

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

# UNT SCHOLARS DAY

Featuring Undergraduate Research | April 3, 2018 | UNT Union 3rd Floor

Be less curious about people and more curious about ideas.  
Marie Curie, Physicist & Chemist 1867-1934

**UNT**  
EST. 1890

HONORS  
COLLEGE

**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 3, 2018**

- 9:00 a.m. – 3:30 p.m.      Check-In  
University Union Small Ballroom, 333, Lobby  
University Union Large Ballroom, 314 Lobby
- 9:30 a.m. – 3:15 p.m.      PANELS  
9:30 – 10:45 a.m.              Panels 1 – 5  
11:00 – 12:15 p.m.            Panels 6 – 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 and the Honors  
College; Dean, Texas Academy of Math and Science

**Keynote Address:** *Gretchen Clark*

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

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

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## **UNT SCHOLARS DAY PLANNING COMMITTEE**

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

## **UNT SCHOLARS DAY FACULTY MENTORS**

Dr. Waquar Ahmed, Geography and the Environment  
Dr. Michael Barnett, Department of Psychology  
Dr. Denise Baxter, Department of Art Education and Art History  
Dr. Kent Chapman, Department of Biological Sciences  
Dr. Shobhana Chelliah, Department of Linguistics  
Dr. Graham Cox, Department of History  
Dr. Diego Cubero, Department of Music History, Theory, and Ethnomusicology  
Dr. Hyunsook Do, Department of Computer Science and Engineering  
Dr. James Duban, Honors College  
Dr. Christopher Fuhrmann, Department of History  
Dr. Mark Hlavacik, Department of Communication Studies  
Dr. Konstantia Kapetangianni, Department of Linguistics  
Dr. Larry Kitchen, Department of Psychology  
Dr. Irene Klaver, Department of Philosophy and Religion  
Dr. Amos Magliocco, Department of English  
Dr. Tom Miles, Honors College  
Dr. Clark Pomerleau, Department of History  
Dr. Miriam Rafailovich, Department of Biochemistry  
Dr. Catherine Ragland, Department of Music History, Theory, and Ethnomusicology  
Dr. Kristin Sherman, Teach North Texas  
Dr. Laura Siebeneck, Department of Emergency Management and Disaster Science  
Dr. Jennifer Way, Department of Art Education and Art History  
Dr. Jackie Whipple-Walker, Department of English  
Dr. Alex Wu (NIH), Texas Academy of Mathematics and Science

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

Dr. Glénisson 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 2018.

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.

# **GRETCHEN CLARK, B.S. BIOLOGICAL SCIENCE, 2018**

## **KEYNOTE SPEAKER**

### *Biographical Sketch*

Gretchen Clark is from Keller Texas, and will be graduating in spring 2018 with a degree in Biology, a minor in Chemistry, and a Chemical Technicians certificate. When she was not out walking her cat or grabbing a drink on Fry, she focused her studies on microbiology, molecular biology, and biochemistry. She completed her undergraduate thesis entitled, "The Synergistic Antibacterial Effect of High Intensity Blue Light and Hydrogen Peroxide" in spring 2017, and received the Davidson Honors Scholar and Outstanding Honors Research Student in the Physical Sciences or Engineering award and the Eugene Medford Biology award and scholarship. In the fall, she will be attending Rensselaer Polytechnic Institute to pursue a doctorate degree in biology. Her future plans include doing science, making money, and changing the world.

