

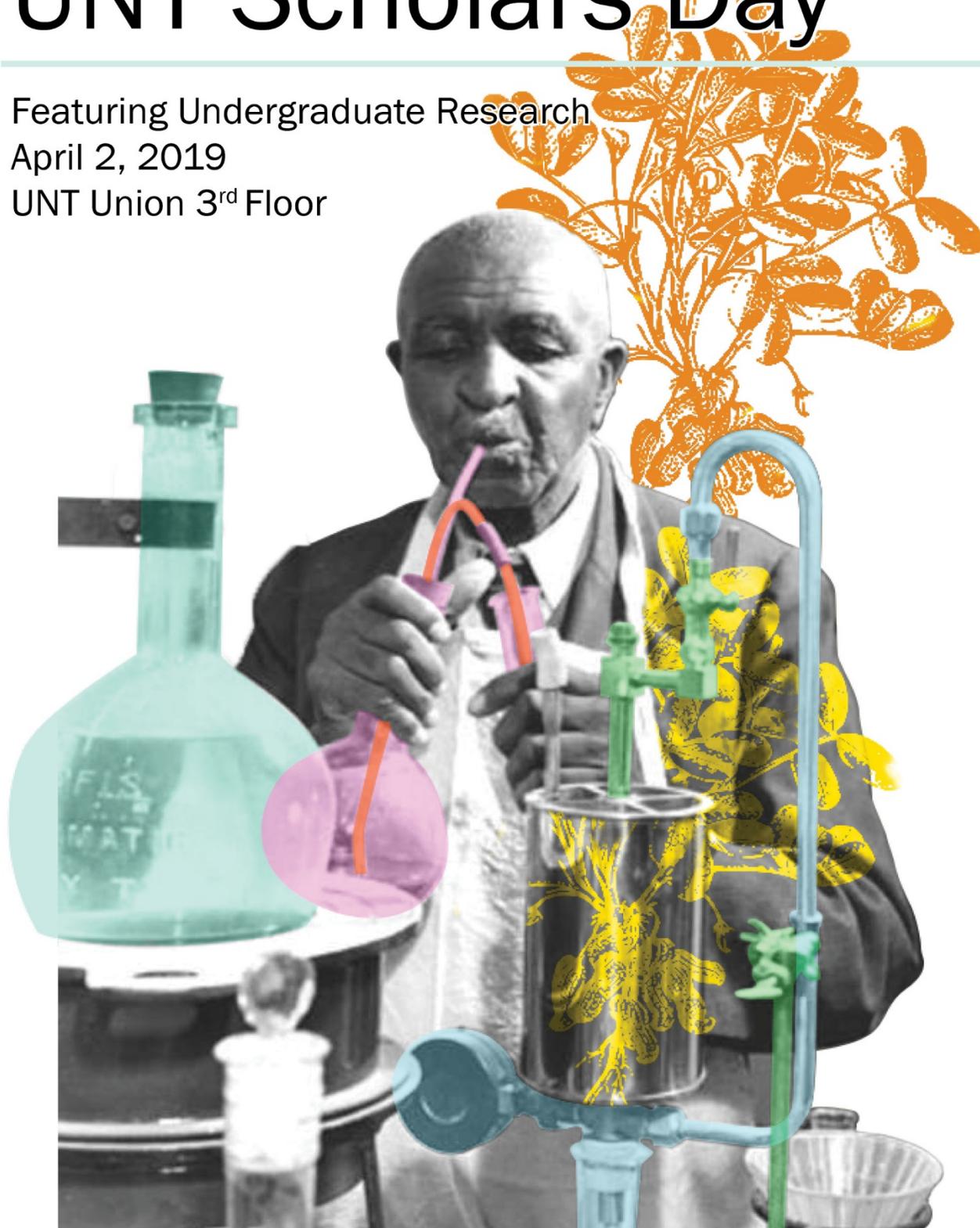
The Office of the Provost and Vice President & the Honors College present

UNT Scholars Day

Featuring Undergraduate Research

April 2, 2019

UNT Union 3rd Floor



When you do the common things in life in an uncommon way, you will command the attention of the world.

George Washington Carver, 1864-1943

**The Office of the Provost and
Vice President for Academic Affairs
&
The Honors College
welcome you
to
UNT SCHOLARS DAY
University Union, Third Floor
April 2, 2019**

9:00 a.m. – 3:30 p.m. Check-In
University Union Small Ballroom, 333, Lobby
University Union Large Ballroom, 314 Lobby (after 1pm)

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 – 9
12:30 – 1:45 p.m. Panels 10 – 13

1:00 – 2:30 p.m. Awards Competition Judging: Scholars Day Poster and Fine Arts Presentation,
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 Ballroom

Welcome: *Dr. Glênisson de Oliveira*, Dean, TAMS (Texas Academy of
Mathematics and Science) and the Honors College

Keynote Address: *Spencer Taylor*, Honors College

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

Mini iPad Giveaway: *Miranda Holland*, TAMS and the Honors College

UNT SCHOLARS DAY PLANNING COMMITTEE

Dr. Glênisson de Oliveira, Dean, TAMS and the Honors College
Dr. Rafe Major, Honors College
Dr. Tom Miles, Honors College
Dr. Jim Duban, TAMS and the Honors College
Dr. Eric Gruver, TAMS and the Honors College
Kelli Butler, Honors College
Megan Cunningham, Honors College
Rachel Dalton, TAMS
Diana Dunklau, TAMS and the Honors College
Miranda Holland, TAMS and the Honors College

UNT SCHOLARS DAY FACULTY MENTORS

Dr. William Acree
Chemistry

Dr. Warren Burggren
Biology

Katie Crowder
Linguistics

Dr. Ana Alonso
Biology

Jingya Cai
Biochemistry

Dr. Thomas Cundari
Chemistry

Dr. Patricia Cukor-Avila
Linguistics

Dr. Jara Carrington
Anthropology

Quincy Davis
Jazz Studies

Dr. Michael D. Barnett
Psychology

Dr. Lingqian Chang
Biomedical Engineering

Dornith Doherty
Studio Art

Dr. James Bednarz
Biology

Dr. Kent Chapman
Biology

Dr. Norman Dolch
Interdisciplinary Studies

Dr. Valarie Bell
Mayborn School of Journalism

Dr. Tae-Youl Choi
Mechanical and Energy
Engineering

Dr. James Duban
Honors College

Dr. Bethany Blackstone
Political Science

Dr. Oliver M. R. Chyan
Chemistry

Dr. Adam Dunstan
Anthropology

Dr. Heidemarie Blumenthal
Psychology

Dr. Ateka Contractor
Psychology

Christian Fagerlund
Drawing and Painting

Dr. Regina Branton
Political Science

Dr. Jannon Fuchs
Biology

Dr. Alexandra Ponette-Gonzalez
Geography

Casey Guillot
Biology

Dr. Andrew Harris
Theatre

Dr. Lisa Henry
Anthropology

Dr. David Hoeninghaus
Ecology

Dr. Joshua Hook
Psychology

Dr. Lee Hughes
Biochemistry

Dr. Raina Joines
English

Dr. Konstantia Kapetangianni
Linguistics

Krishna Kavi
Computer Science and
Engineering

Dr. Jeffry A. Kelber
Chemistry

Dr. James Kennedy
Biology

Dr. Irene Klaver
Philosophy

Dr. Irene J. Klaver
Integrative Studies

Dr. Karl Klose
Biology

Dr. Julie Leventhal
Human Development and
Family Science

Dr. Alexis Palmer
Linguistics

Dr. Amie Lund
Biology

Dr. Paul Marshall
Chemistry

Dave Meder
Jazz Studies

Dr. Gayatri Mehta
Electrical Engineering

Dr. Tom Miles
Honors College

Dr. Sharon Miller
Audiology & Speech-Language
Pathology

Dr. Ron Mittler
Biology

Dr. Saraju Mohanty
Computer Science and
Engineering

Dr. Amy Murrell
Psychology

Dr. John Murphy
Jazz Studies
Nooshin Mirza Nasiri
Chemistry

Dr. Craig Neumann
Psychology

Dr. Rodney Nielsen
Computer Science and
Engineering

Dr. Yolanda Niemann
Psychology

Dr. Ryan Olson
Kinesiology

Dr. Mohammad Omary
Chemistry

Dr. Lisa Owen
Art History

Dr. Pamela Padilla
Biology

Dr. Alexis Palmer
Information Science

Jose Perez
Physics

Jennifer Porst
Media Arts

Dr. Victor Prybutok
Biomedical Engineering &
Psychology

Dr. Javier Rodriguez
English

Dr. Dorian Roehrs
Linguistics

Dr. Douglas Root
Biology

Dr. Anthony Ryals
Psychology

Dr. Brian Sauser
Marketing, Logistics, &
Operations Management

Dr. David Bard-Schwarz
Music Theory and Composition

Dr. Vladimir Shulaev
Biology

Dr. Andrea Silva
Political Science

Dr. Denise Perry Simmons
Chemistry

Dr. Danica Slavish
Psychology

Dr. Nancy Spears
Marketing

Dr. Daniel J. Taylor
Psychology

Dr. Andrew Torget
History

Dr. Jeanne Tunks
Teacher Education and
Administration

Dr. Manish Vaidya
Behavior Analysis & Audiology
and Speech Language Pathology

Dr. Guido Verbeck
Chemistry

Dr. Andrey Voevodin
Materials Science and
Engineering

Dr. Chiachih D.C. Wang
Psychology

Dr. Xuexia Wang
Mathematics

Hannah Wash
Psychology

Dr. Wendy Watson
Political Science

Dr. Duncal Weathers
Mechanical and Energy
Engineering

Dr. Gary R. Webb
Emergency Administration and
Planning

Malinda Wilson
Psychology

Dr. Yong Yang
Biomedical Engineering

Dr. Marcus Young
Materials Science and
Engineering

Dr. Elyse Zavar
Emergency Administration &
Planning

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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. Narendra Dahotre, Interim Vice President for the Office of Research and Innovation at UNT, are pleased to announce funding for awards to undergraduate students with the best papers and posters presented at University Scholars Day 2019.

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.

**SPENCER TAYLOR,
MATERIALS SCIENCE AND ENGINEERING, 2019**

KEYNOTE SPEAKER

Spencer Taylor is from Katy, Texas, and will graduate in spring 2019 with a degree in Materials Science and Engineering and a minor in Mathematics. He completed his senior design project in spring 2018, in which his group designed a process to coat a biocompatible titanium alloy with bioactive glass for use in implants, and he has performed structural metals research with Dr. Sundeep Mukherjee on laser welding of aluminum and steel. Outside of the classroom and lab, Spencer plays Super Smash Bros. Melee competitively and was formerly ranked top 15 in Texas. He is also active in UNT's Quiz Bowl Club and enjoys various intramural sports. In the fall, he will be attending the University of Michigan to pursue a Ph.D. in materials science with the hopes of becoming a professor in the future.

UNT SCHOLARS DAY 2019

APRIL 2, 2019

PANEL PRESENTATION SCHEDULE

SESSION 1: Psychology

9:30-10:45 Union 333A

Chair: Dr. Valarie Bell, Mayborn School of Journalism

Christina Cantu, Department of Psychology

Faculty Mentor: Dr. Michael Barnett, Department of Psychology

Paper Title: Multidimensional Emotion Regulation Strategies Among Hospice Nurses

Fre'Dasia Daniels, Department of Psychology

Faculty Mentor: Dr. Valarie Bell, Mayborn School of Journalism

Paper Title: Exploring the Motivations Behind Social Media Use; A Study on Intrinsic and Extrinsic Motives

QuaDreon Miller, Department of Psychology

Faculty Mentor: Dr. Yolanda Flores-Niemann, Department of Psychology

Paper Title: Ethnic Identity and Educational Outcomes in African American College Students

Abigail Rasmussen, Department of Psychology

Faculty Mentor: Dr. Tom Miles, Honors College

Paper Title: A Paradigm Shift in Schizophrenia

SESSION 2: Public Health and Biomedical Research

9:30-10:45 Union 333B

Chair: Dr. Tom Miles, Honors College

Hannah Asis, Department of Public Health

Faculty Mentor: Dr. Tom Miles, Honors College

Paper Title: Are Minority U.S. Citizens Adequately Protected under 'Trafficking Victims Protection Reauthorization Act of 2013' When Compared to their International and White Counterparts?

Bunyong Dejanipont, Department of Biomedical Engineering

Faculty Mentor: Dr. Victor Prybutok,

Paper Title: A Structural Equation Model of Stress, Mental Health, and Coping among Aging Lesbians and Gay Men

Aima Ovia, Department of Biomedical Engineering
Faculty Mentor: Dr. Tom Miles, Honors College
Paper Title: The Bionic Eye: Can Human Vision Be Fully Restored?

SESSION 3: Emergency Management

9:30-10:45 Union 333C

Chair: Dr. Elyse Zavar, Emergency Administration & Planning

Isabelle Dominguez, Department of Political Science
Faculty Mentor: Dr. Andrea Silva, Department of Political Science
Paper Title: Vulnerable Populations in Disaster-Stricken Areas: A Literature Review

Graham Huether, Department of Emergency Administration and Planning
Faculty Mentor: Dr. Gary R. Webb, Department of Emergency Administration and Planning
Paper Title: Social Capital and Tornado Resilience among International Students

Stephanie Ray, Emergency Administration & Planning
Faculty Mentor: Dr. Elyse Zavar, Emergency Administration & Planning
Paper Title: Commemoration on Foot: Identities and Motivations of Joplin Memorial Runners

SESSION 4: Information Session, College of Science-Corporate Advisory Board

9:30-10:45 Union 382A

SESSION 5: Linguistics

9:30-10:45 Union 382B

Chair: Dr. James Duban, Honors College

Georgina Herrera, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Paper Title: The Use of Code Switching of Latino Instagram Influencers

Ashley Manis, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Paper Title: Language and Advertising in Competing Businesses

Vanessa Marlo, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Paper Title: The Meaning of Twitter Slang used by BTS Fans

SESSION 6: Linguistics

11:00-12:15 Union 333A

Chair: Dr. Konstantia Kapetangianni and Dr. Alexis Palmer, Department of Linguistics

Kristen Acker, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Paper Title: The Functions of Self-Reference Pronouns in Hitler's Speeches

Hannah Rolon, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics
Paper Title: Remaining Static in Dynamic Spaces: A Study of Khmer Language Practice in Facebook Comments

Wesley Scivetti, Department of Linguistics
Faculty Mentor: Dr. Alexis Palmer, Department of Linguistics
Paper Title: Analyzing Corporal Evidence of English Phonesthemes

SESSION 7: English and History

11:00-12:15 Union 333B

Chair: Dr. James Duban, Honors College

Kaitlyn Brown, Department of English
Faculty Mentor: Dr. Javier Rodriguez
Paper Title: Phi People and Frankenstein's Monster as Mirrors for Their Creators

Javal Coleman, Department of History
Faculty Mentor: Dr. Andrew Torget, Department of History
Paper Title: A Texas Nightmare: Compromise of 1850

Harrison Geosits, Department of English
Faculty Mentor: Ms. Raina Joines, Department of English
Paper Title: Gaze

Connor McCain, Department of History
Faculty Mentor: Dr. Jim Duban, The Honors College
Paper Title: "Unenthusiastic" Proselytization: The Unitarian Effort to Merge National Identity and Religion

SESSION 8: Art History

11:00-12:15 Union 333C

Chair: Dr. Lisa Owen, Department of Art Education and Art History

Phoebe Adams, Department of Art Education and Art History
Faculty Mentor: Dr. Lisa Owen, Department of Art Education and Art History
Paper Title: Cotton Textiles as Symbolic of Labor by the Oppressed Person

Claudia Eisermann, Department of Art Education and Art History
Faculty Mentor: Dr. Lisa Owen, Department of Art Education and Art History
Paper Title: The Earthly Paradise- Re-examining the Gardens at the Taj Mahal

SESSION 9: Information Session, College of Science-Corporate Advisory Board

11:00-12:15 Union 382A

SESSION 10: Linguistics

11:00-12:15 Union 382B

Chair: Ms. Katie Crowder, Department of Linguistics

Yoko Esaki, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: ADHD and Metaphors: Blogs

Georgina Fullerton, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: Linguistic Features Within the Server Persona

Brittany Hoffman, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: Social Appropriateness of Terms of Endearment in American English

SESSION 11: Business, Management, and Logistics

12:30-1:45 Union 333A

Chair: Dr. Norman Dolch, Department of Non-Profit Studies

Alyceson-Grace Eke, Department of Business Economics

Faculty Mentor: Dr. Tom Miles, Honors College

Paper Title: How Personality Increases Chances of Impulse Spending

Cesar Baltazar, Department of Marketing, Logistics and Operations Management

Faculty Mentors: Dr. Nancy Spears and Dr. Brian Sauser, Department of Marketing, Logistics and Operations Management

Paper Title: The Relationship between Online Pre-Purchase Decision Making and the Return Supply Chain

Melinda Sapaugh, Integrative Studies

Faculty Mentor: Dr. Norman Dolch, Department of Non-Profit Studies

Paper Title: Assessment of Nonprofit Organization Financial Experiences

SESSION 12: Education

12:30-1:45 Union 333B

Chair: Dr. Tom Miles, Honors College

Miriam Copeland, Department of Music Performance

Faculty Mentor: Dr. Tom Miles, Honors College

Paper Title: The Mediating Effects of Music Programs on Impoverished Students

Jenil Rana, Department of Biological Sciences

Faculty Mentor: Dr. Tom Miles, Honors College

Paper Title: Can the Combination of Rote Learning and Critical Thinking Improve Student Cognition?

Sarah Reynolds, Interdisciplinary Studies and College of Education
Faculty Mentor: Dr. Jeanne Tunks, College of Education
Paper Title: Experiential Learning in an International Teacher-to-Teacher Exchange Program

SESSION 13: Social and Environmental Ecology

12:30-1:15 Union 333C

Chair: Dr. Irene Klaver, Department of Philosophy and Religion

Riley Hamilton, Integrative Studies

Faculty Mentor: Dr. Irene Klaver, Department of Philosophy and Religion

Paper Title: Environmental Injustice Flowing into the Trinity River and Beyond

Em Hudson, Department of Philosophy and Religion

Faculty Mentor: Dr. Irene Klaver, Department of Philosophy and Religion

Paper Title: Recognizing Misogyny: Sexual Violence Against Asian Women in the United States

SESSION 14: Information Session, College of Science-Corporate Advisory Board

12:30-1:45 Union 382A

SESSION 15: Music

12:30-1:45 Union 382B

Chair: Dr. John Murphy, Division of Jazz Studies

Sean Lynch, Department of Music Performance

Faculty Mentor: Mr. Quincy Davis, Department of Music Performance

Paper Title: The Innovation of Rhythmic Accompaniment by Max Roach

Samuel Miyashita, Department of Music History, Theory and Ethnomusicology

Faculty Mentor: Dr. David Bard-Schwarz, Department of Music History, Theory and Ethnomusicology

Paper Title: The Role of Parataxis in Schoenberg's Erwartung Op. 17 from a Lacanian Perspective

Tanakrit Tongnopnua, Department of Jazz Studies

Faculty Mentors: Dr. John Murphy and Dr. Dave Meder, Division of Jazz Studies

Paper Title: The Connection between Modern Jazz Piano style and Bebop Piano

SESSION 16: Linguistics

2:00-3:15 Union 333A

Chair: Dr. Konstantia Kapetangianni, Department of Linguistics

Joshua Acosta, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: Criminalizing Mexican Immigrants: A Critical Analysis of Donald Trump's Twitter Rhetoric

Breanna Cozart, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: Detecting Machine Translation Use by Japanese as a Foreign Language Students

Amayrani Montoya-Salgado, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: Language Discrimination by Twitter Accounts

Jennifer Ragan, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: Grammaticality Judgements of Article Usage in L2 English by L1

Arabic Speakers

SESSION 17: Linguistics

2:00-3:15, Union 333B

Chair: Dr. Patricia Cukor-Avila, Department of Linguistics

Ashley Balcazar, Department of Linguistics

Faculty Mentor: Dr. Patricia Cukor-Avila, Department of Linguistics

Paper Title: The Passive Side of Sexual Violence: A Linguistic Analysis of ICTY “Landmark Cases”

Erin Killian, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: Keysmash as a Global Language and Social Construct

Ciaran McCormick, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni, Department of Linguistics

Paper Title: Lowland Zone Celtic Grammatical Influence in Old English

SESSION 18: Visual Arts

2:00-3:15 Union 333C

Chair: Dr. Andy Harris, Department of Dance and Theater and Ms. Dornith Doherty, Department of Photography and Ceramics

Julie Do, Department of Drawing and Painting

Faculty Mentor: Mr. Christian Fagerlund, Department of Drawing and Painting

Paper Title: A Self-Analysis of My Artistic Journey: Passions and Introspections

Anna Lee, Department of Photography and Ceramics

Faculty Mentor: Ms. Dornith Doherty, Department of Photography and Ceramics

Paper Title: Feathers as Monitors of Particulate Carbon Air Pollution

Tanner Smithson, Department of Dance and Theater

Faculty Mentor: Dr. Andy Harris, Department of Dance and Theater

Paper Title: The Broadway New Deal: Commercial Enhancements and the Non-Profit Sector

SESSION 19: Information Session, College of Science-Corporate Advisory Board
2:00-3:15 Union 382A

SESSION 20: Chemistry

2:00-3:15 Union 382B

Chair: Dr. Denise Perry Simmons, Department of Chemistry

Connie Hu, Texas Academy of Mathematics and Science

Faculty Mentor: Nooshin Mirza Nasiri, Department of Chemistry

Paper Title: In-house Synthesized Novel Gold Nanoparticles Stabilized in Bovine Serum Albumin: Characterization using DLS and Zeta Potential

Eunyoung Kim, Texas Academy of Mathematics and Science

Faculty Mentor: Denise Perry Simmons, Department of Chemistry

Paper Title: Photothermal Efficiency of Silver Nanoparticles in Three-Dimensional Tissue Models

ABSTRACTS FOR PANEL SESSIONS

Kristen Acker, Department of Linguistics, Honors College

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: The Functions of Self-Reference Pronouns in Hitler's Speeches

This study focuses on the functions of self-reference pronouns like I and me in Hitler's speeches. Previous research has shown through quantitative analysis that Hitler's use of self-reference pronouns increased significantly over his career (Robinson & Topping, 2013). However, that research did not examine the functions these pronouns play over time or in the context of power. This study examines the functions of Hitler's self-reference pronouns over time and in the context of power using qualitative analysis. First, his career is split into three stages: early, mid, and late career. In order to analyze Hitler's speeches over time, the researcher analyzes five speeches within each career stage. Each sentence containing a self-reference pronoun is removed from the environment. Then, the self-reference pronoun is coded according to its function. Coding is based on the function that the self-reference pronoun plays in the sentence and the immediate context of the speech while taking into consideration the speech as a whole. The functions of the self-reference pronouns are analyzed through Critical Discourse Analysis (CDA). Historical context is provided for individual speeches when possible to study the speeches in the context of power. This knowledge contributes to the understanding of the roles that self-reference pronouns can perform within political discourse over time, as well as if these roles change substantially with power changes.

