaled cyanoacrylate super-glues. Furthermore, maleic anhydride grafting has little effect on the Young's Modulus of the polymers, and minimally increases the dynamic friction, unlike flame treatment, which tends to weaken treated materials. By implementing this new method of surface activation, new polymeric coatings have been developed that can prevent wear and mitigate the billions of dollars lost to metal corrosion yearly.

Chloe Standridge, Department of Biological Sciences

Title: Isolation and Characterization of *Streptomyces virginiae* Phage FinalStretch

Phage FinalStretch is the first novel phage isolated on *Streptomyces virginiae*. This poster is a presentation of the uniqueness phages offer to the scientific community, and the standard method by which Streptomyces bacteriophage are isolated.

Toluwani Taiwo, Texas Academy of Mathematics and Science

Faculty Mentor: Dr. Rebecca Dickstein, Department of Biological Sciences

Title: Phylogenetic Analysis of the UDP-Glycosyltransferase Gene Family in *Medicago Truncatula*

In this project, we used phylogenetic software to analyze the UDP-glucuronosyltransferases (UGTs) in the plant *Medicago truncatula*. UGTs are responsible for the joining of biological molecules like proteins and saccharides by catalyzing glycosidic bonds. Glycosyltransferases thus far have been characterized by structure resulting from similar conserved domains in the secondary and tertiary structures of these enzymes. We used *Medicago truncatula* as a model species because previous research projects involving *Medicago truncatula* have yet performed phylogenetic analysis this extensively. In addition, the organism has short growth periods, is easily cultivated, and is relatively simple in its genetic and protein mechanisms. We used 15 known and characterized UGT sequences from different plants (Table 1) to find novel UGTs based on sequence comparison and phylogenetic analysis. For further validation, PFAM domain search tool was employed to check the presence of unique UGT domains in the sequences. Protein domains are the features unique to a protein that are responsible for its function and role in an organism. By concluding that the sequences have very similar domains, we may speculate that the proteins have very similar structures, because sequence conformation of a protein determines its function. The phylogenetic study revealed the similarities of uncharacterized UGT sequences to previously characterized enzymes. We concluded that those closely related on the phylogenetic tree, must have very similar functions and specializations as UGTs. Thus, we created 7 groups based on clades that contained known UGT sequences and performed domain analysis of each group. A conclusionary domain analysis affirmed that the unknown UGT sequences have similar structures to the known UGTs in each of the 7 groups used in the phylogenetic analysis. In addition, we used multiple sequence alignment as a supplemental method for comparison to identify homologues amongst the sequences. Previous research has studied the pharmacological regulation via UGTs in the model mouse. A transgenic mouse with cancerous cells is given an anticancer drug to target cancerous cells; however, the anticancer drug that attacks the abnormal body cells, resides in the mouse for extensive periods. This is due to the inability of the drug to distinguish between cancerous cells and noncancerous cells. In the study, they used this model mice to analyze the efficiency of UGTs in attacking excess drug molecules by metabolism. Specifically they employed UGT85H2 from *Medicago truncatula* to perform the deactivation of the drug via glycosidic bond donation, but realized that its inactivation was inefficient. In our project, the goal is to identify another UGT that has similar attributes to UGT85H2, but is more efficient in drug deactivation. Phylogenetic analysis and sequence comparisons will lead to novel UGTs similar to known and characterized UGTs in *Medicago Truncatula* that can be further analyzed in molecular docking and wet-lab experiments.

Michael Thompson, Department Music Performance (Clarinet)

Title: A Case for Pranayama (Yoga Breathing) in Clarinetists' Breathing

A study of the varying aspects of a wind instrumentalist's breath as it pertains to playing the clarinet, and how these individual aspects may be trained through the use of exercises found in pranayama (yogic breathing).

Tyler Torgerson, Department of Materials Science and Engineering

Title: Self-Adaptive Friction Behavior and Thermal Stability of MoS₂-Sb₂O₃-C Coatings

MoS₂-Sb₂O₃-C is a composite coating used as a solid lubricant in satellite applications due to its self-adaptive properties. MoS₂ functions as the primary lubricant in vacuum and dry nitrogen environments, while amorphous carbon becomes the active lubricant in ambient and humid conditions. The friction behavior of the MoS₂-Sb₂O₃-C coating was tested at temperatures ranging from room temperature to 400°C using a high temperature tribometer. Coefficient of friction data collected from the tribometer showed as the temperature increased and water vapor was driven out, the coating's self-adaptive behavior occurred. Thermal cycling tests demonstrated that water vapor in the coating controlled the friction behavior, while at higher temperatures, a new tribochemical phase formed, effecting the sliding wear behavior. A correlation between the film's thermal stability and new tribochemical phases formed at higher temperatures was determined by SEM/EDS and Raman spectroscopy.