# UNT SCHOLARS DAY 2018

APRIL 3, 2018

## PANEL PRESENTATION SCHEDULE

### **SESSION 1: Art History**

**9:30-10:45 Union 333A**

**Chair:** Dr. Denise Baxter, Department of Art Education and Art History

**Annalisa Giannotti**, Department of Art Education and Art History

**Faculty Mentor:** Dr. Denise Baxter

**Title:** Balenciaga and Regional Beauty

**Tess McCoy**, Department of Art Education and Art History

**Faculty Mentor:** Dr. Denise Baxter

**Title:** The Creation of Women's Identity in Fashion: Objectification Within Norman Norell's Classic Silhouette

**Megan Sullivan**, Department of Art Education and Art History

**Faculty Mentor:** Dr. Denise Baxter

**Title:** Jean Paul Gaultier and the Illusioned Body: Exploring Power and Femininity within Fashion

### **SESSION 2: Biology/Biochemistry**

**9:30-10:45 Union 333B**

**Chair:** Dr. Kristin Sherman

**Dakota Ives**, Department of Biological Sciences

**Faculty Mentor:** Dr. Kristin Sherman

**Title:** Understanding the Effects of Caffeine on the Population Rate of *Caenorhabditis elegans*

**Yuqing Liu**, Department of Biochemistry

**Faculty Mentor:** Dr. Miriam Rafailovich

**Title:** Effects of Time-Mediated Addition of TiO<sub>2</sub> Nanoparticles on the Differentiation and Proliferation of Human Dental Pulp Stem Cells

**Isabel Delwel**, Department of Biological Sciences, Honors College, McNair Scholar

**Faculty Mentor:** Dr. Tom Miles

**Title:** Exploring MxA's Antiviral Activity via Rapidly Evolving Residues in the L4 Loop

**David Skiles**, Department of Biochemistry

**Faculty Mentor:** Dr. Tom Miles

**Title:** Astroglia - The Future of Neural Medicine?

**SESSION 3: English**  
**9:30-10:45 Union 333C**  
**Chair:** Dr. Jim Duban

**Kaitlyn Brown**, Department of English  
**Faculty Mentor:** Dr. Tom Miles  
**Title:** Postmodern Influence Penned in the Pages of White Noise and The Road

**Jena Chakour**, Department of Anthropology, Honors College  
**Faculty Mentor:** Dr. James Duban  
**Title:** Divine Drama: Why One Unitarian Newspaper Championed Theater Arts

**Gabriel Puche**, Department of English, Honors College  
**Faculty Mentors:** Dr. Amos Magliocco and Dr. Jackie Whipple-Walker  
**Title:** Escaping Reality: A Threat to American Identity

**SESSION 4: History and Ethics**  
**9:30-10:45 Union 382A**  
**Chair:** Dr. Eric Gruver

**Daniel Witt**, Department of History  
**Faculty Mentor:** Dr. Christopher Fuhrmann  
**Title:** Belief and Unbelief in Divine Intervention among Ordinary Romans

**Stefanie Hustotf**, Department of History  
**Faculty Mentor:** Dr. Graham Cox  
**Title:** *Loving v. Virginia* and its Local Impacts in Texas

**Ashley Yarbrough**, Integrative Studies  
**Faculty Mentor:** Dr. Irene Klaver  
**Title:** Skating along the River of Death: A Personal Examination of Fort Worth's Role in Reframing the Trinity River's Place

**Peter Martinez**, Department of Philosophy, Honors College  
**Faculty Mentor:** Dr. Irene Klaver  
**Title:** Towards a New Reunion with the Trinity River

**SESSION 5: Biological Sciences**  
**9:30-10:45 Union 382B**  
**Chair:** Dr. Tom Miles

**Akila Muthukumar**, Texas Academy of Mathematics and Science  
**Faculty Mentor:** Dr. Kent Chapman  
**Title:** Evaluation of Cottonseed Protein and Oil Reserves in Wild Accessions Cotton grown under Rain-fed or Irrigated Conditions

**Ally Smith**, Department of Biological Sciences

**Faculty Mentor:** Dr. Tom Miles

**Title:** “Made to Order”: The Role of Personalized Medicine in Genetic and Epigenetic Analysis Technologies

**Laurie Nguyen**, Integrative Studies

**Faculty Mentor:** Dr. Tom Miles

**Title:** Cultural Stereotypes, Domestic Abuse, and HIV

## **SESSION 6: Linguistics**

**11:00-12:15 Union 333A**

**Chair:** Dr. Konstantia Kapetangianni

**Joshua Santos**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Frequency and Purpose of Taboo Language Use by Teenagers