Joshua Acosta, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: Criminalizing Mexican Immigrants: A Critical Analysis of Donald Trump's Twitter Rhetoric

This study critically analyzed President Donald Trump's use of rhetoric on Twitter when speaking about immigration issues, specifically about immigrants from Mexico, a country that President Trump has notoriously spoken poorly about. Trump's online rhetoric is important to analyze because it has created what Kristina Piksar calls the "Trump Effect," wherein political opinions are divided not based solely on political beliefs but on opinions of Trump himself (Piksar 2018). This study explored over 650 tweets—specifically referencing to "immigrants," "Mexicans," or "illegals," among other terms—from the beginning of President Trump's term in office and carefully looked at his language use, specifically his word choice, sentence construction, and use of derogatory terms (criminals, rapists, etc.). This study applied Critical Discourse Theory to discover how and why President Trump uses certain tokens and turns of phrase, the authoritative quality of his rhetoric, and how the public is influenced by and responds to his language use. Using Twitter as a platform, this study also discovered how the online public actively and critically reacted to President Trump's tweets on the immigration issues. Through the use of hashtags, this study grouped Twitter users based on their reactivity to President Trump's tweets, for example, under #NotMyPresident, many users actively voice their disdain and disapproval for not only Trump's core messages, but the language he uses to deliver them to the public. This study will help to enlighten the general public on how influential language can be, especially when it is used by a person of such power as the Commander-in-chief of the United States, a global superpower. By becoming aware of the influence possible through language, the public can be wiser of believing everything they read online and can be more selective of where they place their trust.

Phoebe Adams, Department of Art History

Faculty Mentor: Dr. Lisa Owen

Title: Cotton Textiles as Symbolic of Labor by the Oppressed Person

This paper explores textile production, particularly of quilts, in communities shaped by colonialism and imperialism. A study of objects created by colonized communities is inherently tied to forced labor as a means of production. By examining quilts with ethnography as a method, we are forced to encounter our own presupposed notions of how colonization continues to impact creative communities and the history of art as a whole.

My argument for ethnography as a method stems from the necessity to partake in field research when studying textiles, which has been traditionally underused by art historians. While the quilts presented in my case study are visually different, they both represent unique and vibrant textile traditions flourishing despite oppressive labor practices. This argument provides examples of how textile objects hold global meaning, and can provide us with better understanding of people of all races, ethnicities, classes, and etc.

The conclusion reached by this case study calls for art historians to consider additional context when studying artisan objects. By tracing these objects' functions, maker biographies, and popularity across time and geography, art historians can find new understanding of art communities that have been underserved by academia.

Understanding the oppressive labor strategies that shaped the creation of these textile objects is also important in our current study of labor in the textile industries because it documents our historical lack of empathy towards those working in domestic spaces. Studying these objects with ethnographic methods can help foster that empathy, while additionally healing and re-interpreting an art historical method that has historically been harmful to our understanding of non-white peoples.

Hannah Asis, Department of Public Health, Honors College

Faculty Mentor: Dr. Tom Miles

Title: Are Minority U.S. citizens adequately protected under the Trafficking Victims Protection Act when compare

The phrase 'Sex Trafficking' often provokes images of foreign women being smuggled into the U.S and coerced into the sex industry by means of deceit, force, and/or fraud. While it is true that foreign individuals are vulnerable to sex-trafficking, it is important for policymakers and public health officials to be attuned to the susceptibilities facing American youth, particularly minority communities. The relentless grip of sexual exploitation facilitated by pimps, American conceptions, and law enforcement's weak understanding of commercially and sexually-exploited-youth engenders a cyclical life of incarceration and halted social mobility among Americans indoctrinated into the sex industry as children. I explore the inception of the Trafficking Victims Protection Act (TVPA) to determine whether or not its international aspirations are being met on the act's very own home front. In addition, I analyze FBI prostitution and arrest trends that reveal unequal protection between white and minority youth. Although the TVPA has improved reduced the arrest disparities, substantial work to close the victimization gap between white and minority commercially- and sexually-exploited youth remains.

Ashley Balcazar, Department of Linguistics, Undergraduate Research Fellowship

Faculty Mentor: Dr. Patricia Cukor-Avila

Title: The Passive Side of Sexual Violence: A Linguistic Analysis of ICTY "Landmark Cases"

This study analyzes data from an in-depth case study that investigates the language used to describe and discuss sexual violence in war crime tribunals. The data come from trial judgment summaries from the five International

Criminal Tribunal for the Former Yugoslavia (ICTY) “Landmark Cases” in which senior Serb officials were found guilty of war crimes and crimes against humanity committed in Kosovo in the 1990s (UNICTY, 2018). These cases are significant because their trials constitute the first time that wartime sexual violence would be prosecuted on an international stage. Due to the international implications of the ICTY, the language characterizing rape and sexual violence in these documents is of particular interest.

The present analysis reports on the use of passives in the trial judgment summaries of all five ICTY “Landmark Cases.” We posit that the use of a truncated passive, which lacks an overt by-phrase, has the effect of diminishing the culpability of the perpetrator while subtly re-assigning some measure of responsibility to the survivor. In phrases such as “the woman was raped,” the exclusion of the by-phrase renders the rapist an absent referent. The woman, who is the object of the perpetrator’s act of rape, has moved to the subject position, falsely conveying a sense of agency on her part. A preliminary analysis of the Kunarac et al. Judgment Summary (Author; Kunarac et al., 2001) reveals that 80% of passive constructions do not have an overt by-phrase, and when by-phrases do occur, they indirectly refer to the accused, i.e., “one of the accused” or as the “soldiers in the armed forces” which downplays the role of the agent (cf. Cameron, 2015; Erlich, 2001; Bohner, 2001). These findings suggest that linguistic choices collude to downplay the role of the accused in these written reports of rape and sexual violence.

Bohner, G. (2001). Writing about rape: Use of the passive voice and other distancing text features as an expression of perceived responsibility of the victim. *British Journal of Psychology*, 40, 515-529.

Cameron, D. (2015, November 29). Passive aggressive [Blog post]. Retrieved from <https://debuk.wordpress.com/tag/passive-voice/>

Erlich, S. (2001). *Representing Rape: Language and Sexual Consent*. London: Routledge.

Kunarac et al. (2001). *Judgement of Trial Chamber II in the Kunarac, Kovač, and Vuković Case*.

Retrieved from http://www.icty.org/x/cases/kunarac/tjug/en/010222_Kunarac_Kovac_Vukovic_summary_en.pdf

UNICTY. (2018). Landmark Cases. Retrieved from <http://www.icty.org/en/features/crimes-sexual-violence/landmark-cases>

Cesar Baltazar, Department of Marketing, McNair Scholar Program

Faculty Mentor: Dr. Nancy Spears and Dr. Brian Sauser

Title: Relationship Between Online Pre-Purchase Decision Making and the Return Supply Chain

This study investigates the relationship between inverse logistics and the different types of information cues that consumers use to make judgments about online products (i.e., price, shipping, reviews, etc.). In fact, the examination of this study will be divided into the consumers whose behavior is led by short-term impulse purchasing intentions and those of a long-term purchasing behavior. Furthermore, an online survey served as instrument to test the hypotheses developed in the study. This survey consisted of questions targeted to answer consumers satisfaction levels of their online purchases based on the different information cues—which are defined in a typology—and their product dissatisfaction. The expected results will indicate that consumers who purchase online products through impulsivity tend to be more involved in the return supply chain; in contrast, consumers who purchase through intentionality tend to be less involved in the return supply chain. Ultimately, this study will have academic and practical applications for marketers and business companies to make more effective strategic decisions compatible with consumers’ preferences and characteristics.

Kaitlyn Brown, Department of English, Honors College

Faculty Mentor: Dr. Javier Rodriguez

Title: “Phi People and Frankenstein’s Monster as Mirrors for Their Creators”

I will be discussing the parallels between Kris Kelvin in *Solaris* by Stanislaw Lem and Victor Frankenstein in Mary Shelly's *Frankenstein*, including how they both act as creators for sub-human beings. I will discuss how their creation of these cyborg like beings affects the cyborgs and in turn affects Kelvin and Victor Frankenstein as the creators who explored areas way beyond their understanding.

Christina Cantu, Department of Psychology, Undergraduate Research Fellowship

Faculty Mentor: Dr. Michael D. Barnett

Title: Multidimensional Emotion Regulation Strategies Among Hospice Nurses

The purpose of this study was to investigate relationships between four emotion regulation strategies (intrinsic affect-improving, intrinsic affect-worsening, extrinsic affect-improving, and extrinsic affect-worsening) and compassion fatigue, job satisfaction, and life satisfaction among 90 hospice nurses who completed an online survey. Intrinsic affect-improving was associated with higher life satisfaction. Intrinsic affect-worsening was associated with higher compassion fatigue and lower life satisfaction. Extrinsic affect-worsening was associated with lower job satisfaction. Overall, these findings support a multidimensional approach to understanding emotion regulation among hospice nurses.

Javal Coleman, Department of History, McNair Scholar Program

Faculty Mentor: Dr. Andrew J. Torget

Title: A Texas Nightmare: The Compromise of 1850

This is a paper based on research on the Compromise of 1850, and how the Democrats in Texas reacted to it, and how it shaped U.S. political issues that led into the Civil War. The Democrats were not satisfied with the Compromise of 1850, and they were willing to resist, and eventually fight over the protection of what they saw as their states rights. That is the freedom to hold on to their slaves.

Javal Coleman, Department of History, Undergraduate Research Fellowship

Faculty Mentor: Dr. Andrew J. Torget

Title: A Texas Nightmare: Compromise of 1850

Examination of the Compromise of 1850 and how it shaped the ideology of the Democrats in Texas leading up to the Civil War.

Miriam Copeland, Department of Music, Honors College

Faculty Mentor: Dr. Tom Miles

Title: The Mediating Effects of Music Programs on Impoverished Students

Children who grow up in impoverished America face more challenges than their affluent peers. These struggles cause a discrepancy in the academic achievement, behavior, and psychological state of affluent children versus impoverished children. Such prevalent discrepancies provoke the question, what are the positive benefits in regards to education, behavior, and psychology that a strong music program has on the students in an

impoverished school? Previous research indicates that students in music education programs show behavioral improvements, increases in cognitive development, and a better ability to cope with their emotional struggles. In this research I will focus specifically on the academic achievement benefits of music programs by evaluating the test scores of students in schools with strong music programs. Findings conclude that music education does have a positive impact on the academic achievement of students. Due to the conclusion that music education provides benefits for the students who partake in it, which directly combat the negative impacts of poverty, emphasis should be given to the growth of more high quality music programs within the public education system.

Breanna Cozart, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: Detecting Machine Translation Use by Japanese as a Foreign Language Students

Detecting Machine Translation Use by Japanese as a Foreign Language Students

Detecting and preventing the undisclosed use of machine-translation (MT) software by students is an issue for many foreign language (FL) teachers. Previous research has found that plagiarism policies do not prevent MT use (Steding, 2009). Studies have also shown that incorrect usage of MT by beginner level students is harmful to FL acquisition because they do not understand the common mistakes that MT software makes (Darancik, 2016). To examine these claims, we are asking, “Can Japanese FL teachers accurately determine if a Japanese FL student has used Google Translate as reference for writing assignments?” and, “What mistakes or features are commonly found in Japanese FL student writings when translation software is used for reference vs. traditional references such as textbooks and dictionaries?” This research will examine how students use MT, what type of errors they are most likely to accept from MT, and whether instructors can detect whether or not Google Translate has been used. 10 UNT JAPN 2040 students will be tasked with providing a typed essay in Japanese, describing future plans, in which they have used only traditional references, a textbook and dictionary, or only Google Translate. The students will highlight in their written sample to indicate which parts of their sentences were produced using either their textbook or Google Translate. This data will be analyzed for errors and compared. This research will provide a valuable look at real world MT application in the FL classroom. Educating students about the shortcomings of MT within the scope of their current level of FL learning can raise linguistic awareness of the target language and deter students from using MT to complete assignments.

Fre'Dasia Daniels, Department of Psychology, McNair Scholar Program

Faculty Mentor: Dr. Valarie Bell

Title: Exploring the Motivations Behind Social Media Use; study on intrinsic and extrinsic motives

Social media has become a universal concept that people of all ages, from many cultures, are participating in. Since social media is a fairly new researchable construct that is rapidly evolving, there is an increased need for more research within this field. Although intrinsic and extrinsic motivation have been studied in multiple aspects, this study will be examining motivation in regards to individual's preferences and their intensity of social media use. It is predicted that the type of social media platform preferred, will help to indicate whether an individual is more likely to be intrinsically or extrinsically motivated. It is also predicted that social media platforms will attract more extrinsically motivated individuals than intrinsically motivated individuals. It is predicted that the type of social media platform preferred will help to indicate whether an individual is more likely to be intrinsically or extrinsically motivated. It is also predicted that social media platforms will attract more extrinsically motivated individuals than intrinsically motivated individuals. We hope to find a significant relationship between extrinsic motivations across all three platforms.

Bunyong Dejanipont, Department of Biomedical Engineering & Psychology, Undergraduate Research Fellowship

Faculty Mentor: Dr. Victor Prybutok

Title: A Structural Equation Model of Stress, Mental Health, and Coping among Aging Lesbians and Gay Men

Adverse mental health outcomes, including poor quality of life, depression, and anxiety, are more prevalent among sexual minorities because of additional stressors that are unique to these minority group members. Nevertheless, according to Meyer's (2003) minority stress model, adaptive coping resources, such as resilience, social support, and forgiveness, may buffer the negative effects of stressors on psychological wellbeing. However, little research that examines coping resources among older sexual minorities exists despite evidence that suggests older sexual minorities may cope differently from heterosexuals and, importantly, younger sexual minorities. Moreover, fewer studies attempt to examine the minority stress model by using various indicator measures to model each factor in the model.

To address the health disparity among older sexual minorities and provide research evidence for intervention and prevention, we posit and test a model that addresses the moderating role of adaptive coping on stressors and mental health of lesbians and gay men over the age of 50 (LG50+). The model is tested using partial least squares (PLS) structural equation modeling. Participants (n = 100) who were over the age of 50, and self-identified as lesbians or gay men were recruited in the Dallas/Fort Worth metropolitan area. Results suggest that adaptive coping resources moderate the relationship between perceived stress and negative mental health outcomes. Particularly, LG50+ who display high levels of adaptive coping resources are less likely to experience adverse mental health even in the presence of perceived stress. While our findings support Meyer's minority model, they also provide a new model perspective by summarizing adaptive coping resources and negative mental health outcomes through a combination of sub dimensions that reduces measurement error. Thus, the model supports the contention that intervention and prevention that focus on establishing and improving resilience, social support, and forgiveness help LG50+ cope with a wide range of stressors.

Julie Do, Department of Drawing and Painting, Honors College

Faculty Mentor: Christian Fagerlund

Title: A Self-Analysis of My Artistic Journey: Passions and Introspections

My research topic is essentially an extended artist statement, specifically how other artists have impacted my artistic development and what my objectives in art are. This project relies on personal introspection to recognize what I revere about these set of artists. In this paper, I will examine a variety of literature behind the artists that I draw inspiration from to provide further knowledge on them. More importantly, the question I want to answer with my research is, what factors in their existence assisted in their artistic growth? Or rather, how did they become a master in the craft? Then, I will work on several art pieces that reflects what I have researched, elaborate how it fits into my own approach to art, and demonstrate my current artistic skills. Additionally, I will explain how my thesis mentor, Christian Fagerlund, critiqued my ideas and artmaking process. The results I expect to find entails a heightened proficiency in drawing/painting and a strengthened knowledge in art history, all of which will be applied in my current and future practice in art.

Isabelle Dominguez, Department of Political Science, Honors College
Faculty Mentor: Dr. Andrea Silva
Title: Vulnerable Populations in Disaster-Stricken Areas: A Literature Review

My paper is a literature review for my fellowship research with the Castleberry Peace Institute. My literature review evaluates existing literature on vulnerable populations in disaster-stricken areas in regards to the initial disaster, as well as response and recovery efforts. My research focus is to explain the disparity between response and recovery efforts in Puerto Rico after Hurricane Maria and in Houston, TX after Hurricane Harvey.

Claudia Eisermann, Department of Art History
Faculty Mentor: Dr. Lisa Owen
Title: The Earthly Paradise- Re-examining the Gardens at the Taj Mahal

The Taj Mahal, or “Crown Palace”, is one of the most recognizable architectural masterpieces of the world. Capturing the gaze and attention of millions of people, it conveys notions of elegance, romanticism, and perfection with its symbolic white dome, iridescent façade, and symmetrical gardens. The mausoleum is located at the northern end of what was once a lush garden full of fruit, plants, trees, an array of flowers and water features. The gardens of the Taj were indeed an intricate part of the complex itself and possesses its own symbolic language. While much of the scholarship has identified the garden setting (particularly the charbagh design) as evocative of paradise, I argue that the constituent elements of the garden (its water features and botanical specimens) indicate that Shah Jahan was not only attempting to create a paradise garden but the Garden of Paradise itself. The gardens of the Taj Mahal were not only a sanctuary for Shah Jahan to venerate Mumtaz, but a collaboration of beliefs, history, and dedication to the symbolism in the Quran in order to embody the Garden of Paradise within its walls.

Alyceson-Grace Eke, Department of Business Economics, Honors College
Faculty Mentor: Dr. Tom Miles
Title: How Personality Increases Chances of Impulse Spending

How does personality affect the likelihood of conducting impulse buys? Prior research shows impulse buying being predominately affected by duration of self-control, extremities in mood, and duration of emotional suppression. In this paper, I define impulse buying and portray the psychological and economic aspects that explain the process of making decisions. I use collected data on social media platforms to gauge the potential correlation between self-identified personality traits and higher scores on a buying impulse scale. Previous studies analyze correlations between Big Five personality traits and impulse buys, but my research delves into specific traits that are subcategorized in the Big Five. I expect to see personality traits that fall underneath extraversion and neuroticism to correlate with higher scores on a buyer impulse scale. This study is designed help people recognize their propensity to unintentionally make impulse buys.

Yoko Esaki, Department of Linguistics
Faculty Mentor: Dr. Konstantia Kapetangianni
Title: ADHD and Metaphors: Blogs

The internet provides a medium for written and spoken language that can be accessed by people anywhere at anytime. Particularly, blogs (a shortened term for weblogs) are created by individuals and companies to publish or promote some sort of information. This paper is an exploratory analysis of metaphor usage in blogs that are self

proclaimed to be written by people with ADHD and blogs that make no indication to come from an ADHD standpoint. Lakoff and Johnson (1980) claim that language itself is metaphorical, and people use metaphors to convey their life experience and perspectives to others. By comparing the use of metaphors in ADHD and non-ADHD blogs, I aim to answer the following questions: 1) Do ADHD bloggers use metaphors more than non-ADHD bloggers? 2) Are the metaphors used in ADHD blogs focused on the experience of having ADHD? 3) How are metaphors in ADHD blogs similar to metaphors in non-ADHD blogs? To do so, we will collect data of metaphors from three ADHD blogs and three non-ADHD blogs, and will compare the six blogs through posts on a shared topic, such as procrastination.

We expect to find a greater use of metaphors relating to actions or external stimuli in ADHD blogs to convey the internal experience of having ADHD.

Georgina Fullerton, Department of Linguistics, Honors College

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: Linguistic Features Within the Server Persona

The topic of this study is the linguistic features that are used by speakers to create the customer service persona in the food industry. Merritt (1976 & 1978) are two studies that represent the landmarks of research into how language is used in customer service. Past studies such as Azab & Clark (2016) and Eustace (2012) have discovered that accented speech in the service encounter is often viewed in a negative light. Hultgreen (2017) determined that professional language use varies between men and women within call centers. However, there is currently a gap in the literature in relation to the food service industry specifically. The research questions of this study are: 1) Which linguistic features are utilized by speakers of American English in order to create the customer service persona and 2) Are these features consciously or unconsciously chosen? The hypothesis of this research is as follows: native speakers of American English use word choice (including vague language and formal vocabulary), tone, dialect, and pitch in order to create the customer service persona, and that the decision to use these linguistic aspects of speech is not a conscious one. This study consists of an in-depth survey about the linguistic values that servers use in their speech, given to a range of servers from different ages and demographic backgrounds using convenience sampling. The survey will be analyzed using Qualtrics to discover which linguistic features servers view as important for the construction of the customer service persona and whether they believe themselves to consciously alter these parts of speech. This study will also involve audio-recordings of interviews with servers about their perceptions of their speech use during the customer service encounter. The findings of this study will increase the available literature and knowledge involving persona creation through speech and will provide further understanding of speech patterns of the customer service persona that can be taught to workers in order to maximize customer service quality within the food service industry.

(Paper)

Harrison Geosits, Department of English, Undergraduate Research Fellowship

Faculty Mentor: Raina Joines

Title: Gaze

My nonfiction piece explores masculinity and homosexuality through the lens of my experiences with men. This piece is a nonfiction, creative writing memoir which obviously broaches LGBT+ topics, sex, and the dynamics which guide us through our lives. My presentation will mostly include brief readings from the piece, but I could also possibly discuss the writing process. Let me know if you have additional questions.

Riley Hamilton, Department of Integrative Studies, Undergraduate Research Fellowship

Faculty Mentor: Dr. Irene J. Klaver

Title: Environmental Injustice Flowing into the Trinity River and Beyond

The Trinity River has been abused for many generations. Unfortunately, the Trinity's history is not unique. In this paper, I explore histories of environmental justice across the United States and beyond. I define theories related to racism, justice, and environmentalism in order to create a focused lens of how strategic and common environmental injustice is across the world. I also discuss modern local initiatives to re-connect with the Trinity River and provide a reflection with a focus on the future.

Georgina Herrera, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: The Use of Code Switching of Latino Instagram Influencers

This study will investigate the use of Code-switching (CS) on Instagram. I aim to answer 1.) How do Latino Instagram Influencers use (CS) as an ethnic identity marker to connect or relate with their audience? 2.) What types of (CS) are used by male and female influencers on Instagram? For data collection, Instagram captions with English-Spanish code-switches from the year 2018 will be taken from four Latino Instagram Influencers, 2 being male and 2 being females. Holmes's theory (2001) on Ethnic identity marker will be used to analyze the data. The relation of the code-switches will be analyzed according to topics of pattern. Poplack's theory (1980) on the three types of (CS) will be used to analyze the gender differences in the types of (CS) being used. According to preliminary results based on the analysis done so far, cuss words, ethnic foods, and phrases are topics that have been found. The following captions are (CS) examples from a female (1) and male (2) influncer; (1) "DODGING ALL THE PENDEJADAS (bullshit) IN 2018". (2) We go together like Arroz con Habichuelas (rice and beans). Regarding gender differences in the types of code-switches used, my theory is that the female influencers use the most variety of code-switches compared to male influencers. There are preliminary results that do show gender differences and some that don't in bilingual (CS). The significance of this study is to focus on Instagram influencers and their use of (CS) because they have become such a great influence on millions of people and have impacted the marketing world with their use of words to connect with their fan base. This study will be a work of contribution to the topic of code-switching because there is no study focused on Instagram Influencer's code-switching and to understand the use behind it.