Dralia Tulley-Patton, Department of Computer Science

Title: Insider Threat Detection

This poster will be an overview of my research into the possibilities of using natural language processing, mouse movements, and possibly EEG activity to classify an insider threat. The research is in its early stages so there is not data from experimentation yet available for this poster.

Autumn Tyler, Department of Sociology

Faculty Mentor: Dr. Helen Potts, Department of Sociology

Title: Memes through a Sociological Lens

My poster is on optimism and pessimism predicting death anxiety among older adults. We gave 272 older adults living in independent retirement communities a survey. Two of the measures we included in the poster are the Life Orientation Test-Revised and the Multidimensional Fear of Death Scale. There are 3 hypothesis: optimism would predict death anxiety in a negative direction, pessimism would predict death anxiety in a positive direction, and gender and ethnicity would be associated with death anxiety. Results supported all 3 hypothesis, and suggest that given the inevitability of death, limiting negative expectancies (pessimism) is more salient than having positive expectancies (optimism).

Paxton Venable, Department of Sociology

Title: Campus Carry and Victimology

This study investigates being a previous victim of a sexual assault and supporting campus carry. H1: If a student identifies as a victim of sexual assault, he/she is less likely to support campus carry. H2: If someone a student knows has been a victim of a prior assault, he/she is less likely to support campus carry.

Gabriella Webster, Texas Academy of Mathematics and Science

Title: Identifying subcellular changes induced by a sugar-supplemented diet using *C. elegans*

Excessive calorie intake relative to expenditure and increasing consumption of added sugars in the U.S. have manifested in severe health conditions such as diabetes and obesity, resulting in hundreds of billions of dollars in medical costs, and hundreds of thousands of lives lost annually. The leading causes of death associated with both of these conditions are vascular, and investigating the molecular impact hyperglycemia and obesity have on organisms could provide insight as to why diabetic and obese

patients have compromised oxygen delivery. Using *Caenorhabditis elegans* as a genetic model system due to its ability to survive anoxia, I have determined that glucose, fructose, sucrose, and HFCS-50 supplemented diets result in increased lipid accumulation in N2 wild-type animals, determining such diets as obesity mimetics for use in future obesity research in the animal. Using hsp-4: GFP as a biomarker for ER stress, I have also determined that sugar-supplemented diets increase ER-UPR, a trademark ER stress response, which could explain why glucose and fructose fed animals lose the ability to survive anoxia. I have also discovered a metabolic difference between HFCS-50 and sucrose in *C. elegans*, contrary to popular belief that the two chemicals are metabolically the same.

Michelle Wen, Texas Academy of Mathematics and Science

Title: Dynamics of Dune Crestlines Revealed by Multi-Temporal Light Detection and Ranging (LiDAR) Data

Sand dunes are unique landforms on Earth and some other planets. Understanding how sand dunes form and change has long been an important research area for better understanding of the Earth and planetary surface processes. The development of geospatial technology has provided new tools for acquiring high-resolution elevation data for sand dune surfaces. My project focuses on investigating the dynamics of dune crestlines in the White Sands Dune Field in New Mexico using airborne light detection and ranging (LiDAR) data acquired on 1/24/2009, 9/26/2009, and 6/6/2010. This is a challenging project because traditional methods for crestline delineation are inaccurate and time-consuming since current digital image analysis methods cannot extract crestlines effectively. I ran a program developed by my mentor and analyzed data in a geographic information system (GIS). The idea is to use the 6/6/2010 slipface centerlines as a reference for detection and analysis of the 1/24/2009 and 9/26/2009 crestlines.