**Brannon Briggs**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Phonetic Substitution in L2 English Speakers

**Ruth Edwards**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Perceptions of Online Writing Styles

**Jessie Mortensen**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Palatalization in Yiddish

## **SESSION 7: Politics, Economics, and Emergency Management**

**11:00-12:15 Union 333B**

**Chair:** Dr. Tom Miles

**Paul McCormick**, Department of Economics, Honors College

**Faculty Mentor:** Dr. Waquar Ahmed

**Title:** Seeds in the City: Victories, Losses, and Opportunities for Community Gardens in Denton, Texas

**Corey Olszewski**, Department of Emergency Administration and Planning

**Faculty Mentor:** Dr. Laura Siebeneck

**Title:** Emergency Management Collaboration: A Review and New Framework Cycle

**Abir Arabi**, Department of Economics, Honors College

**Faculty Mentor:** Dr. Tom Miles

**Title:** A Cost-Effect Analysis: An Empirical Case Study of Transportation Sustainability Efforts in Two College Towns



**Ashley Balcazar**, Department of Linguistics, Honors College  
**Faculty Mentor:** Dr. Tom Miles  
**Title:** #politicallyincorrect: The Pejoration of Political Language

**SESSION 8: Music and Dance**

**11:00-12:15 Union 333C**

**Chair:** TBA

**Michael Cardenas**, Integrative Studies  
**Faculty Mentor:** Dr. Catherine Ragland  
**Title:** Midnight Swim: Trap and Afro-Tejanidad as Sensorial Phenomena

**Sara Bowden**, Department of Music Theory  
**Faculty Mentor:** Dr. Diego Cubero  
**Title:** Forces of Nature: Birdsong in Time and Place in Olivier Messiaen's Le Traquet Stapazin from Catalogue d'oiseaux

**Brianna Jordan**  
Presentation of a dance video

**SESSION 9: Psychology**

**11:00-12:15 Union 382A**

**Chair:** TBA

**Rachel Armour**, Department of Psychology  
**Faculty Mentor:** Dr. Larry Kitchen  
**Title:** How Do You Feel?

**Sierra Burrier**, Integrative Studies  
**Faculty Mentor:** Dr. Clark Pomerleau  
**Title:** We Still Have Mutual Friends

**Idalia Maciel**, Department of Psychology  
**Faculty Mentor:** Dr. Michael Barnett  
**Title:** The Primal Scene Phenomenon: Witnessing Parental Sexual Activity and Sociosexual Orientation

**SESSION 10: Information Session**, the Toulouse Graduate School

**12:30-1:45 Union 333A**

**Chair:** Dr. Konstantia Kapetangianni, Department of Linguistics

**Stephanie Fuller**, Department of Linguistics  
**Faculty Mentor:** Dr. Konstantia Kapetangianni  
**Title:** Use of Directives in Child Directed Speech Cross-Culturally

**Matthew Houston**, Department of Linguistics  
**Faculty Mentor:** Dr. Konstantia Kapetangianni  
**Title:** Enhancing English Language Pronunciation in L2 Learners through Computer Aided Language Learning

**Jonisha McKiddy**, Department of Linguistics  
**Faculty Mentor:** Dr. Shobhana Chelliah  
**Title:** An Optimality Theoretic View of Reduplication in Lamkang

**Meredith Monroe**, Department of Linguistics  
**Faculty Mentor:** Dr. Konstantia Kapetangianni  
**Title:** The Semantic Properties of Emojis in Text-based Communication

### **SESSION 11: Arts and Letters**

**12:30-1:45 Union 333B**

**Chair:** TBA

**Meaghan Howard**, Department of Art Education and Art History  
**Faculty Mentor:** Dr. Jennifer Way  
**Title:** Ethics in American Craft: The Eames and India

**Andrew Kim**, Department of Communication Studies  
**Faculty Mentor:** Dr. Mark Hlavacik  
**Title:** An Analysis of Visualized Text Genres

### **SESSION 12: Physics and Computer Science**

**12:30-1:45 Union 333C**

**Chair:** Dr. Glénisson de Oliveira

**Sundos Al Subhi**, Department of Computer Science, Honors College  
**Faculty Mentor:** Dr. Hyunsook Do  
**Title:** Performance Testing in Mobile Phone Applications

**Sahil Patel**, Texas Academy of Mathematics and Science  
**Faculty Mentor:** Dr. Carlos Ordonez  
**Title:** Design and Simulation of a Novel Concentric Cone Antihydrogen Gravity Experiment

### **SESSION 13: Linguistics**

**12:30-1:15 Union 382A**

**Glen McLaren**, Department of Linguistics, Honors College  
**Faculty Mentor:** Dr. Konstantia Kapetangianni  
**Title:** Comedians in the Age of Political Correctness