Brittany Hoffman, Department of Linguistics

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: Social Appropriateness of Terms of Endearment in American English

This paper looks at the usage of terms of endearment outside of familial and romantic relationships and when it is deemed appropriate to use them by social standards. The purpose of this study is to gauge the appropriateness of different terms of endearment within different levels of familiarity. This study looks to answer the questions: When is it appropriate to use terms of endearment between persons who do not have a familial or romantic relationship? Do the appropriateness of terms of endearment change depending of the gender of the addressee and the speaker? The 30 participants in this study completed a survey on their personal use of terms of endearment and what they deemed appropriate use of different terms of endearment from others. This information helps to determine between appropriate and inappropriate behavior in interpersonal communication.

Connie Hu, TAMS

Faculty Mentor: Nooshin Mirza Nasiri

Title: In-house Synthesized Novel Gold Nanoparticles Stabilized in Bovine Serum Albumin: Characterization using DLS and Zeta Potential

Nanoparticles (NPs) are designed for therapeutic applications in cancer and characterization is necessary for design and synthesis of NPs capable of use in these applications (e.g. imaging, screening, drug delivery and treatment). Dynamic light scattering (DLS) and Zeta potential characterization provide information regarding NP size and surface charge/stability, respectively. These characteristics can be used to inform the design of active, target-specific NPs. The goal of this study is to analyze the two-week stability of gold (Au) NPs stabilized in bovine serum albumin, which have undergone purification-centrifugation. Preliminary results reveal purified AuNPs-BSA demonstrated a lower polydispersity index in regards to size distribution and were able to maintain an improved Zeta potential over the two weeks relative to the unpurified AuNP-BSA product. Next steps will involve characterization of the purified AuNP-BSA for shape, concentration, absorption spectra, and prototype design for toxicity testing in cancer models.

Emily Hudson, Department of Philosophy, Undergraduate Research Fellowship

Faculty Mentor: Dr. Irene Klaver

Title: Recognizing Misogyny: Sexual Violence Against Asian Women in the United States

Thirty years after Kimberle Crenshaw's "Mapping the Margins," questions of intersectional feminism are more prevalent than ever. Because sexual violence overwhelmingly and disproportionately affects women of color in the United States, it is vital that the compounding mechanisms of gender, race, and class are explored further. Specifically, I am focusing on the complicated ways that these concepts affect Asian women living in the US. In a 2015 report, 19.6% of Asian or Pacific Islander women reported experiencing rape, physical violence, and/or stalking by a partner during their lifetime compared to 46.0% of American Indians or Alaska Native women, 43.7% of Black women, 37.1% of Hispanic women, and 34.6% of White women (Dabby & Yoshihama, 2015). From these statistics, it seems that a small percentage of Asian women have experienced sexual violence; however, I argue that because of the orientalist conception of the sexualized Asian body, value placed on preserving the private sphere in Asian cultures, and lack of a feminist consciousness, sexual violence is not reflected in statistics regarding Asian women.

Graham Huether, Department of Emergency Administration and Planning, Undergraduate Research Fellowship

Faculty Mentor: Dr. Gary R. Webb

Title: Social Capital and Tornado Resilience among International Students

This study examines the role of social capital with tornado resilience among international students at a university located in "Tornado Alley." International students were recruited to participate in semi-standardized interviews to gain an in-depth understanding of their knowledge and experience with tornadoes, as well as the forms of social capital they depend on for tornado information and warnings. The results of this study illustrate the importance of social capital for international students and its role with tornado resilience. They suggest that while international students may lack tornado knowledge or experience, the bonding, bridging, and linking social capital afforded to them contributes directly to their risk perception and resilience. This study addresses a gap in the current research on tornado resilience at universities and may support these institutions in developing a culture of tornado resilience among international students.

Erin Killian, Department of Linguistics, Honors College
Faculty Mentor: Dr. Konstantia Kapetangianni
Title: Keysmash as a Global Language and Social Construct

As more people use the internet as a means of communication instead of writing or calling, our language changes to accommodate. This results in the creation of internet language, a specialized form of written communication such as acronyms, short forms, initialisms (Tagliamonte, 2015). This paper aims to explore another form of internet language known as keysmash in the hopes of answering the following questions: (1) Do online internet communities such as Twitter derive meaning out of gibberish, i.e. keysmash or “jsdnjkgnsdg”? (2) What are the different types of meaning that Twitter users derive out of “keysmash”? (3) Why do Twitter users use keysmash in place of previously coined internet slang such as “lol,” “omg,” etc? (4) What sort of syntactic rules govern the use of keysmash? Previous research has shown that, despite the belief that internet language degenerates the grammar of youth, young individuals do exhibit a high command of complex sets of rules of new written registers used on the internet (Tagliamonte, 2015). And, regardless of their perception of internet language, users are able to understand sentences such as “tbh, idkwat 2 do w dem.....” despite being unwilling to imitate them (De Moraes Abrahão 2014). Keeping previous research in mind, samples of keysmash will be collected from the online internet community Twitter. After that, an online survey using these examples will be distributed at random on Twitter. The survey will attempt to see if speakers are able to differentiate between the different types of keysmash, as well as understand it. In the same survey, participants will also be asked to utilize keysmash in a sentence. We expect to find that the placement of keysmash within the sentence changes along with the purpose of it, with keysmash being used to portray a positive emotion occurring at the beginning of the sentence, and a negative emotion at the end of the sentence. With the current research study, we seek to provide insights into the development of the rapidly evolving phenomena of internet language in the hopes of better understanding the hows and whys of its creation.^[1]_[SEP]

Keywords: keysmash, computer mediated communication, internet language

Eunyoung Kim, TAMS

Faculty Mentor: Dr. Denise Perry Simmons

Title: Photothermal efficiency of silver nanoparticles in three dimensional tissue models: An investigation on the effect of nanopartic

Photothermal treatments for cancer use metallic nanoparticles to increase local temperature through excitation of localized surface plasmon resonance (LSPR). Yet, the effect of the surrounding microenvironment on nanoparticle photothermal efficiencies remain unknown. In vitro 3D tissue substrate models were used to address this understanding. In this experiment, protocols for synthesis of different sized silver nanoparticles stabilized in polyacrylic acid (AgPAA NP) were developed. AgPAA NP were characterized for UV-Vis spectra, size-based dynamic light scattering, surface charge- and stability-based zeta potential. Characterization of three in vitro scaffolding substrates: water, polyHEMA, and hydrogel was performed by irradiation with a 632.8nm HeNe laser. To determine light to heat conversion efficiency of AgPAA NP in substrate-based microenvironments, irradiation-driven temperature measurements were recorded across time with a thermocouple sensor. Mie theory indicates that the absorption spectra of spherical metallic nanoparticles display a singular peak that increases in wavelength, or is red-shifted, with an increase in nanoparticle radius. Experimental results showed that, of the synthesized AgPAA NP with peak absorptions (SPR bands) at 440, 540, and 580nm, those polyHEMA-embedded AgPAA NP with peak absorptions at 540nm and 580nm were able to generate significant laser-induced changes in heat. These data support that substrate and NP size have an effect on

photothermal efficiency of AgPAA NP and thus lay the foundation for the next step – a mathematical guideline to predict improved 3D tissue models for nanoparticle-designed heating in cancer treatment.

Anna Lee, Department of Photography and Ceramics, Undergraduate Research Fellowship

Faculty Mentor: Dornith Doherty

Title: Feathers as Monitors of Particulate Carbon Air Pollution

I will be presenting visual artwork based on research about feathers as monitors of particulate carbon air pollution. I have been utilizing a scanning electron microscope to record images of feathers and quartz filters and the pollution that is retained on the specimens. I am involved in an exhibition that will be on display during scholar's day in the Elm Fork Exhibition Hall. The exhibition features an integrative art science collaboration between undergraduate students Anna Lee and Claire Pitre and their mentors Dornith Doherty and Alexandra Ponette. At scholar's day I will be presenting prints of the SEM images that are also in the exhibition.

Sean Lynch, Department of Jazz Studies, Undergraduate Research Fellowship

Faculty Mentor: Quincy Davis

Title: The innovation of rhythmic accompaniment by Max Roach

Max Roach was a pioneer in the innovation of rhythmic accompaniment on the drum set during the bebop and bop eras of jazz. Many rhythms he played simultaneously with different limbs were very advanced and pushed the boundaries of jazz drumming in the forties through sixties. In my research I transcribed twenty five separate recordings and created a digital PDF of various rhythms, as well as video recorded demonstrations of all rhythms for the musical academic community.

Vanessa Marlo, Department of Linguistics

Faculty Mentor: Dr. Konstantina Kapetangianni

Title: The Meaning of Twitter Slang used by BTS Fans

In this study, we investigate and analyze the slang terms used by the fans of Korean pop music (K-pop) group 방탄소년단 (BANGTAN SONYEONDAN) or BTS on the social networking site Twitter. We also examine whether people who do not consider themselves to be part of the fandom, can identify the meaning of these slang terms. According to previous research, every experience that a person has inside their fandom will have an effect on them because of the fact that they hold these experiences very close to them (Ratka, 2018). Yoon (2018) also argues that K-pop is a hybrid music form, and is able to establish popularity internationally because of this, and that hybridity exists not only in similarity but also in simultaneity between American pop music and K-pop. By looking at specific language terms that people use when talking about their hobbies or interests, we are given insight on the sociolinguistic aspect of a person's identity. In this study, we collected samples of slang terms directly from Twitter and we also collected data through a 18-question survey distributed to 25 participants who are not a part of BTS fandom and 25 participants who are a part of BTS fandom. Members of the fandom on Twitter use slang terms like uwu, artis, and wbk most frequently. It seems that the hardest slang word for participants to define was wbk. This research contributes to the sociolinguistics field by providing an inside look into what slang is used in a specific fandom.

Connor McCain, Department of History and Religious Studies, Honors College

Faculty Mentor: Dr. James Duban

Title: "Unenthusiastic" Proselytization: The Unitarian Effort to Merge National Identity and Religion

This paper uses the mid-nineteenth century newspaper *The Christian Inquirer* as evidence of an effort by Unitarians of the time to unite national identity and their religion. Unlike many popular images of evangelical or other proselytizing religions as fanatical, Unitarianism prided itself on its rationalism. Not only did the newspaper try to incorporate its religious ideals into readers' sense of Americanism, but it made a point to subvert the Calvinistic influences in the US. This included efforts to replace certain philosophy of the Founding Fathers with liberal Christian morals. One of the primary modes the *Inquirer* used, however, was praising national figures and freedoms, especially in contrasting them with European nations. The result of this study is an enlightening look into the dynamics of liberal versus conservative religion in the antebellum United States and how that conflict has influenced later generations of Americans' notions of national identity.

Ciaran McCormick, Department of Linguistics, Honors College

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: Lowland Zone Celtic Grammatical Influence in Old English

Historical Linguistics has previously assumed that Celtic languages had little influence over Old English. New studies suggest that there is much greater influence than previously thought. This research will analyze Old Irish and Old English grammatical constructs in order to show that Lowland Zone Celtic shares grammatical constructs with and has evidence of influence over Old English. The grammatical constructions that will be focused on in this study are the it-cleft construction and the internal possessor construction. The it-cleft construction is when a sentence uses the construction 'it was (noun phrase) that (verb phrase).' An example of the it-cleft construction is "It was the cat that ran away," as opposed to "the cat ran away." The internal possessor construction is when a noun must be marked as being possessed. An example of the internal possessor construction is "I raised my hand," as opposed to "I raised the hand." Filppula and Klemola write about the importance of this reevaluation to understanding the history of the English language (2014). Much of their analysis focused on showing support for the Celtic Hypothesis by documenting the grammatical similarities between Old English and Highland Zone Celtic. Schrijver's study focused on a more specific aspect of the Celtic Hypothesis, providing phonetic evidence suggesting the greater influence of Lowland Celtic upon Old English than the influence of Highland Celtic (2009). This study will take the information put forth by Schrijver and Filppula and Klemola to expand upon their work and will focus on looking at the grammatical evidence in order to show the grammatical influence that Lowland Zone Celtic has had upon Old English. This will be achieved through analyzing and comparing grammatical evidence from literature of Old English and Old Irish. Data will come from historical texts including *Beowulf*, and various fictional Old Irish stories. From the data, glosses will be created and analyzed in order to demonstrate the grammatical similarities between the two languages. This will demonstrate the grammatical influence of Lowland Zone Celtic on Old English through the it-cleft construct and internal possessor construction. This study will serve as a starting point for further research into proving the influence that Lowland Zone Celtic has had over Old English and potentially showing that Lowland Zone Celtic has had a greater influence over Old English than Highland Zone Celtic.

QuaDreon Miller, Department of Psychology, Honors College, Undergraduate Research Fellowship

Faculty Mentor: Dr. Flores Niemann

Title: Ethnic Identity and Educational Outcomes in African American College Students

Our study examined social support among African American university students attending an HWI (Historically White Institution) to understand the unique experience of a campus in transition from PWI (Primarily White Institution) to MSI (Minority Serving Institution). While college students are a vulnerable population to psychological distress (PD), African American students face an increased risk of PD due to their marginalized status. Frequent exposure to microaggressions, discrimination, and racial slights can lead to racial battle fatigue, leading to increased psychological distress. Evidence suggests ethnic identity can serve as both a protective and risk factor for PD, potentially increasing resilience in the face of adversity, or conversely leading to hypervigilance. Past work indicates perceived social support (PSS) can minimize the effects of psychological distress, and may be an important factor in the relationship between Ethnic Identity (EI) and PD. Our study examines whether PSS (Multidimensional Scale of Perceived Social Support) moderates the relationship between EI (Multigroup Ethnic Identity Measure-Revised) and PD (Center for Epidemiological Studies Depression Scale) on Academic Performance

Samuel Miyashita, Department of Music Theory and Composition

Faculty Mentor: Dr. David Bard-Schwarz

Title: The Role of Parataxis in Schoenberg's Erwartung Op. 17 from a Lacanian Perspective

In this talk I will develop a phenomenology of fragmentation as parataxis in Arnold Schoenberg's monodrama Erwartung Op. 17 after theories proposed by Theodor Adorno, Eric Santner, and my advisor Dr. David Bard-Schwarz in order to unpack one of the most arresting and enigmatic features of Schoenberg's aesthetic. Parataxis structures text by juxtaposition, or a linear "side-by-sideness" of logico-grammatical units, (in poetry, music, painting, etc.). Although it can signify a range of emotions, it is usually associated with a certain ineffability, exhilaration, or surplus amid incompleteness. Additionally, in contemporary aesthetics, it allows for subjectivity and multivalence in interpretation by inviting the reader to insert themselves within the space left open between logical units. That Erwartung is a text essentially driven by its paratactic composition becomes clear within the very first measures. However, despite Adorno's assertion that parataxis "shatter[s] the symbolic unity of the work of art," (Adorno 1961), Erwartung is not void of meaningful logic. I will turn to the theories of French psychoanalyst Jacques Lacan to suggest that parataxis in Erwartung aligns with Lacan's notion of the fractured, lacking subject. Additionally, I argue that parataxis indicates a placement not only in physical space, but also in a psychological space between reality and illusion in the psyche of the only character, "Die Frau." The incoherence of the formal logic then, engages in a direct musical relation to the mental instability of the subject. By the end of the talk I will have shown that in Erwartung, Schoenberg constructs a paratactic field of play in order to musically encapsulate the constitutive element of repression within disassociation.

Amayrani Montoya-Salgado, Department of Linguistics,

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: Language Discrimination by Twitter Accounts

This study examines the language terms used on Twitter to portray individuals of different ethnicities who have committed crimes. Previous studies have shown that the use of language play a crucial role in politics and news media. Henriksen (2011) examined language and politics and pointed out that people use language to create and exert power. Therefore, people, politicians, and the media have ideologies as well as different perspectives.

Henriksen (2011) noted that rhetorical tools, metaphors, and presuppositions are part of everyday language and can be used negatively towards bias. Mooney (2011) found that the media is becoming more image led than language led. Also, she concluded that there is a relationship between language, the media, society, and power to produce and consume media messages. The purpose of this study is to examine what types of nouns and adjectives are being used on Twitter when describing an individual who has committed a crime and whether specific ethnicities face discrimination. We focused on three ethnicities: White, Hispanic, and Black. Data is being collected from random Twitter posts reporting crimes. Preliminary results show that Hispanic and Black individuals involved in crimes are being described by nouns and adjectives that have a more negative connotation compared to the ones referring to white individuals. The White individuals are seen more of a “person”, “man”, or “father”. Unlike the Hispanic and Black individuals who are seen as an “illegal”, “felon”, or “Black”. The results of this study will contribute to the field of sociolinguistics by showing how language is used on social media to create power, social perceptions and ultimately discrimination of different ethnicities.

Aima Ovai, Department of Biomedical Engineering, Honors College

Faculty Mentor: Dr. Tom Miles

Title: The Bionic Eye: Can Human Vision Be Fully Restored?

"The Bionic Eye: Can Human Vision Be Fully Restored?" is a paper that was written with keen interest, to address the concern of the restoration of visual perception in humans becoming a possibility, due to available technology or findings that would lead to development of technology to be use for such cause. This paper covers previous research and experiments, research data, and statistics relating to the development of Bionic Eyes from the year 1929 to the present time, and provides a conclusion that addresses the proposed question.

Jennifer Ragan, Department of Linguistics, Honors College

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: Grammaticality Judgements of Article Usage in L2 English by L1 Arabic Speakers

This is an Second Language Acquisition (SLA) focused study, which draws from decades of research on influence of first language (L1) on a second language (L2), and attempts to determine whether there is a difference between the knowledge that L2 speakers have about the target grammar and their performance in written production. Lado (1957) and Hayati (1998) have theorized on and documented the influence of L1 on L2, noting the degree of difference between L1 grammar, syntax, phonology and those of the L2 affected the type of influence on acquisition, whether positive (easier acquisition) or negative (harder acquisition). This study aims to answer the following question: “How does a written production sample of an L1 Arabic speaker compare to a grammaticality judgement task in regards to accurate placement and use of definite and indefinite articles (the and a) in English?” We will use a Grammaticality Judgement Tasks (GJTs) and a brief written production from 10 to 12 beginner and intermediate college-aged L1 Arabic speakers who are learning English as a second language at the Intensive English Language Institute at the University of North Texas. Participants will be asked to complete a short GJT and produce a writing sample of their own. The correct and incorrect answers on the GJT and the grammar of their own writing will be compared to see if there are any inconsistencies. Murphey (1997) and Shiu, L.-J., Yalçın, Ş., & Spada, N. (2017) have studied GJTs that are used to determine competence of language learners in their target language. They found that GJTs were valid measures of linguistic competence as long as certain requirements were met, e.g. ample time given, written tests and not aural activities, and comprehensible instructions if given in the target language. We expect to find a difference between L2 learners’ performance on their written production and judgements of this grammatical feature. The results of this study will contribute to

ESL teaching and methods for teaching article usage and provide further evidence for the relationship between knowledge of a target L2 grammar and learners' performance when using the target language

Jenil Rana, Department of Biology, Honors College

Faculty Mentor: Dr. Tom Miles

Title: Can the combination of rote learning and critical thinking improve student cognition?

Abstract: Does the utilization and incorporation of higher standard learning theory improve retention and comprehension in STEM-based classes? Previous research on learning theories suggests the incorporation of active and collaborative learning with a rote learning style is an effective strategy to become efficient in learning science-based concepts. The technique of combining, rote understanding and critical thinking with any student's learning style can help increase neural communication and make learning more cognitive. These neural networks can be studied using computational systems and comparison can be made between a group of students utilizing this technique to a group of students that is not, to provide valuable data that can be used to show that this approach makes learning efficient. Previous Research that compared exam scores showed that the group of students that participated in collaborative learning and structured discussion scored much higher than students that did not. I think that this research could produce more valuable results if the technique of rote understanding could be incorporated into the methodologies. Moreover, another research found a positive correlation between faculty professors adhering to active learning and positive impact on student learning. The methodologies can be modified in this research where faculty professors can incorporate higher standard learning in classes by stimulating class discussion and encouraging students to utilize rote understanding. The results of the new methodologies can be compared to the result of the old methodologies to show the increase in student knowledge comprehension. Based on previous research, incorporating higher standard learning theory -that includes rote understanding and critical thinking - as a fundamental principle in a student's study routine, it can have a positive impact on student's cognition and knowledge retention.

Stephanie Ray, Department of Emergency Administration & Planning, Undergraduate Research Fellowship

Faculty Mentor: Dr. Elyse Zavar

Title: Commemoration on Foot: Identities and Motivations of Joplin Memorial Runners

An EF-5 tornado struck Joplin, Missouri on May 22, 2011, leaving 25 percent of the structures in Joplin destroyed and an additional 50 percent damaged. On the ground for 38 minutes, the tornado claimed 161 lives and injured over 1,150. Both spontaneous and formal memorials appeared in the days and weeks following the disaster. The Joplin Memorial Run (JMR), rebranded in 2012 as a memorial to the tornado victims, draws participants from across the country to run in the events and perform commemorative activities. The JMR offers a half marathon, 5k, team relays, and a children's fun run in addition to the Walk of Silence, a remembrance honoring those who perished in the tornado. Given that the JMR seeks to draw runners and memorializers, this study examines the role of the memorial race in the long-term community recovery and specifically asks, what are the runners' motivations for participating in the race events? To answer these questions, we attended the 2018 JMR and conducted over 400 semi-structured interviews with race participants in addition to participant observations from the race day and the Walk of Silence. The research identified that while some people attended the JMR solely as a runner or memorializer, most participants cited multiple motivations for their involvement: a love of running, paying tribute to lost loved ones, supporting Joplin's ongoing recovery, and strengthening community and familial bonds. Finally, we consider the ongoing role of the JMR in the recovery of Joplin.

Sarah Reynolds, Department of Interdisciplinary Studies, EC-6 w/ ESL, Honors College

Faculty Mentor: Dr. Jeanne Tunks

Title: Experiential Learning in an International Teacher-to-Teacher Exchange Program

In the International Teacher-to-Teacher Exchange (ITTTE) program, teachers from the United States and Guatemala were paired together, travel to each other's homes, work in each other's schools, and engage in experiences that are aimed at increasing culturally relevant teaching in mathematics. This study examined the learning styles observed in participants' narratives during the 2016-18 ITTTE program. David Kolb's Experiential Learning Cycle (2007) served as the theoretical frame for examining learning styles exhibited in the narratives. In addition, changed teaching practices, as noted in the narratives, were studied. Results from this study revealed that each participant engaged in more than one of Kolb's four learning styles and indicated changed teaching practices. By participating in such an experiential learning process, participants were encouraged to learn in varying styles, making learning more meaningful, and changed practices as a result.