Alex Wu, Texas Academy of Mathematics and Science

Title: A Noninvasive Glucose Biosensor based on High Quality 2-D WS2 Nanoparticles for in situ Perspiration Analysis

Glucose is one of the most important molecules in the human body, and a lack or excess of glucose can be a serious threat to one's health. Therefore, the measurement of the body's glucose level remains an important issue in the medical community. However, there remain two important problems in the field of glucose sensors: the subpar electrical communication between the active site of the enzyme and the electrode and the development of a non-invasive sensor. The sensor I have constructed solves both of these problems by utilizing the electronic potential of 2D materials. The sensor demonstrated excellent sensing capabilities, detecting as low as 10mg/L of glucose. The sensor also provided reliable and accurate data, showing a proportional increase in the current for every increase in the glucose concentration from the current-voltage data. The poster details the fabrication methods use as well as the data and results obtained from electrical testing.

Tan Yan, Texas Academy of Mathematics and Science

Title: Wearable electroencephalography devices provides novel insight into real-time epileptic seizure detection and prediction methods

The inaccessibility of electroencephalography (EEG) service outside of hospitals is a major roadblock to epilepsy treatment. This investigation assessed the viability of using wireless EEG technology with an automated EEG analysis algorithm comprising of the Hilbert-Huang Transform (HHT) and a Support Vector Machine (SVM) developed using LabVIEW to detect and predict epileptic seizures.

Joshua Yarbrough, Department of Psychology

Title: Interpersonal Relationships in Prison Systems and their Effects after Release

My current research project is over interpersonal relationships in prison systems and the effects that those relationships have after an individual is released. I began working on my research project in the fall of 2016. Over the summer, I worked with my mentor to design a questionnaire for participants. After the summer, I began presenting my topic at academic conferences. I have also obtained permissions from another faculty member to use his measure for psychopathy when collecting data. I have contacted several community programs to find participants including local parole offices and outreach programs designed to aid individuals once they leave prison. I have also placed my survey materials on Amazon Mechanical Turk. My mentor and I are currently seeking institutional review board approval to begin collecting data.

Avery Young, Department of Materials Science and Engineering

Title: NiTiSn Shape Memory Alloy for Actuator in Deep Space Expandable Habitat

A new NiTiSn low temperature shape memory alloy (SMA) has been designed to be implemented as an actuator for a deep space expandable habitat. This material shows potential to: 1) reduce the mass and cost, 2) increase the reliability and functionality of actuation devices in deep space conditions. A semi-empirical approach was taken to determine the site preference of Sn in NiTi using both experiment data and density functional theory (DFT) atomistic modeling. The effects of Sn content, NiTi ratio, and precipitation strengthening on transformation temperature, phase composition, and mechanical properties in the NiTiSn SMA system are discussed.

Jennifer Zhang, Texas Academy of Mathematics and Science

Title: High Temperature Nano-mechanical Behavior of High Entropy Alloys for Advanced Jet Engine Applications

High entropy alloys (HEAs) represent a new paradigm in alloy design strategy involving multiple principal elements with applications ranging from jet engine turbine blades to advanced energy materials. The primary objective of this work was to determine mechanical behavior and creep of HEAs using advanced nano-indentation techniques. The creep rate at elevated temperatures and activation energy for creep was analyzed for these advanced structural alloys.

Daniel Zhong, Texas Academy of Mathematics and Science

Title: A Novel Investigation of Gecko Self-Cleaning Dynamics for the Development of Biomimetic Graphene-based Micromanipulators

The adhesive versatility of the gecko foot particularly of its setae and spatulae has long served as a point of interest for the scientific community, inspiring efforts to emulate the unique hierarchical, fibrillar structure of setae in the hopes of advancing contemporary adhesive material technology. This poster thus leads a novel investigation into the velocities and adhesive forces involved in setae-particle-substrate systems, reporting that the unique contact geometry of gecko spatulae creates adhesion forces that are independent of normal pull-off velocity. In the context of gecko movement, which employs normal pull-off velocity in hyperextension, this phenomenon interacts with the dependence of particle-substrate adhesion forces on normal pull-off velocity to dislodge micro/nanoscale particles from gecko feet, thus constituting the basis for the robust self-cleaning mechanisms found in geckos. This poster further details the utilization of the key interplay between spatulae contact geometry and normal pull-off velocity to develop tunable biomimetic micromanipulators. These micromanipulators, comprised of

synthetic microfibers bonded with wrinkled graphene multilayers, report high durability and reliability, demonstrating satisfactory precision in lifting, transporting, and depositing microparticles across a variety of surface substrates. The findings in this poster thus introduce highly efficient, novel self-cleaning mechanisms and micromanipulation methodologies, revolutionizing contemporary development of adhesive surfaces, smart/switchable surfaces, microelectromechanical systems, and various biomedical devices.