**Holly McClarin**, Department of Linguistics, Honors College

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** The Terminology of Fan Fiction and Its Role in the Organization of Online Work

## ABSTRACTS FOR PANEL SESSIONS

**Sundos Al Subhi**, Department of Computer Science

**Faculty Mentor:** Dr. Hyunsook Do

**Title:** Performance Testing in Mobile Phone Applications

In this paper, I will discuss performance testing in mobile phone applications. Mobile phone applications have been growing fast, which has attracted research interests (Zhang and Adipat, 2009, p.293). There are significant research areas in software engineering that are related to mobile phones. The research on new methods and techniques to test mobile phone application is an important area of research because there is variety of operating systems available in the market (Coelho et al., 2016, p.59). Because mobile phone applications become more complicated, the software engineering tools, frameworks and processes are significant to ensure the implement high quality software (Coelho et al., 2016, p.59). By testing the performance of mobile phone applications, developers will be able to get feedback about the applications' task performance and evaluate the level of achieved performance from the users/developers (Zhang and Adipat, 2009, p.294). The purpose of this paper is to find performance testing tools and methods for mobile phone applications in addition to the challenges and issues that might occur during testing the performance of mobile phone applications. SUNCAT, Test Automation Frameworks (such as Appium, Calabash, Robotium, Testdroid), and CrashScope are tools to test the performance of mobile phone application. Also, I explained methods of how to use each tool to test the applications. At the end of the paper, I provided two challenges and issues that developers may face during using these tools, which are manual process and load dependency.

**Abir Arabi**, Department of Economics, Honors College

**Faculty Mentor:** Dr. Tom Miles

**Title:** A Cost-Effect Analysis: An Empirical Case Study of Transportation Sustainability Efforts in Two College Towns

College towns are known for their large student populations, strong human capital, and collaborative economic activity. Ideally, they are arenas to expand research and development given the presence of vibrant academic institutions. One of the themes of this expansion is sustainability as an urban growth objective that emphasizes ecological awareness and strategies to mitigate the effects of climate change. This does not necessarily denote environmental protection alone; it can include several goals, such as social diversity and city structure. For this paper, we specifically look at transportation sustainability associated with urban growth. Particularly, we observe the components of city structure such as walkability and public transportation strategies and how they have been instituted in these college towns; Denton and Austin. Methodologically, we use Quantum GIS and Python's GeoDjango platform to look at urban transportation design differences between these two cities. Using route maps and user data, we show that Denton's sustainability strategies are widely considered more successful than Austin's despite the size differential in Austin's favor. These results can help governments, urban planners, and economists develop strategies to deal with the challenges of urban growth.

**Rachel Armour**, Department of Psychology  
**Faculty Mentor:** Dr. Larry Kitchen  
**Title:** How Do You Feel?

The Behemoth is an oil painting exploring movement and anatomical forms. The focal piece is the overlap between equine and human anatomy juxtaposed for aesthetic affect. The dimensions of the piece are 4'x5'.

**Ashley Balcazar**, Department of Linguistics, Honors College  
**Faculty Mentor:** Dr. Tom Miles  
**Title:** #politicallyincorrect: The Pejoration of Political Language

How is the term "political correctness" understood in the context of modern American politics? This study aims to analyze common language usage and identify factors contributing to the pejoration of political language in social media and the types of language in social media that trigger a sense of political outrage. We examine Facebook and Twitter memes, using API searches referring directly to the terms "PC" or "politically correct," using Dedoose, a text recognition software. Results show that themes primarily related to Hillary Clinton's candidacy. We also identify significant cleavages in racial identity and quantify these statistically. Our results compliment other recent studies which aim to gauge the impact of social media on political and social polarization.

**Sara Bowden**, Department of Music Theory, Honors College  
**Faculty Mentor:** Dr. Diego Cubero  
**Title:** Forces of Nature: Birdsong in Time and Place in Olivier Messiaen's *Le Traquet Stapazin* from *Catalogue d'oiseaux*

Though musical form in music of the eighteenth and nineteenth centuries has been well documented, musical form in twentieth century music is often not included as a facet of a musical analysis. While analyzing twentieth century music, music theorists often use content-based analysis to identify patterns present in large scale musical form. Olivier Messiaen is a twentieth century composer who is well known for his fascination with birdsong and form. In *Le Traquet Stapazin*, Messiaen presents birds as actors in a picturesque scene near the Côte Vermeille in France. Each individual bird is transformed as the time of day and location change throughout the piece. This paper first argues that a content-based analysis of the music of time of day and location provides a compelling case that the birds are modified by their surroundings. The second half of this paper provides examples that affirm that time of day and location affect the content and structural position of the birds.