Hannah Rolon, Department of Linguistics,

Faculty Mentor: Dr. Konstantia Kapetangianni

Title: Remaining Static in Dynamic Spaces: A Study of Khmer Language Practice in Facebook Comments

Remaining Static in Dynamic Spaces:

A Study of Khmer Language Practice in Facebook Comments

In this study, we investigate and analyze the language practices of Cambodian Khmer Youth online within the specific space of the Facebook profile comment. Based on a syntactic analysis of 200 unique comments collected across 40 Facebook profiles and personal observation of Khmer youth utilizing the Facebook comment as a mode of specific in-group language practice within this space, it appears that there is divergence linguistically from the areal group within the same youth subset as well as that of previous generation Khmer people. Specifically, it appears that the language used by Khmer youth in the Facebook profile comment is expressed in a uniform and predictable way via use of precise syntax despite variation in Khmer and English transliteration, and that such consistency in a typically dynamic space is significant in contrast to other spaces across the multi-modal landscape of Facebook. Research on computer-mediated discourse across Social Networking Services have consistently found differences in language practice regarding language choice, crossing, and register in static versus dynamic spaces with evidence of unique and flexible language practice appearing in dynamic spaces like chat spaces, status updates, and comment sections (Androutsopoulos, 2013; Carroll, 2008; Cunliffe, Morris, and Prys, 2013; Merchant, 2001; Seargeant, Tagg, and Ngampramuan, 2011) in contrast to the apparent standardization seen in the comments explored here. In effort to investigate the way Khmer users are employing various aspects of the English language as semiotic resources within contexts appearing atypically formulaic, this study focused on analysis of randomly sampled and anonymous, genuine language data. For the purpose of this study, data in the form of 200 unique comments were sampled across 40 profiles: 20 profiles belonging to Khmer persons determined to be under 30 years old and 20 determined to be persons older than 30 years old, based on self-reported data. Comments were collected, anonymized, organized by basic demographic information, and tagged for adjectives, intensifiers, titles or kinship terms, terms of affection, and emotives (or emoticons) for syntactic analysis. This study attempts to determine whether the specific syntax present in the youth comments is standard to Khmer or influenced by linguistic crossing and growing knowledge of the English language. Further, this study hopes to contribute to research on in-group transliteration practices online to determine if Romanization here follows the ad-hoc assumption of previous research or if governed by phonetic or stylistic rules.

Melinda Sapaugh, Department of Interdisciplinary Studies, Undergraduate Research Fellowship

Faculty Mentor: Dr. Norman Dolch

Title: Assessment of Nonprofit Organization Financial Experiences

More than half of the country's total nonprofits are estimated to be operating with less than one month's cash reserves (Wyman, SeaChange Capital Partners, and GuideStar, 2018). Larger nonprofit organizations are as likely as smaller ones to lose financial stability, despite periods of apparent economic growth. Dolch and associates in "Leadership Cases in Community Nonprofit Organizations" examined the decisions and strategies of nonprofit organizations in response to the 2007 economic recession. This study will replicate the study of Dolch and associates to extend the study to a nine-year longitudinal study. An online survey invitation will be conveyed by United Ways in six communities across the South, Southeast, Midwest, West, and Gulf Coast regions of the USA. Participants will complete the survey on the Qualtrics survey platform and respond on behalf of the nonprofit with which they are affiliated. The resulting sample of nonprofits is considered a convenience sample. Select qualitative interviews will be held with executive directors to tell the story about their nonprofit and financial practices. These are the two study questions to be answered: 1. Are the management strategies that were most frequently used in response to the 2007 "Great Depression" most frequently used today? 2. If not, are there any cost cutting measures that are?

Wesley Scivetti, Department of Linguistics, Honors College

Faculty Mentor: Dr. Alexis Palmer - Assistant Professor of Linguistics

Title: Analyzing Corporal Evidence of English Phonesthemes

The exact characteristics of language are still a matter of debate within linguistics, but there are several features which are observable across much of language. One such hallmark of language is its arbitrariness of form, which means that the sounds alone which make up a word do not provide information about its semantics. Another commonly hypothesized characteristic of language is compositionality, which means that all of language is a combination of discrete parts which together create meaning. However, observed phenomena in language do exist which contradict these characteristics of language. Phonesthemes are one linguistic occurrence which challenges traditional notions of both arbitrariness and compositionality in language. Phonesthemes involve a systematic link between meaning and sound and have been observed in many languages, including English. A common example in English is gl- initial consonant cluster – many words which have this cluster seem to reference the visual effects of light (examples include glare, gleam, glimmer, glisten, and glint). Such cases appear to contradict the idea of semantic arbitrariness of form. They are also non-compositional: unlike morphemes, phonesthemes occur alongside non-recurrent and seemingly meaningless strings. The existence of phonesthemes in English has been significantly supported with several branches of research. Several studies (Hutchins 1998; Bergen 2004) have focused on the preferences of native speakers when guessing definitions for new words which contain known phonesthemes, and have shown that speakers often choose definitions similar to those connected with the phonestheme. Other studies (Otis and Sagi 2008; Abramova et. al. 2013; Abramova et. al. 2016; Gutierrez et. al. 2016; Liu et. al. 2018) have instead focused on analyzing possible phonesthemes in text corpora, using computational methodologies for semantic calculations. Phonesthemes can be observed within text corpora in several ways. Several studies (Otis and Sagi 2008; Abramova et. al. 2016; Liu et. al. 2018) measured the semantic strength of various phonesthemes in corpus data by using distributional semantic methods to provide evidence of meaning correlation. Other studies (Abramova et. al. 2013) have attempted to use Word-Net mapping to automatically create labels based around semantic association. This paper builds upon these works by analyzing the presence of common English phonesthemes by using up to date word embeddings to calculate semantic relatedness. There are two research questions answered by this paper: 1) Is there significant evidence of English

phonesthemes in Corpus Data? 2) Is there evidence in corporal data of several unique types of phonesthemes? This paper will further examine previously overlooked phonesthemes and provides possible distinctions for phonesthemes of different types. Expected findings include significant evidence of the semantic relatedness of previously well-documented English phonesthemes.

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Tanner Smithson, Department of Theatre, Terry Scholar Program

Faculty Mentor: Dr. Andrew Harris

Title: The Broadway New Deal: Commercial Enhancements and the Non-Profit Sector

An examination into the finances and structure of both theatrical producing models, commercial and non-profit. Examination and critique of sector cross-fertilization and the industry's mutual benefit during the decline of the "season subscriber" model and with the introduction of the commercially-focused "enhancement" deal. Examination and critique of the substantial "commercially funded" and "non-profit focused" gifts granted by institutions like the Shubert Foundation.

Tanakrit Tongnopnua, Department of Jazz studies

Faculty Mentor: John Murphy/Dave Meder

Title: The Connection Between Modern Jazz Piano style and Bebop Piano.

The goal of this research is to study the connection between modern jazz style performed in New York City and the traditional Bebop jazz style through the study of music and transcription of pianist Glenn Zaleski. Glenn Zaleski is considered to be one of the leading voice of jazz piano in the 21st century. He is what jazz musicians would describe as an up and coming jazz pianist. Although his style and music might be different from the bebop style, there is still a strong sense of tradition in his playing. The foundation of jazz: the bebop, can still be heard in his music. The secondary goal for this research is to increase the level of understanding of modern jazz through the study of Zaleski's music. Hopefully this research will decrease the level of discontentment people might have towards this modern music, reaches the older audiences who disregard this music as being too modern and lacking tradition and prove to them that the tradition of jazz exists in modern jazz.

RESEARCH POSTER ABSTRACTS

University Union Ballroom

2:30-4:30

Jewel Aleshire, Department of Anthropology, McNair, Undergraduate Research Fellowship

Faculty Mentor: Dr. Lisa Henry and Dr. Adam Dunstan

Title: Impacts of Climate Change: A Comparison of Fijian and Tuvaluan Culture

Anthropogenic climate change poses a threat to the Pacific Islands, particularly low-lying coral atolls. Rising sea levels associated with climate change are causing islands to erode, and seawater is infiltrating drinking water and destroying crops. Furthermore, prior research concludes that sea level rise is impacting islanders' culture due to the loss of their native lands and traditional foods. This comparative research of high islands in Fiji and low-lying coral atolls in Tuvalu identifies the specific impacts of climate change on island environments and islanders' lives, how climate change is defined and perceived, factors that influence climate change perceptions, education surrounding climate change, and local responses and solutions to climate change. The present study uses semi-structured ethnographic interviews, conducted virtually, as the primary source of data. This research can help aid organizations with providing culturally competent aid to islanders and provides an important contribution to the literature by highlighting islanders' personal lived experiences and perspectives.

Tandav Argula, TAMS

Faculty Mentor: Dr. Rajeev Azad

Title: RNA-Seq for Eukaryotic Microbes: Benchmarking Splice-Aware Alignment and Differential Gene

The pipeline chosen for RNA-Seq analysis heavily influences the downstream results. Variance in alignment strategies leads to remarkably different sets of differentially expressed genes. On the other hand, differential expression analysis tools generate non-converging differentially expressed gene sets using the same read alignment data. Therefore, it is important to assess the performance of RNA-Seq analysis tools in order to identify the best performing tools, understand the strengths and weaknesses of different tools, and strategize integration of methods of complementary strengths. In this study, we selected five of the most popular tools for splice-aware sequence alignment, as well as three tools for quantifying differential gene expression, to benchmark their relative performance. Using publicly available RNA-Seq datasets derived from the arbuscules of *Manihot esculenta* infected with *Rhizophagus irregularis*, as well as simulated RNA-Seq datasets using the transcriptomes of these organisms, we have identified a pipeline that yields optimal performance with respect to alignment accuracy, expression estimation, and reproducibility. We follow this benchmarking with a survey of the variance across pipelines and study of the effects of variance on standard downstream analyses, including enrichment and functional characterization. Our study suggests the need for a fresh look at the conclusions of past studies that used RNA-Seq datasets subjected to potentially inaccurate pipelines.

Hannah Asis, Department of Public Health, Honors College

Faculty Mentor: Dr. Tom Miles

Title: Are Minority U.S. citizens adequately protected under 'Trafficking Victims Protection Act' when compare

The phrase 'Sex Trafficking' often provokes images of foreign women being smuggled into the U.S and coerced into the sex industry by means of deceit, force, and/or fraud. While it is true that foreign individuals are

vulnerable to sex-trafficking, it is important for policymakers and public health officials to be attuned to the susceptibilities facing American youth, particularly minority communities. The relentless grip of sexual exploitation facilitated by pimps, American conceptions, and law enforcement's weak understanding of commercially and sexually-exploited-youth engenders a cyclical life of incarceration and halted social mobility among Americans indoctrinated into the sex industry as children. I explore the inception of the Trafficking Victims Protection Act (TVPA) to determine whether or not its international aspirations are being met on the act's very own home front. In addition, I analyze FBI prostitution and arrest trends that reveal unequal protection between white and minority youth. Although the TVPA has improved reduced the arrest disparities, substantial work to close the victimization gap between white and minority commercially- and sexually-exploited youth remains.

Olivia Augustat, Department of Biology and Psychology, Honors College

Faculty Mentor: Dr. Dorian Roehrs

Title: Identification of German Vowel Length

This study concerns the perception of vowel length amongst German minimal pairs e.g. (bieten 'offer': [bi:tən] & bitten 'ask': [bɪtən]), where the first "i" is long and the second is short. In the literature, experience and accurate perception have been found to have a positive relationship regarding vowel perception. My sample was 15 students from the University of North Texas: 5 advanced students of German, 5 novice students of German, and 5 students who were inexperienced with German. I administered a 42 item audio exam with a corresponding form. The form was numbered and had a polar choice, "long" or "short," in regards to the vowel length within each word. Each German vowel sound was equally represented in the audio recording, and each word in the pair differed from each other only by vocalic length.

I formulated two general hypotheses:

- a. The more experience an individual had, the more accurate their perceptions of vowel length.
- b. Consonantal sounds following the vowels could affect perception.

Hypothesis A was supported, with a positive relationship between experience and accurate perception being found, [$F(2, 12) = 12.11$ $p = .001$]. Additionally, hypothesis B was supported for only some types of consonants, with vowels sounds preceded by Laterals being perceived as longer: laterals (short 42%; long 58%) versus plosives (short 53%; long 47%) and nasals (short 56%; long 44%). There was no significant difference between nasals and plosives.

Amber Benton, Department of Anthropology, Undergraduate Research Fellowship

Faculty Mentor: Dr. Tom Miles and Dr. Adam Dunstan

Title: Performative Permaculture: Multiple Cases of Sustainability Activism on YouTube

One of the greatest challenges of humans in modern times is finding ways to live sustainably. Permaculture is a social movement that was created to combat climate change and innovate for the future. YouTube has been growing rapidly as a platform for activism and it contains a community of permaculturists who vlog about their lives, their farms, and their thoughts about the world. This project looked at the videos produced by youtubers within the permaculture community and discusses the way the community communicates with each other, how they relate to their food, and the motivations of the individuals to pick up and continue with permaculture. My interlocutors share a community that was born online and continues to thrive there; however, they often meet in person for the harvesting of meat, for large projects on their farms, and for specialty events such as homesteading conventions. They volunteer on each other's farms, lend or give each other livestock, and share the produce of their lands. The relationships that this community has is unique on the YouTube platform in that the

content creators distance themselves from the fame that large channels in other YouTube communities take as a given. Instead, both content creators and their viewers learn from and teach each other with the shared goals of sustainability, environmental activism, and most of all the devotion of themselves to their families and their shared lifestyle.

Tanvi Bobba, TAMS

Faculty Mentor: Dr. Jannon Fuchs

Title: Primary Cilia in Alzheimer's Disease

The primary cilium is a nonmotile organelle that extends from the cell surface. Undergraduate Research Fellowshipspace and is common in most vertebrate cell types. In the CNS, cell types with primary cilia include neural stem cells, neuronal and glial progenitors, neurons, and astrocytes. This organelle is essential for brain development, largely through cilia-dependent canonical sonic hedgehog (Shh) signaling. Shh initiates mitoses that expand neural progenitor populations, and has effects on cell fate and differentiation. Shh helps maintain astrocyte homeostasis and neuronal plasticity, but the increased levels with injury and inflammation can lead to astrogliosis. Alzheimer's disease is associated with cell cycle dysfunction, astrogliosis, and declines in neural plasticity, suggesting to us that there might be abnormalities in cilia that are important for the etiology of the disease.

Alana Byeon, TAMS

Faculty Mentor: Dr. Danica Slavish

Title: Associations between Depression, Anxiety, and Intraindividual Variability in Sleep in Nurses

Recent studies have shown that greater night-to-night variability in sleep is associated with poorer mental and physical health outcomes, such as greater depression and anxiety symptoms, higher BMI, dysregulated cortisol, and greater systemic inflammation. No studies have examined these relationships in nurses, who are particularly likely to experience variable sleep due to stressful work environments and rotating work schedules. We analyzed data from a larger study of 400 nurses who completed a baseline survey to assess depression and anxiety, followed by 14 days of sleep diaries. We found that greater night-to-night variability in sleep duration, latency, etc across the 14 days, was associated with greater depressive and anxiety symptoms. These preliminary findings suggest that more variability in sleep may be associated with poorer mental health in nurses. Those nurses with variable sleep may also be experiencing high levels of stress or engaging in other poor health behaviors, which may also contribute to depression/anxiety. Cognitive behavioral treatments that target both maintaining a consistent sleep schedule and coping with negative emotions or distress may be particularly helpful in this population.

Julia Christina Camacho, TAMS

Faculty Mentor: Dr. Xuexia Wang

Title: Predicting the Development of Secondary Central Nervous System Cancer Through Ensemble Learning Methods

Secondary cancers, which develop as a result of initial radiation or chemotherapy treatments, are a major cause of cancer patient morbidity and mortality. Prediction of the development of secondary cancer is crucial in order to determine optimal treatment and prevention strategies. There is significant inter-individual variability in the risk of developing secondary CNS (central nervous system) cancers, which indicates that genetics plays a role in

patient susceptibility. This project developed a computational method for the prediction of secondary CNS cancer through ensemble learning utilizing both clinical and genetic data.

Data were obtained from a 2017 COG (Children's Oncology Group) study, and included radiation data as well as 89 SNP features. Feature selection was performed using 4 tree-based methods, and 8 individual machine learning models were trained using both 10 and 6 features. Then, 4 types of ensemble models were constructed using the top-performing individual models as well as combinations chosen in order to maximize model diversity. Grid search was utilized to optimize hyperparameters, and the model evaluation metrics used were accuracy and ROC AUC scores.

The 10 most important features were radiation amount, patient age, and 8 SNP mutations in genes such as BRCA2 and XRCC5. The addition of genetic data to clinical models did not immediately increase prediction accuracy, which indicated that feature selection was needed in order to filter out noise in the genetic data. Models trained on 6 features were also more accurate than models trained on 10 features, and highest ensemble accuracy was achieved through stacking.

Christina Cantu, Department of Psychology, Undergraduate Research Fellowship

Faculty Mentor: Dr. Ateka Contractor

Title: Relation between Trauma Types and Positive Memory Recall Processes

Traumatic events are classified into two broad types; interpersonal and non-interpersonal. Interpersonal traumas are perpetrated by other individuals; examples include physical assault and sexual assault (Mauritz, Goossens, Draijer, & van Achterberg, 2013). Non-interpersonal traumatic events are not perpetrated by another individual and are outside of an individual's control; examples include life-threatening illness, accidental injury, and natural disaster (Haldane & Nickerson, 2016).

Trauma type and count has been associated with clinical correlates. To elaborate, previous research has established that individuals who have experienced interpersonal trauma(s) report greater PTSD symptom severity (Forbes et al., 2014), greater depression severity (Contractor, Brown, & Weiss, 2018), greater negative schemas/thoughts related to self/others/world (Peace, Porter, & Brinke, 2008), lower self-esteem (Peace, Porter, & Brinke, 2008), and greater negative affect (Brown, Bruce, Buchholz, Artime, Hu, & Sheline, 2016). compared to those who experience non-interpersonal trauma(s). The severe psychopathology associated with interpersonal trauma(s) can be attributed to poor self-image, greater self-blame, and the corrosion of their world view which affects functioning, including cognitions and memories (Alisic et al., 2014; Joseph, Williams, & Yule, 1997; Woodward et al., 2015). Additionally, the number of traumatic events an individual experiences has been positively linked to more severe psychopathology than an individual who experiences a single event (Contractor et al., 2018, Gerber et al., 2018), attributed to the dose response theory.

The purpose of this study is to investigate differences in (1) number of recalled positive memories, (2) reported vividness of a recalled positive memory; and (3) reported accessibility of a recalled positive memory across individuals reporting a most distressing (index) interpersonal vs. non-interpersonal trauma.

Emily Cao, TAMS

Faculty Mentor: Dr. Mohammad Omary

Title: Synthesis, Stabilization, and Application of the Phosphors PtPOP and AuTPPTS

We have researched the applications of the water-soluble phosphorescent platinum complex $K_4[Pt_2(P_2O_5H_2)] \cdot 2H_2O$, referred to as "Platinum POP" (or PtPOP) as well as the water-soluble phosphorescent Au(I) complex $Na_8[Au(TPPTS)_3]$, TPPTS = tris(3,3',3'-trisulfonatophenyl)phosphine, referred to as AuTPPTS. PtPOP, an inorganic water-soluble phosphor, has a natural green luminescence due to reactions between its two

platinum atoms. Because its levels of emission correspond to the amount of oxygen present, it has applications in the detection of Reactive Oxygen Species (ROS), amines, and heavy metals. However, there were a few demerits of PtPOP that had to be taken care of, such as its stability and sensing capabilities. We increased the stability by changing the composition of the solvent mixture, functionalizing the molecule, and stabilizing the pH. Additionally, we checked the reversibility of the sensor by adding an acid or a polysaccharide. We also researched the sensitivity of PtPOP towards amines and have further increased the stability of the complex by forming a polymer with small molecules and characterizing the resulting polymer. As for AuTPPTS, we tested our plans of developing a biosensor for Sialyl Lewis X, the sUndergraduate Research Fellowship protein present on the endothelium of pancreatic cancer cells. Previous studies of pH and temperature-dependent luminescence titrations have shown that the sensitization of AuTPPTS is augmented at physiological conditions, which makes it suitable for biomedical applications. Unfortunately, the tests failed, as the emission intensity of AuTPPTS did not increase after the addition of Sialyl Lewis X. However, we are researching an additional application of AuTPPTS for another protein, Beta-amyloid protein, which is associated with Alzheimer's Disease.

Stephen Chen, TAMS

Faculty Mentor: Dr. Denise Perry Simmons

Title: Gold Nanoparticle Synthesis: Investigating the Relationship between Ultraviolet Light Absorbance and Nanoparticle Stability

Nanoparticle technology is an emerging field of study in cancer therapy. One application of nanoparticles is to act as drug delivery systems. With the synthesis of biodegradable, metallic nanoparticles, the desired outcome is to allow the metal encapsulated nanoparticles to enter the body of a cancer patient and target specific cancerous cells. From there, the polymer nanoshell of the nanoparticle can deliver the specific cargo into the cancer cells, inducing a self-destruct mechanism. Another application of metallic nanoparticles is through the use of heat. In such treatment, infrared light can be shined on the metallic nanoparticles, causing them to absorb the light, convert light to heat, and then kill nearby tumor cells. Before these agent can be used in humans, however, they must be characterized (e.g. size, shape, stability, concentration). This study uses UV-Vis Spectroscopy to investigate the stability of gold nanoparticles encapsulated with different concentrations of bovine serum albumin (AuNP-BSA). The research goal is to develop a stable AuNP prototype for use as a nano-carrier for delivery of therapeutic agents or use of AuNP as an active killing agent alone. Stability will be tested over a 15-day window of time. Future studies will test the stable AuNP-BSA in in vitro models of cancer.

Natasha Chugh, TAMS, Undergraduate Research Fellowship

Faculty Mentor: Dr. Jeffrey A. Kelber

Title: Atomic Layer Deposition of BN as a novel capping barrier on B₂O₃

The deposition of boron oxide films on Si or on SiO₂ substrates by atomic layer deposition (ALD) is of growing interest in microelectronics for shallow doping of high-aspect-ratio transistor structures. B₂O₃, however, forms volatile boric acid (H₃BO₃) upon ambient exposure, requiring a passivation barrier for which BN was investigated as a possible candidate. In situ deposition of BN is demonstrated by sequential BCl₃/NH₃ reactions at 600 K on two different oxidized boron substrates: (a) B₂O₃ on Si at room temperature ("B₂O₃/Si"); and (b) a boron-silicon oxide formed by sequential BCl₃/O₂ reaction at 650 K on SiO₂ followed by annealing to 1000 K ("B-Si-oxide"). X-ray photoelectron spectroscopy (XPS) data demonstrate layer-by-layer growth of BN on B₂O₃/Si with an average growth rate of ~ 1.4 Å/cycle, accompanied by some B₂O₃ removal during the first BN cycle. In contrast, BN growth was observed on B-O-Si without any reaction with the substrate. XPS data also indicate that the oxide/nitride heterostructures are stable upon annealing in ultrahigh vacuum to > 1000 K. XPS

data after exposure of these heterostructures to ambient indicate limited N oxidation, but with no observable effect/hydroxylation of/on the underlying oxide films. These results demonstrate that BN films as thin as 13 Å, are potential candidates for passivation barriers for boron oxide films prepared for shallow doping applications.