**Brannon Briggs**, Department of Linguistics  
**Faculty Mentor:** Dr. Konstantia Kapetangianni  
**Title:** Phonetic Substitution in L2 English Speakers

This study will focus on the cross-language substitution of /w/ for /v/ (/v/->/w/), a feature that second-language speakers of English from a variety of linguistic backgrounds share. The study focuses on native speakers of Finnish and German. Participants from these backgrounds will be asked to read aloud from a list of words containing those sounds in both English, as well as their native language, a process known as elicitation. Elicitations will be recorded, analyzed through Praat for physical similarities and

dissimilarities, and aim to focus on speakers from both language groups who do not exhibit full fluency in English. Elicitations of this feature will eventuate in an analysis of the qualities of /w/ as used in English, as well as a comparison of these features between each language. Elicitations will then eventuate in an analysis of what relevant environments this substitution occurs, and how those environments may behold themselves to the specific sound systems of Finnish and German. Findings should result in a definitive description of the resulting English /w/ for both language backgrounds, as well as a description of the environments in which /v/->/w/ occur. This is not a psycholinguistic account, but research may become influential for psycholinguists who wish to explore why the features of resultative /w/ are perceived as such by native English speakers.

**Kaitlyn Brown**, Department of English, Honors College

**Faculty Mentor:** Dr. Tom Miles

**Title:** Postmodern Influence Penned in the Pages of *White Noise* and *The Road*

How do people think in the 21st century? While this would take a lifetime of research, perhaps our answers lie in the media of the age, particularly in an age's literature. Postmodernism encompasses much of the mentalities present in our world today. Postmodernism differs from culture to culture, but for this essay I will focus on aspects found in the United States. *White Noise* by Don DeLillo and *The Road* by Cormac McCarthy both provide powerful examples of literature influenced by postmodernism. At first glance both can depress the reader, both at times may be very trying, however with a closer look and a change in perspective, both offer so much more than the surface rhythms of both novels: from elements of hope and nostalgia, immense amounts of humor, and the exploration of the beauty of us as a human race. I will explore *The Road's* and *White Noise's* different perspectives on death and life, and their perspectives on the individualistic search for meaning through the lens of postmodernism.

**Sierra Burrier**, Integrative Studies

**Faculty Mentor:** Dr. Clark Pomerleau

**Title:** We Still Have Mutual Friends

My paper will be an analysis of my research on sexual assault and harassment against women. It will discuss their coping mechanisms with assault and the ways in which they experienced it (their demographic/other background factors). At the end of paper I will include a poem encompassing as much of the experiences as best as I possibly can. My studies have been mostly qualitative, although I have interviewed 30 women, the focus will be highly detailed on individual cases.

**Michael Cardenas**, Integrative Studies

**Faculty Mentor:** Dr. Catherine Ragland

**Title:** Midnight Swim: Trap and Afro-Tejanidad as Sensorial Phenomena

Under the mentorship and guidance of Dr. Cathy Ragland, I intend to intend to conduct research on musicians and participants on a thriving Hip Hop musical scene in the historically Mexican-American West Side of San Antonio, Texas, under the label Midnight Swim, and focusing on the lead rapper, Mateo Sun . By employing Ethnomusicological research methodology methods (participant-observation of performances, venues, recording studios, interviewing, audio/visual documentation, fieldnotes) and utilizing cross-disciplinary frameworks from Anthropology, Performance Studies, Gender Studies, and Ethnomusicology, will examine the soundscapes and scenes of San Antonio's West Side analyzing the

effects of political and socioeconomic conditions within this marginalized community and how the youth in this music/dance scene are identifying and sympathizing with a black music-culture as a means to reshape and reimagine their own Mexicanness within a modern, hybrid American and Texan identity. I will also explore the role of technology, social-networking, digital sampling, other sound-mediating techniques utilized by artists and fans to create new communities, new identities and new linkages that allow them to create sonic support networks that combat and comment on social/cultural alienation, economic stagnation and race. In particular, I expect to learn about how participants in this music culture appropriate and perform blackness as a symbolic referent that implies meaning and knowledge of the self. This reimagining of Texas-Mexican (Tejano) identity merges notions of locality through structures of feeling experienced and expressed communally and that bring Tejano and African-American communities together in new and creative ways. It is my hope that this research will help update work previously done on hip hop in ethnomusicology and the social sciences that has excluded youth communities in the Texas as well as the American Southwest.

**Jena Chakour**, Department of Anthropology, Honors College

**Faculty Mentor:** Dr. James Duban

**Title:** Divine Drama: Why One Unitarian Newspaper Championed Theater Arts

It is hard to imagine an America now without Broadway. Yet the initial communities that blossomed into the United States carried deep religious convictions often at odds with the values espoused in the theatrical arts. Along with other public leisure, the stage performance was considered by homespun Calvinists to be a veritable progeny of imputed sin transmitted from Adam and Eve. Ministers and lettered men labelled participation, whether by performers or audience, as Satan relying on the inherent depravity of man's nature to engage them in sin. Theater was qualified as a distraction, unbecoming of a good New England Christian. So what happened between hellish temptation and Hamilton: An American Musical? How was theater able to transcend designation as a capitulation to inherent wickedness and become a prized jewel in the crown of culture? What changed in how theater was viewed? Most importantly, who changed it, and why? From wartime precedents in England to chinks in the logical armor of Calvinism, my project, under the direction of Dr. Duban, will examine the history of theater in the New England colonies with regard to religious moral outlook, briefly draw the scaffolds of worldview that clashed in these debates of faith, and explain why one Unitarian newspaper championed theatrical arts. Bearing a majority of this responsibility is the excellent primary resource of the Unitarian Christian Inquirer, specifically while edited by Rev. Henry W. Bellows, along with speeches by Bellows himself. I intend to show how Bellows' intellectual dexterity allowed him to integrate theater and faith. Brilliant and thoughtful, Bellows cleverly dispersed Unitarian principles in theatrical discourse. This project exists within a group of students whose final essays stand to be published in a collection edited by Dr. Duban. No two essays will be alike, all taking on unique topics.

**Isabel Delwel**, Department of Biological Sciences, Honors College, McNair Scholar

**Faculty Mentor:** Dr. Tom Miles

**Title:** Exploring MxA's Antiviral Activity via Rapidly Evolving Residues in the L4 Loop

The innate arm of mammalian immunity encodes hundreds of antiviral proteins that act cell-autonomously to block viral replication, often by binding virally encoded proteins. To respond to rapid viral evolution, antiviral genes evolve at an accelerated rate. Signatures of diversifying selection can be used to successfully predict antiviral protein surfaces that are used to recognize viral pathogens.

Functional studies have demonstrated that the binding specificity to viral targets is governed by only a few rapidly evolving residues at the interaction interfaces. Previously, studies showed that single amino acid residue changes in positively selected residues of Loop L4 dictate the antiviral specificity of the broadly antiviral protein, MxA. A library of human MxA variants that encode every possible five amino acid combination at the rapidly evolving sites in L4 were assessed for their antiviral functionality against the Thogoto virus (THOV). The screen revealed that all active MxA variants (~5%) had a strict preference for phenylalanine (F), tryptophan (W) or tyrosine (Y) at position 561. This study outlines two projects: the first testing 20 MxA variants analyzing their antiviral activity against a panel of viruses; the second discovering the genetic basis of MxA super restrictors previously discovered. A minigenome system tested 20 of the F, W, or Y variants against the human influenza virus (BM18), avian origin influenza, and Thogoto virus. BM18 plasmids were optimized and each variant was transfected into the cells to later be analyzed for antiviral activity. The same process was used to test the 20 MxA variants against avian origin influenza and Thogoto virus. A rare set of variants with enhanced antiviral activity against THOV when compared to human MxA was also found. To determine the genetic basis of super restriction, the intermediate sequence variants between WT human MxA and the super restrictors were generated and their functionality in the THOV replication assay was assessed. Single point mutations were generated in designed primers using site-directed mutagenesis. After running multiple PCRs and cloning, they were sent for sequencing. After the sequences were analyzed, the protein MxA expressions were verified using a western blot technique. By doing this, the antiviral activity of these new constructs against THOV with a minigenome assay was determined. Use of combinatorial mutagenesis in residues subject to diversifying selection during evolution could provide a means to potentially increase antiviral efficacy of proteins like MxA, for therapeutic use.