Katherine Cline, Department of Biology, McNair Scholar Program

Faculty Mentor: Dr. James Kennedy

Title: Biodiversity of non-biting midges (Diptera: Chironomidae) within Denton watersheds along an urban gradient

This project is part of a larger study by University of North Texas Benthic Ecology Laboratory, examining the ecological health for six of Denton's storm water retention ponds across an urban gradient. The purpose of this research segment is to understand how Chironomidae population characteristics respond to watershed components and anthropogenic influences on water quality. Chironomidae (Insecta: Diptera) are often the most dominant and productive aquatic insect within freshwater ecosystems. Larvae were collected from the ponds through sweep net sampling of three habitat types, within a meter squared, during May of 2017. Comparing diversity among samples, by vegetation, suggests differing habitat preference of the chironomids between cattails, emergent vegetation, and submerged vegetation. The larvae collected have been identified to the genus level and these data have been correlated with land use and physical chemical values to identify the population most sensitive metrics in changes to watershed. Apogee Pond shows to be different because it is most heavily influenced by urbanization and has the least diverse population. The other five ponds have similar diversity. These results will be integrated with ongoing research within the ponds to develop a conservation plan to protect Denton's water resources and maximize their aquatic invertebrate diversity.

Jared Cortez, Department of Psychology, Undergraduate Research Fellowship

Faculty Mentor: Dr. Anthony Ryals

Title: Does Cognitive Inhibition Play a Role in the Police Officer's Dilemma?

First-responder (i.e., law enforcement) shooting situations require individuals to control the urge to fire upon threatening targets while suppressing this urge for non-threatening targets. Previous research, using a computerized Shoot/Don't Shoot task, suggests that this decision-making process is prone to bias due to the likelihood to perceive different ethnicity individuals as threats (Correll et al., 2002). While it is assumed that cognitive inhibition is a primary cognitive process involved in threat versus non-threat distinction, no known empirical work has linked inhibition measures with response patterns or errors to this task. UNT undergraduates will be tested using a computerized version of the Shoot/Don't Shoot task in combination with additional tests of executive inhibition (i.e., Stroop and Flanker task) to correlate performance and response biases across measures. This will provide evidence for or against the role of cognitive control in threatening perceptions and related biases (Correll, Urland, & Ito, 2006).

Kaitlynn Davis, Department of Ecology for Environmental Science, Undergraduate Research Fellowship

Faculty Mentor: Dr. James Kennedy

Title: Biomonitoring at the Dallas-Fort Worth International Airport: Use of Chironomidae Larvae in Detecting Change in Urban Streams

Urban streams surrounding the DFW International Airport were assessed by the University of North Texas (UNT) Benthic Ecology Lab via a multi-year biomonitoring study funded by the airport. The objective of these studies

was to identify the major human activities within the airport watershed that could potentially affect water quality. Freshwater environments support a diversity of larvae of the Dipteran family Chironomidae. Chironomidae are the most prevalent taxa in this study, making up 20-50% of the benthic macroinvertebrates sampled. This taxonomic group is known for its species diversity, with representatives that have a wide array of tolerances to different ecological conditions. As part of the biomonitoring study, Chironomidae larvae were identified to genus and their distributions evaluated based on responses to land use. Identification of Chironomidae genera improved our ability to detect environmental changes in the urban streams surrounding the Dallas-Fort Worth International Airport.

Caralyn Dawson, Department of Ecology for Environmental Science

Faculty Mentor: Terra Rowe

Title: Redlining as Environmental Racism: Assessing the Connections Between Discriminatory Policies of the 20th Century and Disparate Effects of Hurricane Katrina in New Orleans

The theory behind this research study begins with the assumption that sections of New Orleans have historically been geographically vulnerable to flooding, making them cheaper and more attractive to minority populations and individuals of low socioeconomic status. This research is intended to demonstrate a link between redlining policies and impacts of Hurricane Katrina felt by minorities in New Orleans, and will show that this grouping of minority populations led to categorization of these neighborhoods as undesirable and more risky for investment than affluent and white neighborhoods. The intention of this project is to prove that denial of loan and mortgage services to residents in undesirable areas led to difficulty for residents in those

Bunyong Dejanipont, Department of Biomedical Engineering & Psychology, Undergraduate Research Fellowship

Faculty Mentor: Dr. Victor Prybutok

Title: A Structural Equation Model of Stress, Mental Health, and Coping among Aging Lesbians and Gay Men

Adverse mental health outcomes, including poor quality of life, depression, and anxiety, are more prevalent among sexual minorities because of additional stressors that are unique to these minority group members. Nevertheless, according to Meyer's (2003) minority stress model, adaptive coping resources, such as resilience, social support, and forgiveness, may buffer the negative effects of stressors on psychological wellbeing. However, little research that examines coping resources among older sexual minorities exists despite evidence that suggests older sexual minorities may cope differently from heterosexuals and, importantly, younger sexual minorities. Moreover, fewer studies attempt to examine the minority stress model by using various indicator measures to model each factor in the model.

To address the health disparity among older sexual minorities and provide research evidence for intervention and prevention, we posit and test a model that addresses the moderating role of adaptive coping on stressors and mental health of lesbians and gay men over the age of 50 (LG50+). The model is tested using partial least squares (PLS) structural equation modeling. Participants (n = 100) who were over the age of 50, and self-identified as lesbians or gay men were recruited in the Dallas/Fort Worth metropolitan area. Results suggest that adaptive coping resources moderate the relationship between perceived stress and negative mental health outcomes. Particularly, LG50+ who display high levels of adaptive coping resources are less likely to experience adverse mental health even in the presence of perceived stress. While our findings support Meyer's minority model, they also provide a new model perspective by summarizing adaptive coping resources and negative mental health outcomes through a combination of sub dimensions that reduces measurement error. Thus, the model supports the

contention that intervention and prevention that focus on establishing and improving resilience, social support, and forgiveness help LG50+ cope with a wide range of stressors.

Maddox Dockins, Department of Materials Science and Engineering, Undergraduate Research Fellowship
Faculty Mentor: Dr. Andrey Voevodin

Title: Creation of Thin Film Semiconducting Materials

With the rapid development of humanity's technological capabilities, some softwares that are produced are beginning to need hardware that is more advanced than any hardware that is currently available. Because of this, the study of nanoelectronics has become vital for the continuation of intensive software development. To continue advancing the capabilities of hardware, Dr. Voevodin's research group has been researching nanomaterials and their ability to be utilized as transistors within computing chips.

Leo Dong, TAMS

Faculty Mentor: Dr Ron Mittler

Title: The effects of oxidative stress on NAF-1 expression in breast cancer

This research investigates the role of a specific protein—termed nutrient-deprivation autophagy factor-1 (NAF-1)—in human breast cancer. In previous research, levels of NAF-1 have been shown to be higher in breast cancer cells as compared to normal (wild-type) cells. Furthermore, the lab discovered that cancer cells and wild-type cells that are engineered to have higher levels of NAF-1 have enhanced resistance to oxidative stress, a type of cellular stress created by the accumulation of reactive oxygen species, such as superoxide (O₂), within the cells. With this NAF-1 mediated resistance to oxidative stress, tumors engineered to have elevated NAF-1 levels grew larger and were more aggressive than wild-type tumors. Furthermore, tumors engineered to have reduced levels of NAF-1 were smaller and less aggressive than wild-type tumors. Preliminary results suggest that NAF-1 expression levels decreased in the HEK paraquat and glucose/glucose oxidase treatments.

Tyler Dozier, Department of Media Arts

Faculty Mentor: Jennifer Porst

Title: Diversifying the Media

I research how representation has shifted in the media industry by focusing on a local media business. I looked at how diversity and inclusion are more prevalent in the media.

Kate Ellis, Department of Integrative Studies, Honors College

Faculty Mentor: Dr. Tom Miles

Title: Nonverbal Communication Across Cultures

I am in the process of researching variations in nonverbal communication among different cultures and how it can change with being placed in a different culture. I will delve into the reasons behind these changes, including but not limited to, the meanings of various hand gestures/facial expressions and their degree of politeness or offensiveness, as well as the effects of intercultural nonverbal ignorance.

Tim Esquivel, Department of Chemistry
Faculty Mentor: Dr. Francis D'Souza and Dr. Michael Thomas

Title: Photo- and Electrochemical Properties of Pentacene Porphyrins
Several photo- and electrochemical tests are ran on a few pentacene porphyrins to view their spectrums of absorbance and fluorescence as well as oxidation states and the potential required to achieve them. This data then can be used to interpret if proper electron transfer can occur between the pentacene and poyphyrin units.

Alden Gartrell, Department of Applied Behavior Analysis & Audiology and Speech Language Pathology,
Undergraduate Research Fellowship
Faculty Mentor: Dr. Manish Vaidya

Title: The Effects of Extinction on Low Amplitude Muscle Flexions
The road to recovery following an injury can be arduous and exhausting, this is particularly true for patients' recovery from total knee arthroplasty (TKA). Due to the nature of the procedure, TKA results in proprioceptive damage. Proprioceptive damage may reduce the patient's sensitivity to the feedback naturally provided by the body following the engagement of their quadriceps. Behavior analytically, this phenomenon may effectively be characterized as localized extinction. An effective behavior analytic intervention should be able to identify the onset of extinction and provide alternative means of feedback to combat localized extinction of effort and improve the recovery process.

The current study takes the aim of identifying and isolating the pattern of extinction for the vastus medialis oblique (VMO) flexion response using healthy participants. Before extinction can be assessed, a history of reinforcement needs to be established. This is done by having the participant flex above certain criteria (5,000 microvolts) 3 times. After which all feedback is removed and the extinction phase begins. By specifically programming and replicating extinction, we can begin to identify what a typical extinction curve might look like for a microvolt level response. This information may prove vital in the improvement of current physical rehabilitation techniques.

Mary Gowdy, Department of Linguistics, Honors College
Faculty Mentor: Katie Crowder

Title: Check Your Privilege: The Framing of 'Privilege' and the Changes in its Connotation
As the word "privilege" has been used more frequently in the present times, it has taken on more of a negative connotation. It's associated with white privilege, class privilege, male privilege, etc. This research examines how people view privilege by studying the language and linguistic frames they use to talk about it.

Gillian Graham, Department of Ecology, Undergraduate Research Fellowship
Faculty Mentor: Dr. James Kennedy

Title: Dragonfly Diversity as a Source of Conservation in Urban Ponds
The City of Denton, located in a semi-arid region of Texas, has over 200 man made ponds within its city limits. Many of these ponds, located in densely populated areas, are engineered to control storm water runoff. There is a general lack of recognition of the value these waters contribute to regional biodiversity and as green-spaces. This study, as part of a larger study of all benthic macro invertebrates, is monitoring habitat variables and odonate diversity in a series of ponds selected to represent a gradient of urban influences. The objective of this study is to identify the variables and stressors associated with the diversity. The study has determined that the storm water

ponds have comparable levels of diversity, but differing odonate species composition. Also some environmental stressors may lead to morphological differences. The ponds contribute to the natural resources in the city by providing beautiful, green spaces and management of storm water. Results of this study will be used to develop a conservation plan to maximize the aquatic health of the ponds and if implemented, contribute to the sustainable development in Denton.

Avi Gupta, TAMS

Faculty Mentor: Dr. William Acree

Title: Determination of Abraham model solute descriptors based on experimental solubility data
For this project, our lab worked to obtain the Abraham model solute coefficients for various organic chemicals.

Jeongmu Hahn, TAMS

Faculty Mentor: Dr. Rodney Nielsen

Title: Utilization of EEG Signals to Classify Semantic Categories
My research pertains to using machine learning to classify what the patient was thinking at the time of recording. The machine learning model will classify their EEG signals into 1 of 12 semantic categories.

Alice Hou, TAMS

Faculty Mentor: Dr. Lingqian Chang

Title: An Innovative Nanochip Skin Patch Approach for Electroporating and Transfecting Skin Cancer Melanoma Cells with CRISPR Cas9

Melanoma is the most dangerous and invasive form of skin cancer. Every hour a person dies of melanoma. It is estimated that in 2018, about 91,270 new melanomas will be diagnosed and about 9,320 people are expected to die of melanoma. Researches have shown that several genes are related to the melanoma of human cells. Loss of genes such as NF1, MED12, NF2, CUL3, TADA2B and TADA1 have frequently been observed to show resistance to Vemurafenib, a therapeutic RAF inhibitor.

The purpose of this research is to develop an innovative nanochip skin patch to electroporate and transfect melanoma cells with CRISPR Cas9. CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) Cas9 is a unique tool that enables medical researchers to edit parts of the genome by removing, adding or changing sections of the DNA sequence to study and treat genetic diseases. Traditionally researchers have been delivering CRISPR Cas9 complex into the cells by virus infection. This viral vector delivery method has many limitations including safety, stability and cell type specificity. For example, some viruses are genetically unstable and can quickly reorganize their genomes. This is detrimental to the certainty and reproducibility of the study conducted using a viral vector.

This project targets to eliminate these limitations by utilizing Nano electroporation to electroporate and transduce the cells targeting the NF2 gene with large molecular weight molecule such as CRISPR associated cas9 protein with high efficiency. This will be done through a nanochip platform fabricated to allow effective, large scale, and accurate transfection. The innovative nanochip CRISPR Cas9 delivery tool can greatly improve the delivery accuracy, efficiency and stability. It not only can be used to treat melanoma skin cancer cells, but also be potentially expanded to treat many other categories of cancer cells and thus bring huge impact to the medical field.

Connie Hu, TAMS

Faculty Mentor: Nooshin Mirza Nasiri

Title: Characterization of In-House Synthesized Novel Gold Nanoparticles using Dynamic Light Scattering and Zeta Potential

Nanoparticles (NPs) are being designed for therapeutic applications and characterization is necessary for designing and synthesizing NPs which are able to target specific cancer cells. Dynamic light scattering (DLS) and Zeta potential characterization provide information regarding a NP's size and sUndergraduate Research Fellowshippace charge respectively. Both size and sUndergraduate Research Fellowshippace charge provide information regarding a NP's stability and can be used for informing the design of future NPs. The goal of this study is to analyze the stability of Au NPs which have undergone centrifugation and removal of supernatant through analysis of DLS and Zeta potential characterization of the NPs over a period of 2 weeks. The centrifuged NPs demonstrated a lower polydispersity index in regards to size distribution and were able to maintain a greater magnitude of Zeta potential over the time period than the NPs that did not undergo centrifugation. Other studies are needed in regards to the changes of the absorption spectrum of Au NPs over time using UV-Vis Spectroscopy.

Angie Huang, TAMS

Faculty Mentor: Dr. Warren Burggren

Title: The Survival & Vascular Development of Chickens Exposed to the Environmental Contaminant TCDD: 2,3,7,8-Tetrachlorodibenzodioxin

TCDD is a persistent pollutant that can be delivered to the mammalian fetus from the mother via placenta and breast milk and via yolk in birds. TCDD is known to disturb the development of the chicken embryo. In addition to its effects on mortality, TCDD can also be cardiotoxic, cause angiogenic malformations and organs abnormalities, and affect mechanisms involved in energy metabolism and immunity. This project aims to analyze the early stage vascular development of TCDD exposed chicken embryos, as well aims to observe the survival of chicken embryos exposed to numerous doses TCDD and the morphology of hatched chickens 5 days after birth.

Graham Huether, Department of Emergency Administration and Planning, Undergraduate Research Fellowship

Faculty Mentor: Dr. Gary R. Webb

Title: Social Capital and Tornado Resilience among International Students

This study examines the role of social capital with tornado resilience among international students at a university located in "Tornado Alley." International students were recruited to participate in semi-standardized interviews to gain an in-depth understanding of their knowledge and experience with tornadoes, as well as the forms of social capital they depend of for tornado information and warnings. The results of this study illustrate the importance of social capital for international students and its role with tornado resilience. They suggest that while international students may lack tornado knowledge or experience, the bonding, bridging, and linking social capital afforded to them contributes directly to their risk perception and resilience. This study addresses a gap in the current research on tornado resilience at universities and may support these institutions in developing a culture of tornado resilience among international students.

Brittney Jackson, Department of Psychology, Honors College
Faculty Mentor: Dr. Heidemarie Blumenthal

Title: Protective behavioral strategies and cannabis use problems: A test of the moderating role of gender
Cannabis is the most commonly used illicit substance among college students; while the prevalence of use peaks during the young adult period, only a small proportion of users will evidence use problems (e.g., Cannabis Use Disorder). Protective behavioral strategies (PBS) are self-regulation techniques that people engage in before, after, or instead of using a substance (e.g., alcohol, cannabis, etc.) that may limit use-related risks. Although PBS have been studied extensively in terms of alcohol use, limited work has examined PBS in relation to cannabis. With recent strides towards legalization, it is essential to further examine potential harm reduction strategies for cannabis use, and PBS represent a promising target for both prevention and treatment programs. Together, data suggest that understanding cannabis use and PBS among college students in particular may be an especially productive approach to promoting harm reduction with the increasingly prevalent use of cannabis. **Method:** Participants will include 392 college students (ages 18-25, Mage = 19.95, 66.8% women) who endorsed cannabis use within the past year in an online survey. The PBSM (Pedersen et al., 2016) will be used to assess PBS; the MPI (Johnson & White, 1989) will assess for cannabis use problems. We will then use linear regression to examine the association between PBS use and negative consequences related to cannabis use, controlling for age and past-year use frequency. Given documented differences in risk and protective factors between male and female substance users, PROCESS (Hayes, 2017) will further investigate gender as a potential moderator of the relation between PBS and cannabis use problems.

Victoria Jacobson and Chloe Hunter, Department of Human Development and Family Science, Honors College
Faculty Mentor: Dr. Julie Leventhal

Title: Gender Socialization: From Gender-Typicality to Gender-Neutrality
Gender socialization, the process by which a child is taught to act like a boy or girl, occurs within multiple contexts of a child's development (Blakemore & Hill, 2008). The purpose of this presentation is to explore systemic influences on gender socialization and family, institutional, and policy-related challenges related to gender inconsistencies within and across each system. Various professionals, parents, and policymakers could benefit from increased awareness of the differences in gender-typed vs. gender-neutral behaviors and relevant implications will be provided regarding what can be done within families, institutions, and policy to create micro- and macro-level changes regarding gender socialization.
(This poster was co-authored by Victoria and Chloe, and Chloe's email is chloehunter@my.unt.edu)

Jacqueline Jia, TAMS
Faculty Mentor: Dr. Mohammad Omary

Title: An Investigation of the Synthesis and Characterization of Silver Nanowires
My project studies the synthesis of silver nanowires for optoelectronic and conductive properties. Silver nanowires were synthesized using the polyol method with chitosan as a stabilizing/capping agent. Characterization through UV-Vis spectrometry attained absorption peaks at around 380 nm. Microscopy also showed evidence of nanowires. Future applications include potential replacement of ITO (indium tin oxide) as a conductive material.

Charly Jin, TAMS

Faculty Mentor: Dr. Douglas D. Root

Title: Measuring Myosin Head Interactions in Presence of Destabilizer and Stabilizer Peptides using FRET
Using FRET, I will test the effectiveness of the destabilizer and stabilizer peptides on myosin. Checking the energy transfer will reveal how close the heads of myosin are to the S2 region.

MiKayla Jones, Department of Political science, Undergraduate Research Fellowship

Faculty Mentor: Dr. Bethany Blackstone

Title: Comparing the Policy Agendas of the U.S. Supreme Court and the U.S. Congress

I examine agenda-setting in the U.S. Supreme Court and the U.S. Congress to answer the following question: How are the policy agendas of the U.S. Supreme Court and the U.S. Congress similar and dissimilar? This project contributes to the literature on interbranch relations by measuring the degree of overlap between the congressional and Supreme Court policy agendas.

Kristina Kafle, TAMS, Undergraduate Research Fellowship

Faculty Mentor: Dr. Thomas Cundari

Title: Tungsten-Ligand Bond Strengths for Common 2p Non-Metal Ligands

Tungsten (W) is a transition metal in catalysts that functions through its versatile oxidation states and ability to form strong bonds. Additionally, tungsten plays a significant role in consumer, industry, and chemical applications. This research focuses on W and various nitrogen and phosphorus-based ligands to determine the differences in interaction among isoelectronic ligand types. In previous findings, it was seen that the strength of a metal-ligand (M-L) bond is key to the preferred mechanism for C-H bond activation in catalysis. The present study seeks to calculate accurate M-L bond strengths pertinent to catalysis such as WN and WP, σ and π bonds. Because thermodynamic data for larger, catalytically relevant metal complexes is sparse, we seek to develop theoretical protocols for heavy, Earth-abundant, metal catalysts with higher accuracy and efficiency for larger, experimentally relevant complexes. The present study similarly reports the physical quantification of the variance and uncertainty in Density Functional Theory (DFT) calculations.

The computational chemistry calculations run with the Gaussian 09 software package in combination to an array of common functionals acting upon various basis sets exhibit a consistency across the data sets. Visualized through

a heat map, the consistent error percentage rates imply similar behavior among all effective core potentials. There is, however, slight inconsistency in the values for the second π -bond in the N2 data (std. dev. \sim 6.4 kcal/mol).

There

is similar predictive ability among all density functionals tested with respect to bond angles and bond lengths.

Rhea Kapoor, TAMS

Faculty Mentor: Dr. Krishna Kavi

Title: Analyzing Reuse Distance Patterns in Applications for High-Bandwidth Memory Design

The basis of this research attempts to simultaneously satisfy capacity requirements as well as performance demands in emerging applications such as big data analysis and high performance computing.

The research work involves improving the performance of the main memory as the demand for memory rises especially for data-intensive applications in the areas of big data analytics and highperformance computing.

Logan Karwoski, Department of Psychology, McNair Scholar Program
Faculty Mentor: Dr. Joshua Hook

Title: Thoughts, prayers, action: Assessing the relationship between prayer and further civic engagement
The United States has seen a spike in tragic events (i.e., natural disasters, mass shootings, etc.) over the last few years and a common first response is an offering of thoughts and prayers. However, recent criticism has associated the term "thoughts and prayers" as a token display of support for a social cause with an accompanying lack of willingness to devote significant effort to enact meaningful change. It is important to understand the influence prayer may have on an individual's level of civic engagement. The purpose of this study is to examine the relationship between prayer and prosocial behavior towards communities struck by tragic events. Specifically, this study explores facets of personal prayer and locus of control that may predict higher probabilities of participating in methods of civic engagement.

Conner Kennedy, Department of Biochemistry, Undergraduate Research Fellowship
Faculty Mentor: Dr. Amie Lund

Title: Traffic-Generated Air Pollution-Mediated Alterations in Cerebral AhR and CYP Enzyme Expression Dependent upon Age and Diet in C57BL/6J Mice
Inhalation exposure to traffic-generated air pollutants have been reported to have deleterious effects on the central nervous system (CNS), including blood brain barrier (BBB) disruption and neurovascular, neuroinflammatory, and neurodegenerative diseases. Cytochrome P450 enzymes (CYPs) are one of the main classes of biotransforming enzymes present in the body, which mediate reactions of thousands of endogenous and exogenous substrates. Altered expression of certain CYP enzymes are associated with neurodegenerative disorders, thus we chose to investigate the effects of inhaled traffic-generated air pollutants on expression of these enzymes in the CNS on the BBB. Additionally, because activation through the aryl hydrocarbon receptor (AhR) regulates transcription of CYP1A1 and 1B1, we analyzed its expression in the cerebrum and microvasculature, as well. Young (2 mo) or aged (18 mo) male C57BL/6J wild type mice were placed on either a "Western" high fat (21% fat by content) or low fat diet, and subsequently exposed to either 300 µg/m³ of mixed exhaust (MVE: 250 µg/m³ PM diesel engine + 50 µg/m³ PM gasoline engine emissions) or filtered air (FA, controls) for 6 hr/day, 7 days/wk, for 50 days. Brain tissue was collected at the end of the exposure period, and prepared for either real time RT-qPCR or double immunofluorescence, to detect variation in AhR and CYP enzyme expression in the cerebrum and/or BBB. MVE-exposure resulted in significant increases in CYP2D (~1.5-fold), CYP2E1 (~2-fold) enzymes, with trending increases in AhR and CYP1B1 enzyme expression in the CNS of aged mice on a low fat diet, while the expression of these same enzymes had the opposite trends in expression (decreased with MVE exposure) in the CNS of young C57BL/6J mice on a low fat diet. There was no statistic change observed in expression of CYP1A1 in either young or old mice. In the high-fat fed C57BL/6J mice, MVE-exposure resulted in a significant decrease in CYP1B1, with trending decreases in CYP2D, CYP2E1, and CYP3A1 mRNA in the aged mice. Inverse (increasing) trends in expression in CYP2D, CYP2E1, and CYP3A1 were observed in the young mice on a high fat diet, compared to FA controls. Thus, our preliminary findings suggest that inhalation exposure to traffic-generated pollutants altered cerebral expression of AhR and CYP enzymes in the young vs. aged differently (typically inversely), that is further complicated with concurrent consumption of a high fat diet. Research funded by NIEHS R00ES0126586 (AKL).