**Ruth Edwards**, Department of Linguistics  
**Faculty Mentor:** Dr. Konstantia Kapetangianni  
**Title:** Perceptions of Online Writing Styles

This study will examine written texts through electronic mediated communication (EMC) in which online text will not have any punctuation or capitalization. A survey will be conducted online with participants ages 14 - 18, 19 - 29 and 30 - 40 to answer questions about the perceptions of this written style. The research questions are as follows: What are the general opinions of this style from each age group? Are texts without punctuation and/or capitalization understood by any of these age groups? Does the lack of punctuation and/or capitalization give text found in social media a sense of multimodality, such as nonverbal cues or tone? We predict participants under 30 will have a positive opinion, will understand the text, and will have a shared meaning of the particular style based on personal observations. In contrast, we predict participants over 30 will have a negative opinion and will have lesser understanding of the text. The latter prediction is based on a study conducted by Houser, in which different age groups gave differing opinions on electronic communication in general. The data collected from the online survey will then be analyzed quantitatively and qualitatively. The quantitative data will be tested to confirm or deny the hypothesis. Early results from the survey show a great divide of opinions between participants older than 30 and those who are younger than 30.



**Stephanie Fuller**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Use of Directives in Child Directed Speech Cross-Culturally

The purpose of this study is to compare the use of directives in Child Directed Speech (CDS) between Japanese speakers and North American English speakers. Previous research suggests that the overuse of Lead Attentional Directives (LAD) impedes the development of the lexicon, while Follow Behavioral Directives (FBD) may have a positive influence on the lexicon and first language development; other research suggests cultural differences have a role in the use of directives (Asur, Flynn, and Eichorst, Cristia, Dupoux, Gurven, and Stieglitz, Rowe). This study investigates how the use of directives in CDS varies between Japanese and North American English speakers, both quantitatively and qualitatively, and how the purpose of the directives changes between the two cultures being investigated. The research questions are as follows: What is the amount of directives, both Lead Attentional Directives and Follow Behavioral Directives, used by Japanese speakers and North American English speakers in Child Directed Speech? How does the number of directives used by Japanese speakers compare with North American English speakers? And how does the purpose of directives change between Japanese speakers and North American English speakers? The speech between parent-child dyads from the CHILDES corpus will be analyzed to find the types and amounts of directives used by the caretakers. Ten transcripts from North American English speakers and ten transcripts from Japanese speakers will be analyzed using the CLAN software; the transcripts selected will contain natural speech between the caretaker and child, the child's age range being 1-3 years. Further research is needed before any comparisons can be made between the two groups of speakers, however preliminary data results suggest that the majority of directives used by the English speakers are FBDs.

**Annalisa Giannotti**, Department of Art Education and Art History

**Faculty Mentor:** Dr. Denise Baxter

**Title:** Balenciaga and Regional Beauty

This essay discusses two versions of the same dress design created by the Spanish haute couture designer Cristóbal Balenciaga in 1955, one produced in his workshop in Madrid and the other produced in his workshop in Paris. I argue that the material and formal differences between the two dresses are a result of the different ideas regarding gender and national identity within the two counties in which the dresses were produced. While the similarities between these two dresses are well documented, their differences have never been discussed.

**Matthew Houston**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Enhancing English Language Pronunciation in L2 Learners through Computer Aided Language Learning

This study will attempt to investigate and analyze the use of Computer Aided Language Learning (CALL) in teaching native English pronunciation to second-language learners. Previous studies in the field have concluded that individuals may be able to grow faster in a language when they obtain individualized help from CALL software. Prior research has also pointed to the usefulness of CALL in teaching native prosody, the stress and inflection of language, to second language learners (Gorjian, Abdolmajid, and Parisa; 2012). As such, it can be posited that software such as Praat, which is able to

detail individualized vowel qualities of users, should have merit within a classroom setting. During the course of this study, we will be teaching pronunciation to a group of three to four Korean ESL learners through one-on-one language instruction using Praat. Participants will be asked to read sets of words which differ only in their vowel quality (ex. [Teal /Til/ ] vs. [Till /Tf>l/]) into a microphone. From their recordings, their vowels will then be analyzed and plotted within an Excel chart so that they can see how their vowels relate to those of native speakers. Analysis and investigation of data from this study should show whether individualized mapping of the learner's vowels lead to better efficacy in teaching pronunciation. Preliminary results from this study have already shown that there is a noticeable level of improvement in individuals who train vowel quality for short periods of time with Praat.