Eunyoung Kim, TAMS

Faculty Mentor: Dr. Denise Perry Simmons

Title: Photothermal efficiency of silver nanoparticles in three dimensional tissue models: An investigation on the effect of nanopartic

Photothermal treatments for cancer use metallic nanoparticles to increase local temperature through excitation of localized surface plasmon resonance (LSPR). Yet, the effect of the surrounding microenvironment on nanoparticle photothermal efficiencies remain unknown. In vitro 3D tissue substrate models were used to address this understanding. In this experiment, protocols for synthesis of different sized silver nanoparticles stabilized in polyacrylic acid (AgPAA NP) were developed. AgPAA NP were characterized for UV-Vis spectra, size-based dynamic light scattering, surface charge- and stability-based zeta potential. Characterization of three in vitro scaffolding substrates: water, polyHEMA, and hydrogel was performed by irradiation with a 632.8nm HeNe laser. To determine light to heat conversion efficiency of AgPAA NP in substrate-based microenvironments, irradiation-driven temperature measurements were recorded across time with a thermocouple sensor. Mie theory indicates that the absorption spectra of spherical metallic nanoparticles display a singular peak that increases in wavelength, or is red-shifted, with an increase in nanoparticle radius. Experimental results showed that, of the synthesized AgPAA NP with peak absorptions (SPR bands) at 440, 540, and 580nm, those polyHEMA-embedded AgPAA NP with peak absorptions at 540nm and 580nm were able to generate significant laser-induced changes in heat. These data support that substrate and NP size have an effect on photothermal efficiency of AgPAA NP and thus lay the foundation for the next step – a mathematical guideline to predict improved 3D tissue models for nanoparticle-designed heating in cancer treatment.

Nilesh Kodali, TAMS

Faculty Mentor: Dr. Joshua Hook

Title: Meta- Analysis: correlation between forgiveness traits and HEXACO traits

I conducted a meta analysis with various research articles that correlate different parts of the HEXACO personality traits to the forgiveness traits.

Arham Kothari, TAMS

Faculty Mentor: Dr. Saraju Mohanty

Title: Smart-Log

Smart-Log is a sensor system connecting nutrition and stress that alerts the user when they are not in need of the nutrition they are consuming. When their eating is due caused by stress, the user application will alert them, in turn discouraging them from eating and working towards reducing their chances of obesity. This food detection-based log system contributes to IoMT through nutritional information distribution and stress detection to improve user health.

Anvith Kowtha, TAMS

Faculty Mentor: Dr. Ana P. Alonso

Title: Analyzing the Compounds Produced by The Cuckoo Fungus

Uncovering the compounds produced by the Cuckoo Fungus sclerotia that influence the symbiotic relationship between the fungus and the termite. The two organisms shared a special relationship in which the fungus mimics the eggs of the termites in order to occupy the termite nest as a shelter. While the fungus sclerotia physically represent the eggs, there is likely a pheromonal connection as well, because pheromones play a role in termite-egg recognition. This, can be accomplished by the usage of mass spectrometry and metabolomics techniques.

Riya Kumar, TAMS

Faculty Mentor: Dr. Daniel J. Taylor

Title: Associations between pain, depression, stress, and substance use in nurses with and without insomnia

Insomnia and pain are related to increased risk for the development of depression and substance use disorders. Depression, substance use, stress, and pain are also strongly correlated with sleep impairment. No studies have examined associations between insomnia, pain, stress, substance use, and depression in a sample of nurses, who may experience these disturbances due to stressful work environments, intense physical demands, and rotating work schedules. Therefore, the present study examined if insomnia symptoms, pain symptoms, and perceived stress were associated with alcohol use and depressive symptoms in nurses, and if insomnia diagnosis moderated these associations. Associations were examined in a sample of 400 nurses recruited from two hospitals for a parent study, "Sleep and Vaccine Response in Nurses." Participants completed self-report measures of depression, pain, insomnia, and stress. Results revealed that insomnia symptoms, stress, and pain were associated with sleep disturbance. Additionally, results suggest that greater stress was associated with greater substance usage. Finally, the study found that nurses with insomnia may be more susceptible to depressive symptoms under times of higher stress.

Rhianna LaValla, Department of Information Science, Undergraduate Research Fellowship

Faculty Mentor: Dr. Alexis Palmer

Title: Authorship Attribution for Insider Threat Detection

Insider threats are one of the most costly and difficult to detect security threats, particularly for businesses that deal with classified or proprietary information. They bypass most traditional security measures, which focus on restricting and denying access to those outside of the organization, and are typically even approved to access the information they leak. This can be for personal financial gain, to spite the company, if the person is being blackmailed, part of a whistleblower program, or even accidental. My research aims to pick out insider threats before they occur, by analyzing employee's textual data and determining when they vary from their norm.

Quan Le, TAMS

Faculty Mentor: Dr. Wonbong Choi

Title: Bio-derived waste hemp carbon for high performance flexible supercapacitor

The study, design, and characterization of a flexible high-performance supercapacitor using waste hemp carbon

Grace Lee, TAMS

Faculty Mentor: Dr. William Acree

Title: Abraham Solvation Model Coefficients of o-Acetoacetanisidide

Abraham Solvation Model Coefficients of o-Acetoacetanisidide

Isai Leguizamo, Department of Biology, McNair Scholar Program

Faculty Mentor: Dr. Karl Klose

Title: Inactivation of the flagellin gene flaC in *Vibrio cholerae*

Vibrio cholerae is a Gram-negative bacterium with a single polar flagellum that is responsible for the enteric disease cholera. *V. cholerae* is spread through contaminated water in areas with poor sanitation. Once ingested by humans, the bacterium propels itself via the flagellum toward the epithelial cells of the small intestine and adheres to the sUndergraduate Research Fellowshippace, where it produces cholera toxin (CT). CT causes an efflux of fluid into the lumen of the small intestine. This initiates the symptoms of profuse diarrhea, which can lead to severe dehydration and death. *V. cholerae*'s flagellar filament is composed of five flagellin proteins that share a high degree of homology (FlaA, FlaB, FlaC, FlaD, and FlaE). However, only flaA is necessary and sufficient for flagellar synthesis and motility. The flagellin proteins of *V. cholerae* are contained in two separate chromosomal loci: flaAC, and flaEDB. To determine the contribution of the FlaC flagellin to filament formation and motility, the flaC gene will be deleted from wildtype *V. cholerae*, as well as a *V. cholerae* strain lacking flaEDB. A plasmid that contains the deletion of flaC coding sequence (flaC) will be introduced by conjugation into the *V. cholerae* strains, and integrated into the chromosome by homologous recombination. A second recombination that removes the flaC sequence will be selected for by the counterselectable marker sacB. *V. cholerae* containing flaC will be identified by PCR and confirmed by sequencing. The effect of flaC on motility will then be analyzed by inoculation of the strains into motility agar.

Andrea Lopez Garza, Department of Anthropology, Undergraduate Research Fellowship

Faculty Mentor: Dr. Jara Carrington

Title: Latinx LGBTQ Oral History Project

This is an oral history project that focuses on the collection of oral narratives, photographs, historical documents, activist memorabilia, and other related materials of Latinx LGBTQ-identified persons in North Texas. As "mainstream" histories and narratives on LGBTQ people frequently exclude the ways that factors such as race, gender, ethnicity and legal status intersect with and influence sexual identities and practices, the experiences, perspectives and important contributions of LGBTQ-identified persons of color are overlooked. First-person accounts by minority or marginalized groups depict the stories and perspectives that are unheard and unseen in the mainstream narratives. This project makes visible the diverse and multilayered narratives of Latinx LGBTQ-identified persons as integral to LGBTQ history in North Texas.

Jonathan Lu, TAMS, Undergraduate Research Fellowship

Faculty Mentor: Dr. William Acree

Title: Group-Additivity Model Correlations for Enthalpies of Solvation of Organic Chemicals

In this research, we present a novel Group-Additivity model in which variables utilized to predict enthalpies of solvation are based on molecular structure (non-experimental) rather than experimentally collected data. These models thus require a relatively small set of empirical data to predict the behavior of a much larger range of chemicals. Our models include those of solutes dissolved in benzene, acetonitrile, and tetrahydrofuran. Group-additivity models of these solvents were then compared to their Abraham counterparts and showed similar levels of predictive accuracy, giving insight to their potential as an efficient method of determining chemical properties.

Sean Lynch, Department of Jazz Studies, Undergraduate Research Fellowship

Faculty Mentor: Quincy Davis

Title: The innovative rhythmic accompaniment of Max Roach

Max Roach was a pioneer in the innovation of rhythmic accompaniment on the drum set during the bebop and bop eras of jazz. Many rhythms he played simultaneously with different limbs were very advanced and pushed the boundaries of jazz drumming in the forties through sixties. In my research I transcribed twenty five separate recordings and created a digital PDF of various rhythms, as well as video recorded demonstrations of all rhythms for the musical academic community.

Pramati Madugula, TAMS

Faculty Mentor: Dr. Oliver M. R. Chyan

Title: Liquid Phase Deposition of Azole Group Inhibitors on Copper

Electronic devices have become an irreplaceable part of our lives. We are surrounded by them, every hour of every day of our lives, whether it be our cellular devices, laptops, refrigerators, or vacuum cleaners. The most basic units of an electric device are microcircuits, minuscule circuits that perform complex functions when used in multitude. One of the most commonly used materials in these microcircuits is copper due to its numerous advantageous properties, including its low resistivity and high conductivity of electricity, as well as its relatively low cost. However, due to numerous uncontrollable factors, including sulfides and chlorides present in the environment and atmospheric moisture, copper interconnects at bimetallic interfaces have been discovered to corrode in said microcircuits, causing problematic device failures and posing a major challenge to manufacturers in the microelectronics industry. Our research explores the usage group inhibitors to prevent this corrosion of copper interconnects at bimetallic interfaces in microcircuits.

Victoria Magallanes, Department of Communications and Political Science, Undergraduate Research Fellowship

Faculty Mentor: Regina Branton

Title: Where Politics and History Collide: Looking at the significance between Confederate Monuments and Voter ID Laws

This study compared the statistical relationship between a state's voter identification laws and quantitative amount of confederate monuments. First we compiled the confederate monument data for each state, then we compiled the voter identification data for each state. Specifically, we coded the Voter ID laws in four different categories: non strict, strict, non- photo and photo. Other variables accounted for are the state's regional location, the state

governor and legislature party, and minority population. Overall the research has led us to establish a correlation between confederate monuments and photo voter identification laws in Southern States. The hope for this study is to open up a new avenue for future researchers which has not yet been explored.

Kendra Maher, Department of Audiology and Speech Language Pathology, Honors College
Faculty Mentor: Dr. Sharon Miller

Title: Neural Coding of Speech with and without a Hearing Aid

This electrophysiological research project aimed to investigate whether hearing aids affect the neural coding of critical acoustic cues that differentiate the speech sounds 'b' versus 'd'. The study had two specific aims: 1) to determine whether cortical auditory event-related potentials (ERPs) elicited using 'ba' and 'da' stimuli varied consistently in an unaided condition; and 2) whether hearing aids modified the unaided cortical response patterns to the speech sounds. Ten listeners with normal hearing participated in the study, and ERPs were collected with and without hearing aids. Preliminary results suggest the ba-da contrast was differentially encoded in the auditory cortex with and without a hearing aid. However, the hearing aid did modify neural response patterns, suggesting that patients would need to adapt to the aided altered cortical representations.

Alaina McGuffee, Department of Political Science, Honors College
Faculty Mentor: Dr. Bethany Blackstone

Title: Policymaking at the Intersection of Legislative and Judicial Politics

Previous research on Congress-Court interactions typically focuses on either a single issue area or the use of one policy tool (e.g. judicial review, statutory construction, or statutory overrides). I will develop a typology to characterize alternative policymaking contexts in which Congress and the Supreme Court interact to facilitate comparisons of policymaking across issue areas. My broader project will consider contemporary Congress-Supreme Court interaction by analyzing primary and secondary sources related to congressional and judicial policymaking between 2002 and 2017. In this manuscript, I take the preliminary step of reviewing existing studies of Congress-Supreme Court interaction and evaluating how well the Legislative Baseline Formula articulated and critiqued by Lovell (2010) explains instances of Congress-Court interaction.

Raahi Menon, TAMS

Faculty Mentor: Dr. Douglas Root

Title: Determining the Presence of Hysteresis in and the Effects of a Destabilizer Peptide on Tropomyosin

My research aims to determine the existence of hysteresis in tropomyosin, as well the effects of a synthetic destabilizer peptide developed in lab. Hysteresis is strongly related to the stability of the protein, and is exhibited if the forces necessary to coil and uncoil are consistently different. This implies that stable intermediate structures are being formed during the folding and unfolding process. As myosin, another muscle protein, has a tail structure that is very similar to the coiled coil of tropomyosin, I hypothesized that, like myosin, tropomyosin would not exhibit hysteresis. Not only this, but tropomyosin is known to be a fairly unstable protein, and as hysteresis is related to stable processes, it is unlikely that tropomyosin would exhibit it. I hypothesized that the destabilizer peptide would decrease the forces necessary to extend and contract tropomyosin, as destabilization is correlated to increased contractility.

Nicholas Mercado, Department of Biochemistry, Honors College, Undergraduate Research Fellowship
Faculty Mentor: Dr. Lee E. Hughes

Title: Analysis of Induced Antibiotic Susceptibility in *Streptomyces griseus* Lysogens

Using the Kirby-Bauer Antibiotic Susceptibility protocol, comparisons of susceptibility were made between *Streptomyces griseus* ATCC 10137 and lysogens of this strain. So far, lysogens created by infection with *Streptomyces* phages LilBooBoo, a Cluster BB1 phage, and Animus, an unclustered phage, have been tested. *S. griseus*(LilBooBoo) showed a 31% increase in the zone of inhibition for Ciprofloxacin, a 33% increase for Polymyxin B, and a 79% increase for Tetracycline. *S. griseus*(Animus) showed a 35% increase in the zone of inhibition for Ciprofloxacin, a 40% increase for Polymyxin B, a 53% increase for Tetracycline, and induced apparent new susceptibility in Amoxicillin and Ampicillin with an increase in inhibition zone diameter from 0mm in the parent strain to 7mm and 10mm respectively. Both the parent and lysogen strains were fully resistant to Sulfamethoxazole and Streptomycin. Lastly, Triple Sulfa produced a very cloudy zone with an average diameter of 26mm throughout all tested organisms. The Kirby-Bauer method will continue to be used for analysis of susceptibility differences in *S. griseus* and lysogens from various clusters to determine if this increase in susceptibility is cluster specific or a general trend for *S. griseus* lysogens. Once data has been collected for a wide array of phages in different clusters, bioinformatic tools will be used to develop an understanding of this increase. While research is still in early development, it is possible that genes related to resistance in the parent strain are being directly affected or otherwise disrupted by the insertion of the prophage, or genes carried by the prophage are changing susceptibility of the host. It is also possible that the change in zone size is due to phage induction. These possibilities will be tested once the initial data collection phase is complete.

QuaDreon Miller, Department of Psychology, Honors College, Undergraduate Research Fellowship
Faculty Mentor: Dr. Flores Niemann

Title: Ethnic Identity and Educational Outcomes in African American College Students

Studies have shown that African American students demonstrate lower levels of academic engagement, lower grades, and higher dropout rates, and lower reports of social support (Cole et al., 2007), especially for African American males. Stallman (2010) found that psychological distress was reported more for college students than for the general population, which is negatively associated with academic performance. However, current literature has not fully examined the role that ethnic identity plays in a college student's life, especially for students of color in historically white institutions (HWIs) and/or PWIs. Racial stressors are in the everyday lives of ethnic minority students and should be taking into consideration, whenever testing for psychological distress in college studies (Greer, 2008).

Daxon Mitchell, Department of Psychology, Undergraduate Research Fellowship
Faculty Mentor: Dr. Chiachih D.C. Wang

Title: The Associations of Adult Attachment, Fear of Missing Out, and Need for Popularity on Social Media Use Among College Students

The prevalence of social media use has increased dramatically over the last decade and overuse of social media has been linked to depression, anxiety, and social dysfunction. Because social media use will likely continue to increase in the foreseeable future, identifying factors that contribute to greater social media use will provide a greater understanding of social media use. Recent research has found that several interpersonal factors including adult attachment, the fear of missing out, and the need for popularity each contribute to greater social media use. However, the combined effects of these variables on social media use have yet to be examined. The current study

seeks to analyze the direct effect of adult attachment on social media use as well as its indirect effect via the fear of missing out using a sample of college students, who have significant social motivations to utilize social media. Need for popularity will also be evaluated as a potential moderator on the relationship between adult attachment and the fear of missing out.

Madison Molloy, Department of Psychology and Criminal Justice, Honors College

Faculty Mentor: Thomas Miles

Title: The Evolving Role of Social Media on User Punitiveness and Criminal Sentencing

My research examines the role of social media usage and news participation via social media on user punitiveness and tendency to perceive punishment, deterrence, rehabilitation or incapacitation as the most important role of criminal sentencing. Because previous research indicates that mass media outlets such as television news programs and dramatized crime and police-reality shows suggests a positive relationship between media consumption, fear of crime, perception of crime seriousness and punitiveness, I predict that social media habits are related to punitiveness and a preference for harsh sentencing policies as well.

Akila Muthukumar, TAMS

Faculty Mentor: Dr. Kent Chapman

Title: Cottonseed Oil and Protein Analysis

Analyzed 6 replicates of cotton grown in rain fed and irrigated conditions in conjunction with a USDA study to determine the effect of watering conditions, geographic location and various factors on nutritional content of seeds. Then, unusual samples are analyzed in detail to find novel FATB mutations. Future application includes ability to genetically modify plants for nutritional fortification.

Varun Nayak, TAMS

Faculty Mentor: Dr. Gayatri Mehta

Title: Gamifying Electrical Engineering

I used computer science to teach electrical engineering concepts to middle schoolers.

Reese Neal, TAMS

Faculty Mentor: Dr. William Acree

Title: Determining the Solubility Behavior of O-Acetoacetanilide in Organic Solvents

The Abraham General Model of Solvation is a mathematical equation that is often used in computational chemistry to quantitatively predict the solubility behavior of two immiscible phases. The model uses one of two phase-dependent equations shown below to calculate the ratio of the concentrations of a solute between two equilibrium and immiscible phases, also known as the partition coefficient. The model also calculates the solute descriptors such as the solute's acidity, basicity, and dipolarity, as well as the corresponding solvent descriptors. The resulting descriptors explain behaviors of the chemical compounds, which allows for improved efficiency of the use of these chemicals in fields such as pharmaceuticals and agriculture. The poster that is to be presented on scholars day in a typical analysis of chemical O-acetoacetanilide, a chemical common in dyes in the construction and textile industry, using the Abraham solvation model.

Amy Nguyen, Department of Psychology, Undergraduate Research Fellowship
Faculty Mentor: Dr. ChiaChih D.C. Wang

Title: The Associations of Internalized Sociocultural Body Standards, Cultural Orientation and Body Dissatisfaction of College Students

Research suggests that the prevalence of body image dissatisfaction (BID) among adolescents and college students is around 50% and that BID is a significant predictor of depression, anxiety, low self-esteem, and eating disorders (Bearman et al., 2006; Gavin et al., 2010; Kostanski & Gullone, 1998; Stice et al., 2000). Previous research has identified internalized sociocultural body standards influenced by media, family, and peers as a major factor contributing to high levels of body dissatisfaction. Because one's cultural orientation is likely to affect how susceptible she or he may be to external influences, cultural orientation variables may interact with sociocultural body standards affecting the development of BID. However, the combined effects of these variables have yet to be examined. The current study will analyze the direct effect of internalization of sociocultural body standards on BID as well as the moderator effects of cultural orientation variables on the main relationship. In addition, the potential gender differences in the hypothesized direct and moderator effects will be explored.

Mira Patel, TAMS

Faculty Mentor: Dr. Pamela Padilla

Title: Effects of a High Glucose Diet on the Unfolded Protein Response in *Caenorhabditis elegans*

Hyperglycemia is a metabolic syndrome associated with diabetes, this project investigates the involvement of specific genes and dietary glucose on molecular stress responses and slow growth. This project uses the nematode *Caenorhabditis elegans*, as a model to observe the function of the mitochondrial and endoplasmic reticulum Unfolded Protein Response (UPR) as a means to understand diabetes at a cellular level. UPR is integral to retain proper cellular function and as a result, has implications in diseases that impair cellular integrity. Hence, to investigate the specific molecular effects of hyperglycemia, this project primarily focused on the UPR as a stress response. Furthermore, a series of multi-generational experiments established that the UPR stress caused by a high-glucose diet affects only those directly influenced by the glucose itself, and not the subsequent generations. This finding negates that the UPR process is involved with the epigenetic side of diabetes, and therefore gives an insight into the cell's ability to restore health via such responses without hereditary implications. Moreover, the insulin like-receptor homolog, *daf-2(e1370)*, mutant animals resisted the stress sought by a high glucose diet in terms of both, the UPR and the slow growth phenotype. This showed that in the *daf-2* mutant, a glucose diet did not elicit a heightened UPR or slow the development of the nematodes. These investigations have pinpointed specific correlations of glucose and the DAF-2 insulin signaling pathway in the Unfolding Protein Response within molecular processes and provide a strong basis for developing strategies for pharmacological therapies for disorders such as diabetes.

Vishal Patel, TAMS

Faculty Mentor: Dr. Warren Burggren

Title: The Affect of Hypoxia on Zebrafish Recovery and Knockdown as an Animal Model.

The need for an accurate model for the human cardiovascular system is required to test various diseases and drugs which may affect the human heart. Thus, this research seeks to provide Zebrafish as an animal model which is apt in emulating a human heart attack and its recovery. Hypoxia was used to knockdown fish and stimulate a heart attack. Then, it was hypothesized that as time in hypoxia increased, Troponin T would increase as well, which proved that there was damage to the heart. Zebrafish were tracked through hypoxia exposure and recovery to note

cardiac output and survival rates. When accounting for the resting period, the researchers believe that the zebrafish will recover better in the long-term with a two hour resting period and then being treated. Thus, Zebrafish were tracked over time, development, and in comparison to a control to show damage to the heart and their recovery, creating them a reliable animal model for the human cardiovascular system.

Avery Patton, Department of Ecology for Environmental Science, Undergraduate Research Fellowship
Faculty Mentor: Dr. David Hoeninghaus

Title: Ecomorphology of fishes from intermittent streams in Denton, TX

Seasonal drought is a natural process that occurs in many freshwater ecosystems, such as intermittent streams, and native species are adapted to persist during these conditions or to rapidly recolonize these areas upon re-connection of fragmented reaches. However, anthropogenic activities, notably increased freshwater resource demands, and global climate change are increasing both the severity and length of drought resulting in reduced survival and local extirpations of native species. Therefore, it is important to quantify species traits associated with habitat use and diet that can be used to understand and predict how species may respond to changes in the environment. We measured 32 morphological variables and calculated 21 ecomorphological indices for 12 fish species across 5 families collected from intermittent streams in Denton, TX, which represent 5 habitat and 4 trophic groups. Population averages were recorded for each ecomorphological index and compared among species and different habitat and trophic groups. This data will compliment additional trait datasets for these fishes, and be applied with other studies in these systems to determine significant traits that can be used to predict species-specific responses to changes in the environment.

Aditya Paul, TAMS

Faculty Mentor: Ram Dantu

Title: True Matching of Employer's Needs

This project presents a novel blockchain-based tool to assist with hiring decisions by eliminating the need for background checks and providing a novel way of shortlisting applicants for a potential career

Veena Peraka, TAMS

Faculty Mentor: Casey Guillot

Title: The relationship of positive urgency (but not negative urgency) with alcohol use is moderated by PTSD symptoms

Many studies have related negative urgency (i.e., the trait tendency to act impulsively in response to negative emotion) and positive urgency (i.e., the trait tendency to act impulsively in response to positive emotion) to alcohol use. Numerous studies also have related post-traumatic stress disorder (PTSD) symptoms to alcohol use. To our knowledge, however, no prior study has investigated whether the relationship of positive and negative urgency with alcohol use is moderated by PTSD symptoms. In the current study, the full sample consisted of 542 young-adult college students (aged 18-35; M age = 21.1; sex: 71.4% female). Participants were administered self-report measures of positive and negative urgency, PTSD symptoms and symptom clusters, trauma exposure, and alcohol consumption and problems. Moderated regression analyses statistically controlled for sex, age, and anxiety and depressive symptoms, with analyses involving alcohol problems additionally controlling for alcohol consumption. In the full sample, moderated regression analyses revealed that the association of positive urgency (but not negative urgency) with alcohol consumption was significantly moderated by PTSD symptoms, such that

positive urgency was more strongly related to greater alcohol consumption at lower (vs. higher) levels of PTSD symptoms. In examining the PTSD symptom clusters that underlie this association, post hoc analyses revealed that all PTSD symptom clusters except one (i.e., hyperarousal/hyperreactivity) similarly and significantly moderated the positive urgency and alcohol consumption relationship. Moderated regression analyses further revealed that the association of positive urgency (but not negative urgency) with alcohol problems was significantly moderated by PTSD symptoms, such that positive urgency was more strongly related to greater alcohol problems at higher (vs. lower) levels of PTSD symptoms. In examining the PTSD symptom clusters that underlie this association, post hoc analyses revealed that PTSD intrusion (or re-experiencing) symptoms and avoidance symptoms similarly and significantly moderated the positive urgency and alcohol problems relationship. In the trauma-exposed subsample of 410 participants (75.6% of the total sample), the pattern of findings in relation to alcohol consumption was unchanged in terms of statistical significance, whereas the pattern of findings in relation to alcohol problems became non-significant. Hence, the relationship of positive urgency with alcohol use appears to be differentially moderated depending on if the outcome variable is alcohol consumption or alcohol problems, although the relationship with alcohol problems did not retain significance when the sample was limited to only trauma-exposed individuals. The potential implications of these findings are discussed.

Benjamin Phipps, Department of Biology and Spanish, Honors College, Undergraduate Research Fellowship
Faculty Mentor: Dr. Amie Lund

Title: The Effects of Exposure to Air Pollutants on RAS Expression and Signaling of Monocytes in Wild-Type Mice.

While multiple studies have reported a positive correlation between exposure to traffic-generated air pollution and exacerbation of cardiovascular disease (CVD), and more recently kidney diseases, very few studies have focused on the effects of these exposures in a healthy animal model. Furthermore, little is known on whether these exposure-related effects are exacerbated by concurrent consumption of a high fat diet. The renin-angiotensin system (RAS), when dysregulated, is known to mediate pathogenesis in the renal and cardiovascular system through Angiotensin (Ang) II signaling via the Ang II Type 1 (AT1) and/or Type 2 (AT2) receptors. We have previously reported that plasma Ang II levels are increased in C57Bl/6 wildtype mice exposed to traffic-generated pollutants. Thus, we hypothesize that inhalation exposure to traffic-generated pollutants results in altered RAS signaling in the vasculature and/or kidneys. To test this hypothesis, 3 mo old male C57Bl6 mice on either a high-fat "Western" diet (HF, 21% fat) or standard (LF, low fat) mouse chow were randomly assigned to inhalational exposure of either filtered-air (FA n=10 per diet) or a mixture of 70 $\mu\text{g PM}/\text{m}^3$ diesel exhaust + 30 $\mu\text{g PM}/\text{m}^3$ gasoline exhaust (MVE: n=10 per diet) for 6 hr/day for 30 days. MVE exposure resulted in increased expression of the AT1 receptor in the vasculature, as determined by RT-qPCR and immunofluorescence, which was further exacerbated in MVE+HF diet animals, compared to FA controls. Vascular oxidative stress, expression of intracellular adhesion molecule (ICAM)-1, and monocyte/macrophage infiltration were significantly increased in the aorta of MVE+LF and MVE+HF C57Bl/6 mice. MVE-exposure resulted in increased renal AT-1 and renin protein expression (transcript levels only moderately increased, $p=0.098$), compared to FA controls. Interestingly, renal MCP-1 mRNA levels were decreased with either HF diet or MVE-exposure, compared to FA+LF. No statistical change was observed in renal AT-2 levels across groups. Such findings indicate that inhalation exposure to traffic-generated pollutants can promote induction of RAS signaling, associated with factors that mediate the initiation and progression of vascular and kidney disease.

Claire Pitre, Department of Geography, Undergraduate Research Fellowship
Faculty Mentor: Dr. Alexandra Ponette-González

Title: Bird Feathers as Biomonitors of Soot Pollution

Black carbon, commonly known as soot, is a component of particle pollution. The emission of black carbon into the atmosphere is one of the main contributors of anthropogenic global warming and has adverse effects on air quality. Birds have been used as biomonitors for atmospheric pollution via the collection and measurement of pollutants that have accumulated in bird feathers, muscle tissue, urine, and preen oil. Bird feathers, specifically, can be used as non-destructive biomonitors because already-moulted feathers can be analyzed. In previous studies, bird feathers have been used to track bioaccumulation (the internal concentration of substances ingested by an organism) of pollutants, but most have not been concerned with the external accumulation of airborne pollutants in on bird feathers. When external contamination in feathers is addressed, generally the goal is to not quantify it but to remove it to more clearly investigate internal concentration. External contamination of bird feathers can occur directly from airborne pollutants, water, or during the process of preening. In this study, primary chicken feathers are tested for their capacity to externally accumulate black carbon particles. Primary feathers are washed with double-deionized water and acetone before being exposed to black carbon pollution near streets with high automobile traffic levels in Denton, Texas. The feathers are then washed again and the black carbon particles collected and analyzed to determine the quantity of externally accumulated black carbon. The examination of feathers as biomonitors for atmospheric black carbon provides a valuable geographically localized method for assessing anthropogenic climate warming and air quality.

Ellen Qian, TAMS

Faculty Mentor: Dr. William Acree

Title: Streamlining the Design of Task-Specific Ionic Liquids to Eliminate the Impact of Greenhouse Gases

Eliminating the harmful effects of greenhouse gases (GHGs) by controlling their release into the atmosphere is arguably the most challenging environmental issue scientists face. However, ionic liquids (ILs) prove to be a promising solution. Nicknamed “designer liquids,” ILs are salts in the liquid state that can be chemically designed to accomplish specific tasks. In my project, I am designing environmentally friendly ILs that can capture GHGs effectively. I hypothesized that ILs with a shorter chain structure would be able to solubilize GHGs with greater efficacy, due to their compact structure, which would have less steric hindrance when solubilizing gas molecules. Using the Abraham model, a linear free-energy relationship, I created a matrix in Excel that calculates the partition coefficients of 784 IL systems, revealing the ILs that capture GHGs effectively. In doing so, I have identified a structural pattern among the ILs that capture common GHGs well. I discovered that bulky ILs tended to reveal more attachment sites and space for capturing gaseous molecules, and the opposite held true for ILs that had smaller, more compact structures. In short, contrary to my initial hypothesis, it is critical to note that the longer alkyl chains in ionic liquids may reveal more attachment sites and space for capturing gases. These findings will improve and accelerate the development of novel ILs for capturing destructive GHGs, leaving a cleaner environment for generations to come.

Jordan Quandahl, Department of Psychology, Honors College

Faculty Mentor: Malinda Wilson

Title: How Does Childhood Abuse Effect the Grades of Adolescents?

During this research study, I will look at how childhood abuse effects adolescents and their grades. Tsegba (2013), suggest that childhood abuse has a major effect on primary school students. The research I have currently

gathered leans more toward a positive correlation between childhood abuse and grades of adolescence significantly decreasing. Other articles show that college students who suffered child abuse also tend to have a decrease in their grade point average as well. I predict that there will be a strong relationship among interpersonal trauma and students' grades. I will measure this data by compiling different scholarly articles, and by using previous research methods.

Ian Rapp, Department of Ecology, Undergraduate Research Fellowship
Faculty Mentor: Dr. David Hoeinghaus

Title: Sampling Methodology for sUndergraduate Research Fellowshipace Microbiota in Stream Fishes
Drought is a natural environmental stressor in arid regions, but the duration and intensity of drought conditions are being exacerbated due to human demands on freshwater resources and global climate change. While many species in these regions exhibit adaptations that allow for population persistence or recolonization over time, they may be, or will soon be experiencing conditions at the extremes of their tolerances, resulting in decreased fitness or local extirpation of populations. Host-microbiome interactions, which may be impacted by these increasingly harsh environmental conditions, play an important role in host immune function and defense. We sampled sUndergraduate Research Fellowshipace microbial communities from five species of stream fishes (*Lepomis macrochirus*, *L. megalotis*, *Micropterus salmoides*, *Fundulus notatus*, and *Lythrurus umbratilis*) from upstream and downstream reaches of Hickory Creek (Denton, TX) at the onset of drought conditions to quantify differences in microbial composition among and within species and stream reaches. Replicate individuals of each species were sampled, and total length was recorded for each individual in the field. Additionally, water samples were collected from each site to determine the composition of microbes available from the environment to colonize the fishes. DNA was extracted from fish sUndergraduate Research Fellowshipace microbial community and water samples using a Power Soil DNA Isolation Kit, and will be sequenced on an Illumina MiSeq. The results from this study will provide insight into the diversity of sUndergraduate Research Fellowshipace microbial communities in these fishes and inform future sampling efforts in this stream system.

Stephanie Ray, Department of Emergency Administration & Planning, Undergraduate Research Fellowship
Faculty Mentor: Dr. Elyse Zavar

Title: Commemoration on Foot: Identities and Motivations of Joplin Memorial Runners
An EF-5 tornado struck Joplin, Missouri on May 22, 2011, leaving 25 percent of the structures in Joplin destroyed and an additional 50 percent damaged. On the ground for 38 minutes, the tornado claimed 161 lives and injured over 1,150. Both spontaneous and formal memorials appeared in the days and weeks following the disaster. The Joplin Memorial Run (JMR), rebranded in 2012 as a memorial to the tornado victims, draws participants from across the country to run in the events and perform commemorative activities. The JMR offers a half marathon, 5k, team relays, and a children's fun run in addition to the Walk of Silence, a remembrance honoring those who perished in the tornado. Given that the JMR seeks to draw runners and memorializers, this study examines the role of the memorial race in the long-term community recovery and specifically asks, what are the runners' motivations for participating in the race events? To answer these questions, we attended the 2018 JMR and conducted over 400 semi-structured interviews with race participants in addition to participant observations from the race day and the Walk of Silence. The research identified that while some people attended the JMR solely as a runner or memorializer, most participants cited multiple motivations for their involvement: a love of running, paying tribute to lost loved ones, supporting Joplin's ongoing recovery, and strengthening community and familial bonds. Finally, we consider the ongoing role of the JMR in the recovery of Joplin.

Michael Reyes, Department of Psychology, Undergraduate Research Fellowship
Faculty Mentor: Dr. Craig Neumann

Title: Investigating Natural Speech Differences in Psychopathic and Non-Psychopathic Offenders

There are many distinct linguistic characteristics found in psychopaths including differences in acoustics (Louth et al., 1998), disfluent language (Hancock et al., 2013), and emotional lexicon (Gawda, 2013). The present study uses the Computerized assessment of Affect from Natural Speech (CANS; Cohen et al., 2009) to distinguish differences in the natural speech of criminal offenders during a clinical interview. Previously used in schizophrenia research (Cohen et al., 2016), the CANS software detects differences in prosody and computes a host of other variables. We expect to see differences in response length, number of utterances, and number of pauses and pause length. This study will deepen literature by providing evidence of objective linguistic differences between psychopathic and non-psychopathic offenders.

Ashley Risinger, Department of Psychology, Undergraduate Research Fellowship
Faculty Mentor: Hannah Wash

Title: Examining Differences in Natural Speech Between Psychopathic and Non-psychopathic Offenders
I am examining the relationship between psychopaths and non-psychopaths based on speech samples.

Madison Roberts, Department of Biochemistry, Honors College
Faculty Mentor: Jingya Cai

Title: Screening of *Medicago truncatula* Tnt1 Mutants to Characterize the MtVIT-L Gene

Medicago truncatula is a model legume used for the study of symbiotic nitrogen fixation with the bacteria *Rhizobium meliloti*. *M. truncatula* forms nodules, specialized organs, in which the symbiotic relationship with rhizobia can occur. The AtVIT gene in *Arabidopsis thaliana* codes for a vacuolar iron transporter that plays a role in the uptake of ferrous iron (Fe(II)). MtVIT-L gene is a homolog of AtVIT gene and it is proposed that MtVIT-L is an iron transporter and plays an important role in symbiotic nitrogen fixation. When the MtVIT-L gene is disrupted, the plant is stunted under a low nitrogen environment, its nodules are white and cannot fix nitrogen.

In my research, I screened two Tnt1 mutants for the Tnt1 insertion in the MtVIT-L gene.

Hannah Rothberg, Department of Psychology, Honors College
Faculty Mentor: Dr. Tom Miles

Title: The Silenced Majority of PTSD

Does Posttraumatic Stress Disorder (PTSD) manifest differently in victims of sexual assault? PTSD is often studied and characterized based on the effects of combat in veterans, while more inclusive research does not typically differentiate between types of trauma within their studies. Though sexual assault is linked to dissociation and a likelihood to develop PTSD, there is little research that investigates this relationship and how that may affect later PTSD symptomology. I looked at how the type of trauma may elicit a certain defense response, specifically the freeze response or Tonic Immobility (TI) in relation to sexual assault, and how this peritraumatic response would alter PTSD manifestation. A secondary interest of this study was to understand the relationship between an individual's social standing and how it affects susceptibility to developing PTSD, specifically through gender. While we are unsure of why women are more likely to develop PTSD, men who have been sexually

assaulted report even higher levels of symptoms, showing our social attitude of inferiority may aid in the progression of PTSD development. Ultimately, this study aims to understand the specific implications the type of trauma can have on symptomology to implement more effective options for treatment.

Nathaniel Rowe, TAMS

Faculty Mentor: Dr. Duncan Weathers

Title: Simulations for Oxygen Particle Detection

Simulations Using The Stopping Range of Ions in Matter for Oxygen Particle Detection

Maria Rubiano, Department of Ecology for Environmental Science, Undergraduate Research Fellowship

Faculty Mentor: Dr. James Bednarz

Title: The Movement Ecology of Painted Buntings: Subadult Versus Adult Males.

The goal of this research was to provide support for the Female Mimicry Hypothesis of Painted Bunting males, which states that the green plumage coloration of subadult males makes them appear identical to females and enables them to sneak into tricolored adult males' territories, likely to commit cuckoldry. For this reason, it was predicted that subadults would be found within larger territory sizes compared to adult males. To test this hypothesis, nine radiotracer nanotags were secured onto three subadult and six adult Painted Bunting males. Their territory sizes were estimated and compared by use of radiotelemetry equipment and GIS technology. Due to small, unequal sample sizes and difficulty in finding the subadult males, the radiotelemetry data are not representative and do not provide support for the hypothesis. However, I can suggest from experience in the field that the subadult males do move within a larger range because they were much more difficult to find and collect data on after being deployed, as opposed to the adult males whom regularly stayed in the vicinity of their deployment.

Marti Sanders, Department of Biology, McNair Scholar Program

Faculty Mentor: Dr. James Kennedy

Title: Anthropogenic Activities Effect on the Growth and Development of Representative Dragonflies (Odonata: Libellulidae) from Denton,

Urbanization can have detrimental impacts to ecological environments. One way to measure the level and severity of the impacts urbanization has on aquatic ecosystems is through biological monitoring. The Benthic Ecology Laboratory at the University of North Texas is currently conducting a large-scale study to determine how urbanization and watershed characteristics affect the population and diversity of benthic macroinvertebrates from six watersheds in Denton, TX. This portion of the study focuses on the growth and development of representative dragonflies from these watersheds. The results from this study will be integrated with ongoing projects to provide a conservation strategy to help protect Denton's freshwater resources. Dragonfly nymphs were collected in May 2017 from six watersheds in Denton, TX using sweep nets inside a one-meter squared area from three different habitats. The nymph's hind wing, thorax, and head width were measured in mm using an OMAX digital microscope camera and Troup View software. The measurements were put through statistical analysis to determine which ponds produced a diverse range in growth, implying that the water quality at those ponds is suitable for reproduction and development.

Thomas Sanders, Department of Mechanical and Energy Engineering, Undergraduate Research Fellowship
Faculty Mentor: Dr. Duncan Weathers

Title: Installation of Van de Graaff Ion Accelerator and Design of Target Chamber Assembly

I helped install a Van de Graaff particle accelerator and its associated target chamber under the guidance of Dr. Weathers of the UNT Physics Department. Most of my activities this year revolved around designing, fabricating, and assembling components for the advanced target chamber. The facility will be primarily used for Rutherford Backscattering Spectrometry.

Melinda Sapaugh, Department of Interdisciplinary Studies, Undergraduate Research Fellowship
Faculty Mentor: Dr. Norman Dolch

Title: Assessment of Nonprofit Organization Financial Experiences

More than half of the country's total nonprofits are estimated to be operating with less than one month's cash reserves (Wyman, SeaChange Capital Partners, and GuideStar, 2018). Larger nonprofit organizations are as likely as smaller ones to lose financial stability, despite periods of apparent economic growth. Dolch and associates in "Leadership Cases in Community Nonprofit Organizations" examined the decisions and strategies of nonprofit organizations in response to the 2007 economic recession. This study will replicate the study of Dolch and associates to extend the study to a nine-year longitudinal study. An online survey invitation will be conveyed by United Ways in six communities across the South, Southeast, Midwest, West, and Gulf Coast regions of the USA. Participants will complete the survey on the Qualtrics survey platform and respond on behalf of the nonprofit with which they are affiliated. The resulting sample of nonprofits is considered a convenience sample. Select qualitative interviews will be held with executive directors to tell the story about their nonprofit and financial practices. These are the two study questions to be answered: 1. Are the management strategies that were most frequently used in response to the 2007 "Great Depression" most frequently used today? 2. If not, are there any cost cutting measures that are?

Kavya Sarma, TAMS

Faculty Mentor: Dr. Guido Verbeck

Title: Characterization of transition metal nanoparticles as matrix substitutes for maldi ms

My research is on the topic of characterizing metal nanoparticles, through soft landing deposition, as matrix substitutes for matrix assisted laser desorption ionization mass spectrometry. This pioneers a new technique for analyzing tissues and other biochemical samples.

Madalyn Sheridan, Department of Kinesiology, Health Promotion, and Recreation, Honors College,
Undergraduate Research Fellowship

Faculty Mentor: Dr. Ryan L. Olson

Title: Modified neurocognitive function during acute moderate-intensity exercise

Much of the research on exercise and neurocognitive function has focused on changes following a bout of exercise, while little is currently known about changes in performance during exercise. The primary purpose of this study was to examine the effects of low-intensity cycling on cognitive function in college-aged students, indexed by behavioral (response accuracy, reaction time) and neuroelectric (P3 amplitude, P3 latency) responses. Twenty-seven (Mage = 22.9 ± 3.0 years old) college-aged individuals were counterbalanced into low-intensity

exercise (EX) and seated control (SC) conditions. During each condition, participants completed a 10-minute resting baseline period, 20 minutes of either sustained cycling or seated rest, and a 20-minute recovery period. Primary outcomes were assessed at 10-minute intervals (5 blocks total) throughout each condition. Across time blocks, both conditions exhibited faster reaction times but reduced accuracy, suggesting a speed-accuracy tradeoff. There was a significant reduction in P3 amplitude during the 20-minute exercise period compared to the control condition. Taken together, the results suggest that exercise at lower doses may have the greatest impact on neuroelectric measures of brain function, with minimal influence on behavioral outcomes of cognitive performance.

Rishi Shridharan, TAMS

Faculty Mentor: Dr. Jannon Fuchs

Title: A Novel Oligodendrocyte Maturation Model with Implications in Demyelinating Disorders

Primary cilia are nonmotile signal conductors present in most vertebrate cell types. Notably, however, cilia have not been well documented in oligodendrocytes, which myelinate axons of the central nervous system. Primary ciliary defects are associated with ciliopathic conditions, and modeling cilia defects may help understand demyelinating disorders.

In this immunohistochemical study of the developing mouse brain, a novel model of the association between cilia loss and Wnt/ β -catenin signaling pathway activation was proposed and assessed. The model predicts generally low Wnt/ β -catenin activity in the presence of cilia, early in development, and higher β -catenin activity post-cilia loss, associated with myelination.

In support of this model, oligodendrocyte progenitor cells (OPCs) commonly had primary cilia. In contrast, cilia were rare in mature oligodendrocytes, due to cilia loss during development. At P4 and P7 (postnatal days 4 and 7), cilia were observed abundantly in oligodendrocytes (Olig2+). Over the second postnatal week, there was a significant decrease in the percentage of oligodendrocytes that had cilia. This loss was associated with concurrent upregulation of myelin protein production. In fact, at P14, relatively high myelin levels and lack of cilia were observed in oligodendrocytes. The average cilium length in cells of the oligodendrocyte lineage also decreased between P7 and P14, consistent with a diminishing role of cilia at later ages. The model proposed also predicts that primary cilium loss helps end proliferative capacity and promotes oligodendrocyte maturation. The rationale for these effects is that loss of the primary cilium releases β -catenin sequestered at its base, leading to myelin gene expression through β -catenin-induced transcriptional activation in the nucleus. Indeed, cilium absence was highly associated with elevated Wnt/ β -catenin activity, as indicated by TCF3 and Axin2-LacZ transgenic reporter expression.

An investigation into cilia-defective Tg737orpk (mutant) mice yielded the discovery that fewer OPC-associated cilia are present, and that mature oligodendrocytes are differentially reduced in mutant mice relative to OPCs, suggesting that cilia are necessary for maturation. Taken together, this study supports the model's proposal that primary cilia are vital for oligodendrogenesis, maturation, and myelin production. By providing new information about how defective primary cilia may cause myelin defects, this study may help elucidate processes involved in ciliopathies and demyelinating disorders.

Payton Smith, Department of Kinesiology, Health Promotion, and Recreation,

Faculty Mentor: Dr. Ryan L. Olson

Title: Associations between concussions, cognitive function, and emotion processing

Nearly 2.5 million people in the United States are diagnosed with a traumatic brain injury (TBI) or "concussion" every year. Common concussion symptoms include chronic headaches, weakness, reduced coordination,

confusion, and agitation. Recently, researchers have identified several potential underlying mechanisms that may better explain symptom outcomes, including impairments in neurocognitive function and dysfunctional emotion regulation. To date, most research examining these mechanisms have focused on cognitive deficits following a concussion. However, findings have been mixed when examining behavioral impairments in memory, inhibitory control, cognitive flexibility, and attention in concussed individuals. This may be due to the measures be implemented, as they typically only assess overt behavioral responses (e.g., reaction time, accuracy) versus more precise measures of brain function (e.g., neural activity). In addition, few of these studies have examined emotional regulation in the concussed population. Thus, the primary purpose of this project was to compare differences in neurocognitive function between individuals with and without a history of concussion. A secondary aim was to examine differences in emotional processing between previously concussed and non-concussed individuals.

Rebecca Strange, Department of Biology, Honors College

Faculty Mentor: Dr. James Duban

Title: Mental health and the Unitarian faith

Under the guidance of Dr Duban, I read through a historic Unitarian newspaper and discovered an article recording one of the first instances of music therapy in America. This lead me to research the Unitarian perspective on mental health, including sermons on the importance of the fine Arts for mental health and the influence of Unitarian pastor William Ellery Channing on mental asylum pioneer Dorothea Dix.

Lauren Tademey, Department of Psychology, Honors College

Faculty Mentor: Dr. Tom Miles

Title: Power and Prayer: A Family Impact Analysis of HB 3859

Texas HB 3859, also known as ‘The Right to Serve Children’ Act, was written to protect religiously-affiliated child welfare service providers from legal recourse in the event that they choose to deny an individual or family certain services based on sincerely-held religious beliefs. These protections were granted with the intention of supporting families by opening more avenues for them to receive the child welfare and adoption services they need. However, a family impact analysis showed that the bill is limited in its ability to support families in its application. The goal of this policy analysis is to identify the deficits present within HB 3859 and provide suggestions for its amendment and improvement. Specifically, we recommend that the bill be amended or modified to include a provision for the identification and tracking of children in the care of welfare providers who need alternative access to medical or social services due to the denial of services by a child welfare provider based on sincerely held religious beliefs.

Spencer Taylor, Department of Materials Science and Engineering, Honors College

Faculty Mentor: Dr. Marcus Young

Title: Addition of Cr in Co-base Superalloys

Superalloys are metal alloys that maintain good performance at high temperatures. Most metals weaken at high temperatures because more energy is available to promote dislocation movement; however, superalloys maintain their strength at high temperatures due to the presence of a γ' phase precipitated throughout a γ microstructure, which hinders dislocation movement. The addition of alloying elements such as chromium fights oxidation, which also readily occurs at high temperatures. This unique combination of high-temperature strength and oxidation

resistance makes superalloys useful in applications such as jet turbines, which see extremely high operating temperatures. While nickel-base superalloys are the most widely used superalloys industrially, recently-discovered cobalt-base superalloy systems show promise to achieve higher working temperatures than those of current Ni-based superalloys with further optimization. My work examines the effects of chromium addition in cobalt-base superalloys on microstructure and performance.

Allison Taylor, Department of Biology, Honors College

Faculty Mentor: Dr. Jannon Fuchs

Title: Peripheral remyelination in Charcot Marie Tooth disease

Charcot Marie Tooth disease (CMT) is the most commonly inherited neuromuscular degenerative disorder. Caused by the demyelination within Schwann cells of the peripheral nervous system (PNS), CMT has a slow progression and can be quite debilitating. In this paper, a metanalytic approach was used to provide an update on the published research surrounding the therapies for CMT. Since there is no curative medicine available, patients with CMT are currently treated by rehabilitation, such as stretching and strengthening, and pharmacological management of pain. The unique plasticity of Schwann cells has been the focus of much of the research surrounding remyelination in the PNS. Therapies such as Schwann cell transplantation and pharmacological enhancement of remyelination have produced promising results and await human trials. Alternatively, new technologies in neurogenetics have provided gene therapies that have proved effective and can be adaptive for the individual. Advances in our understanding of glial cell development and remyelination will further improve the repair of peripheral nerves damaged by degenerative diseases such as CMT.

Dennis Tei-Muno, Department of Biology, Honors College

Faculty Mentor: Dr. Tom Miles

Title: A Study of The Cortisol Awakening Response

Can higher circadian levels of blood cortisol during the early hours of the day, opposed to post midday cortisol levels be attributed to a stress response or an evolutionary measure aimed at adjusting to the unfolding tasks of the day? Previous research and literature on the circadian rhythm and stress, indicate that there is an established rhythm where cortisol levels peak sharply in the waking hours of the day (usually between 0600 and 0800 hrs) and decrease for the remaining hours of the day. Scientifically, while a detraction of this rhythm would be considered an abnormality, little work has been done to ascertain the reasons cortisol peaks early in the day. In this paper, I use data from earlier research done on the topics of the cortisol awakening response, perceived stress and the effect of daily stressors on cortisol levels throughout the day. Preliminary research on increased cortisol secretion in the morning tilts to an explanation that a cortisol spike may be an evolutionary measure, as regardless of circumstance, cortisol levels rise sharply at approximately the same time every day and sharply decline after that time period.

Tanakrit Tongnopnua, Department of Jazz studies

Faculty Mentor: Dr. John Murphy and Dave Meder

Title: The Connection Between Modern Jazz Piano style and Bebop Piano.

The goal of this research is to study the connection between modern jazz style performed in New York City and the traditional Bebop jazz style through the study of music and transcription of pianist Glenn Zaleski. Glenn Zaleski is considered to be one of the leading voice of jazz piano in the 21st century. He is what jazz musicians

would describe as an up and coming jazz pianist. Although his style and music might be different from the bebop style, there is still a strong sense of tradition in his playing. The foundation of jazz: the bebop, can still be heard in Zaleski's music. The secondary goal for this research is to increase the level of understanding of modern jazz through the study of Zaleski's music. Hopefully this research will decrease the level of discontentment people might have towards this modern music, reaches the older audiences who disregard this music as being too modern and lacking tradition and prove to them that the tradition of jazz exists in modern jazz.

Samuel Van Vleet, Department of Psychology, McNair Scholar Program

Faculty Mentor: Dr. Yolanda Niemann

Title: Power in the Panels: Superhero Powers as Stereotypes

This project utilizes a combination of quantitative survey and qualitative free response data from a study examining different attitudes about race via a comic book super hero lens. The research team investigated each participant's implicit biases and how self-identity interacts with stereotypes to form perceptions of media figures. Participants (N= 522) were randomly presented drawings of racially diverse (White, African American, Hispanic, Middle Eastern, Asian, and Native American) superheroes specifically created for the study and asked questions about their perceptions of the hero's powers, character role (hero, villain, sidekick), and socioeconomic status. This poster focuses on the ascription of powers to a hero to assess whether certain powers would be given to heroes based on race. Qualitative data regarding each participant's ideation of their superhero's power were examined and several poignant differences were supported. Hero powers were often ascribed similarly to popular real-world comic book heroes or based on racial stereotypes. Costuming appears to be an important factor to control for when conducting these sorts of studies.

Erica Vanegas, Department of Psychology, McNair Scholar Program

Faculty Mentor: Dr. Amy Murrell

Title: The Relationship Between Toxic Masculinity, Empathy, and Alexithymia

In Western cultures, intensely feeling and expressing emotions is frequently associated with women, while men are discouraged from experiencing and displaying emotions and are told to suppress them (Chaplin 2015). Masculinity is associated with physical strength and dominance (Harris III & Harper, 2008). The messages that young men are taught can have a negative influence on their own understanding of their feelings and how to healthily express those feelings (Pappas, 2019). For example, men are more likely to engage in violent behaviors when confronted with intense emotions and are likely to face mental health problems such as depression and suicidal ideation (Green & Addis, 2012).

When a person struggles to process and identify their own feelings, it is known as alexithymia (Sekely, Taylor, & Bagby, 2018). Alexithymia includes struggling to articulate and describe one's feelings. Furthermore, the thinking of people who struggle with alexithymia is typically externally oriented, because they do not focus on what they are feeling and use experiential avoidance as a coping mechanism (Preece, Becerra, Robinson, & Dandy, 2017). Because alexithymia involves understanding one's own feelings, it is possible that this construct can also be applied to empathy, which involves understanding the emotions of others. In this study, male college students will be surveyed to assess: their views of gender roles and how rigidly they adhere to them, their levels of alexithymia, and their levels of empathy. The purpose of this study is to investigate if masculinity impacts empathy via levels of alexithymia in males.

Sangita Vasikaran, TAMS

Faculty Mentor: Dr. Lee Hughes

Title: Isolation and Characterization of Novel Bacteriophages Ostambo and Liambo from *Streptomyces antibioticus*

Julissa Velasquez, Department of Chemistry, McNair Scholar Program

Faculty Mentor: Dr. Paul Marshall

Title: Spectroscopic and relative rate studies of the oxidation of fluoromethane initiated by atomic chlorine. Mixtures of fluoromethane, chlorine, and oxygen were subjected to continuous UV photolysis and monitored with Fourier Transform infrared (FT-IR) spectroscopy at a resolution of 0.5 cm⁻¹. Reactant mixtures were prepared within Pyrex bulbs manometrically to a total pressure of ca. 1 atm made up with argon bath gas. The process of UV photolysis was conducted, using a mercury pen-light, directly within a white-type long path cell of 100 cm³ volume and a path length of 240 cm. The dominant products of these experiments are hydrogen chloride (HCl), chlorofluoromethane (CH₂ClF), and formyl fluoride (HCOF). Determination of the absolute yield of HCOF permits the first measurement of its absolute IR band intensities (*S*). The carbonyl stretching mode for HCOF at 1780-1880 cm⁻¹ has $S = 4.2 \times 10^{-17}$ cm molecule⁻¹. These data were employed to study competition between the reactions of fluoromethyl (CH₂F) radicals with chlorine, which leads to the production of CH₂ClF, and oxygen, which leads via several steps to the production of HCOF. The chlorine mechanism is found to be 3.7 times slower than the oxygen pathway at equivalent concentrations. This mechanism constrains the ratio of the rate constants for the elementary reactions: CH₂F + Cl₂ → CH₂ClF + Cl and CH₂F + O₂ (+ Ar) → CH₂FOO (+ Ar), neither of which has been determined before. Relative kinetics yield the rate constant for the initial Cl + CH₂F step, and also the kinetic isotope effect for Cl reaction with CD₃F. A quantitative mechanism for atmospheric oxidation of fluoromethane, a simple example of halogenated hydrocarbons which are important in global warming and stratospheric ozone loss, has been developed through these experiments.

Nikhil Vicas, TAMS

Faculty Mentor: Dr. Arup Neogi

Title: Plasmon-Induced Circular Dichroism in Triskelion-based Gold(I) Metastructure for Novel Advances of Biochemistry Methods.

Current biochemistry methods, such as chiral nanosensors and CD spectroscopy, are extremely promising for studying the properties of biomolecules. However, natural asymmetry in optical properties of these biomolecules leads to decreased detection sensitivity, greatly reducing the applicability of this multifaceted technology. To solve this, plasmonic metastructures offer an attractive platform for the tunable enhancement of optical properties of molecular and biochemical species. Controlling the chiroptical effects—the differential reaction with right and left circularly polarized light—of these structures by engineering chiral plasmonic structures allows for substantial enhancement of biomolecular detection sensitivity. Herein, I report strong chiroptical effects, including circular dichroism (CD) and chiral anisotropy (gCD), in the visible and near-infrared range for gold triskelion nanoplasmonic structures. I utilize a commercial electromagnetic FDTD simulation software to calculate the absorption and CD spectra of this nanoplasmonic structure with results indicating strong structural chiroptical properties. Additionally, an optimization routine is implemented to maximize the anisotropic response through the adjustment of visible parameters. Larger-scale structures were simulated, ensuring the scalability of the model. Physical nanostructures were fabricated via electron beam lithography with a positive PMMA resist followed by electron beam evaporation and liftoff procedures. Furthermore, a multi-task deep-learning chiroptical response

prediction model has been developed for the meta-absorber; this deep learning model uses structure parameters as inputs and outputs a prediction of the CD response. The utilization of these structures improves the accuracy of chiral nanosensors, CD spectroscopy, and polarization-resolved biological imaging; such improved accuracy is extremely useful for biomolecular study and therapeutic methods.

Dylan Wages, Department of Mechanical and Energy Engineering, McNair Scholar Program

Faculty Mentor: Dr. Tae-Youl Choi

Title: Finding Non-Reciprocity in Phononic Crystals Using Surface Roughness
The purpose of this research is to find non-reciprocity in a phononic crystal using surface roughness for the purpose of enhancing ultrasound imaging.

Justin Walsh, Department of Political Science, Undergraduate Research Fellowship

Faculty Mentor: Dr. Regina Branton

Title: Comparing Prosecutorial Declination Across Criminal Cases in Indian Country and Non-Indian Country
Research project utilizing multiple large datasets in order to compare declination by US Attorneys in Indian and Non-Indian cases from 2010-2014.

Karen Wang, TAMS

Faculty Mentor: Dr. Vladimir Shulaev

Title: The Response of *Saccharomyces cerevisiae* to Stress Combinations

Stress is a psychological and physiological phenomenon that affects our everyday life, but it's only recently that scientists have taken the molecular effects of stress into consideration. Individually, many types of biological stresses and their effects at a molecular and cellular level are relatively well studied; however, the response of the cell to a combination of those stresses is more obscure. Furthermore, the connection and possible causality between biological stresses and the beginnings of cancer is a relatively recent and unexplored frontier. Our project investigates molecular changes that biological stresses inflict on cellular metabolism by identifying and quantifying metabolites, products of metabolism, that are differentially expressed in stressed and unstressed *Saccharomyces cerevisiae* cultures.

This study reports preliminary data on metabolic perturbations in *Saccharomyces cerevisiae* subjected to heat shock, oxidative, and hyperosmotic stress. Extracted samples were methoximated and trimethylsilylated in order to increase volatility in the analysis performed by gas chromatography-mass spectrometry using a metabolomics approach. Data processing of the chromatograms was performed by Xcalibur and AnalyzerPro software. We ran multivariate analysis on the data, such as principle component analysis (PCA) and orthogonal partial least squares analysis (OPLS-DA). The clusters of points representing metabolites produced by the stressed and unstressed samples were distinctly separated on the PCA and OPLS-DA models, indicating the presence of unique metabolites in each sample. We concluded that significant differences exist between the stressed and unstressed samples. Further experimentation is going towards elucidating the underlying networks that govern stress responses from a genetic to metabolic level.

Maggie Wang, TAMS

Faculty Mentor: Dr. Donghui Zhu

Title: Biodegradability of Zinc-based Biomaterials

The necessity of degradable biometals for medical implants arises from the invasiveness of procedures required for extraction stents and sutures. Of the three main biodegradable metals, this project explores the biodegradable nature of Zinc and its properties. In addition to the evaluation of pure zinc, we explore the benefits in morphology and biodegradability offered through solution immersion and electroplating.

Angela Whistler, Department of International Studies and History, Honors College

Faculty Mentor: Dr. Wendy Watson

Title: The Cycle of Massacre

Gun control and gun rights are not separate entities, nor are they defined for political alignment. Gun control's and gun right's relationship are transformed between generations of legislative ideals. However, regulations that both protected the public through a regulatory capacity and upheld the foundation of the second amendment and the right to bear arms are not only a tried legal precedence, but they are also a possible solution for the current gun debate.

For decades, the debate regarding the status of firearm regulation within our nation has been polarized and riddled with myths rather than facts.

Silvester v. Becerra (2017) brought forth a second amendment challenge to the 9th circuit court of appeals (denied March 2018) regarding the waiting period for subsequent purchasers in the state of California. However, while reading the arguments for both the appellant and appellee, the stark contrast in precedence practice became prevalent, thusly enticing the question at hand: What is the history of firearm regulatory practices within the United States?

Within the span of a generation, the relationship between political identity and regulatory ideals regarding the second amendment transcended from public safety standards into polarized political platforms, but for prior generations, regulation was standard practice.

Coupled with the unprecedented and controversial decision within *District of Columbia v. Heller* (2008), precedence became prominent both within the question at hand and within the confusion surrounding the gun debate.

Sienna Wu, TAMS

Faculty Mentor: Dr. Warren Burggren

Title: Angiogenesis in chicken embryos exposed to crude oil and TCDD (2, 3, 7, 8- Tetrachlorodibenzo-p-dioxin)

This ongoing project aims to quantify the effects of crude oil and one of its components, TCDD, on the angiogenesis in chicken embryos. The experiment consisted of injecting crude oil/TCDD onto the chorioallantoic membrane (CAM) of shell-less cultures in vitro. By processing pictures and videos of embryos before and after exposure through the *AngioTool* and *ImageJ* softwares, three quantities relating to angiogenesis were found: average vessel length, number of junctions, and vessel density. Results and comparison of effects between the different variable groups (treated v. varying dosages of oil/TCDD) are to be utilized to conduct further investigation into the overarching objective of analyzing early vascular development of chicken embryos exposed to environmental toxins.

Justin Xie, TAMS

Faculty Mentor: Dr. Rodney Nielsen

Title: Classification of EEG signals

Locked-in syndrome is a condition involving the complete paralysis of an individual despite their complete awareness. Such a condition is the premise in Brain-Computer Interface (BCI) research, which studies the communication between a wired brain and a computer. The EEG machine monitors the electric activity in the brain and harvests data in the form of signals. Specifically, this project analyzes specifically the EEG classification of tangible words and categories through their respective categories.

Bingxin Yang, TAMS

Faculty Mentor: Dr. Yong Yang

Title: Development of Alveolus Chip to Mimic In Vivo Testing

The question this research project aims to answer is how it would be possible to effectively reproduce conditions that are able to produce the same effect as in vivo experimentation. Our goal lies especially in developing a device that differentiates itself from other previously created tissue chips through new and innovative composition. This process entails creating a chip out of PDMS, a non-toxic gel-like substance often found in shampoos, contact lenses, and lubricants.

Kevin Yao, TAMS

Faculty Mentor: Jose Perez

Title: Towards Mass Producing Graphene: Revealing the Mechanism for Thinning of Exfoliated Graphite

Graphene is a material of immense research interest due to its unique electronic and mechanical properties. However, the fundamental problem in the mass production of this wonder material is the lack of a method to cheaply fabricate pristine graphene monolayers. The method of mechanically exfoliating graphite yields the highest quality graphene, but mostly generates multilayered graphite. Therefore, the process of thinning, or etching, multilayers into monolayers is extremely impactful. It allows for the mass production of pristine graphene, which other methods cannot achieve. Based on this opportunity, a suitable method for thinning graphite is found and the mechanism determined. It is hypothesized that low energy electron irradiation can thin graphite on select substrates due to a mechanism involving the conductivity of the substrate. Helium plasma is used to generate low-energy electrons for thinning graphite because this is the most common method used in industry and research. We also test the etching on various substrates because graphene exfoliated on different substrates has various applications.

We studied thinning using graphite flakes of various thicknesses on SiO₂, low and high-resistivity Si, indium tin oxide

(ITO), and silicon carbide (SiC). We find that thinning does not occur on low-resistivity Si and ITO. Additionally, thinning occurs on high-resistivity Si and SiC, although much less than on SiO₂. From these results, we conclude that this method is suitable for thinning graphite and the main factor in the thinning is the conductivity of the substrate rather than the availability of oxygen like previous papers have proposed.

Philip Zeng, TAMS

Faculty Mentor: Dr. Rodney Nielsen

Title: Improvement of a Metaphor Novelty Grading System through Error Analysis and Feature Extraction

By analyzing the results of the automatic metaphor novelty grader and comparing those grades to the aggregated gold standard labels, this research hopes to identify additional features of novel metaphors that can be used to improve the accuracy of the automatic metaphor novelty grader.

Zihan Zhao, TAMS

Faculty Mentor: Dr. Pamela Padilla

Title: The Role of *cisd* in *C. elegans* Fertility

In humans, the CDGSH iron sulfur domain containing (CISD) gene family CISD1 (mitoNEET), CISD2 (Miner1), and CISD3 (Miner2), has the function to transport iron into mitochondria, thus regulating iron levels.

Additionally, irregular iron levels has been reported to be linked to abnormal Reactive Oxygen Species (ROS). CISD1 mutations cause diabetes mellitus and CISD2 mutations cause Wolfram Syndrome 2. CISD3 mutations have no reported associated phenotypic results yet, but could resemble infertility symptoms of hemochromatosis, an iron metabolism disorder. The *Caenorhabditis elegans* genome contains *cisd* genes that are homologous with humans: CISD-1, homologous to CISD1 and CISD2, and CISD-3.1 and CISD-3.2 homologous to CISD3. To test if the *cisd* gene family affects fertility, we performed sterility, embryo lethality and fecundity experiments on the *C. elegans* strains N2, *cisd-1(tm4993)*, *cisd-3.1(pn24)* and *cisd-3.2(pn64)*. We began all experiments with worm growth synchronization. Synchronized gravid adults were examined using Nomarski microscopy for uterine embryos to test for sterility. For embryo lethality assays, embryos laid through worm growth synchronization and marked after removal of adults. Unhatched embryos were counted as dead after forty-eight hours. For fecundity assays, synchronized worms were separated to lay embryos with petri dish changes every twenty-four hours. After five days, hatched larvae of each worm were totaled to quantify brood size. Compared to control strain N2, *cisd-1(tm4993)* and *cisd-3.2(pn64)* display a low percent of sterility, *cisd-3.2(pn64)* animals have high embryo lethality, and *cisd-1(tm4993)* and *cisd-3.2(pn64)* have reduced fecundity. Thus, the three experiments revealed that the *cisd* gene family does affect fertility.

Christopher Zhou, TAMS

Faculty Mentor: Dr. Thomas Cundari

Title: Computational Study of Methane Activation by a Chromium Nitride Complex

This focus of this study is to investigate the properties of chromium nitride metal complexes and determine their potential to act as catalysts in C-H bond activation.

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