**Meaghan Howard**, Department of Art Education and Art History

**Faculty Mentor:** Dr. Jennifer Way

**Title:** Ethics in American Craft: The Eames and India

During the period of postwar modernism and design, the United States adopted design as a tool to enable the modernization and liberation of states in South and Southeast Asia. American designers were sent to evaluate, influence, and develop local craft into global industries. The operation, and legacy, of colonialism and imperialism also fuels an ethical discussion of these foreign aid projects. I focus on Charles and Ray Eames in their duties or functionality as designers modernizing craft in India during the 1950s and 1960s. I use modernity ethics and ecofeminist theory to discuss the modernization and advancement of technology in Indian craft catalyzed by these efforts.

**Stefanie Hustoff**, Department of History

**Faculty Mentor:** Dr. Graham Cox

**Title:** *Loving v. Virginia* and its Local Impacts in Texas

*Loving v. Virginia*, 388 US 1 (1967) was a landmark decision of the United States Supreme Court which deemed anti-miscegenation laws unconstitutional. This paper examines reactions to the case as well as the implementation and impact in the state of Texas, and by studying the coverage, or lack thereof, of *Loving v. Virginia* by the different majority demographics' newspapers in Texas and the how attitudes have changed towards interracial marriage. Major trends seen throughout the primary sources are that only African American owned newspapers covered the Loving case, however afterwards college, Catholic, and urban newspapers stated covering more stories involving interracial marriage and attempts to engage their communities in conversation about it. After the topic of interracial marriage became less prominent in Texan print media, the LGBT civil rights movement used the *Loving* case in their arguments for protection against discrimination. The majority of Texans tried to ignore Loving when it first became a national story, however the Catholic and University demographics initiated normalization of interracial couples, allowing the sentiment to spread to other parts of Texas.

**Dakota Ives**, Department of Biological Sciences

**Faculty Mentor:** Dr. Kristin Sherman

**Title:** Understanding the Effects of Caffeine on the Population Rate of *Caenorhabditis elegans*

*Caenorhabditis elegans* (*C. elegans*) are transparent soil nematodes that are used as a genetic model to study developmental biology and neurobiology. The population/growth rate of *C. elegans* has been shown to decrease when caffeine has been added to their diet. It was found that the presence of caffeine

did limit their population/growth rate. When observed at 30mM of caffeine, *C. elegans* showed a 74.20% decrease in population/growth. It was also observed that the *C. elegans* physical appearance was thinner as caffeine concentration was increased.

**Andrew Kim**, Department of Communication Studies

**Faculty Mentor:** Dr. Mark Hlavacik

**Title:** An Analysis of Visualized Text Genres

This paper looks at textbooks in graphic novel format and hypothesizing their effectiveness in increasing reading comprehension among students based on the theory of visual literacy. The paper categorizes the different types of visualized texts such as graphic novels (fiction and non-fiction), graphic treatises, and graphic textbooks. I categorized four different visual text genres and provide books that I have read for examples. I then describe their strengths and weaknesses and hypothesize concerning the academic subjects they are best suited for, based on the book's genre and structure.

**Joseph Lee**, Texas Academy of Mathematics and Science

**Faculty Mentor:** Dr. Alex Wu (NIH)

**Title:** Brain-Derived Neurotrophic Factor (BDNF) is a Potential Therapeutic Target in Brain-seeking Triple-Negative Breast Cancer

Breast cancer continues to rise at an alarming rate in the U.S. According to the National Cancer Institute, the number of American women diagnosed with breast cancer is expected to increase by as much as 50% by 2030. Triple-Negative Breast Cancer (TNBC), one of the more aggressive forms of breast cancer, will account for 15% of these breast cancer cases. Women diagnosed with TNBCs are at a high risk of their cancer recurring in the brain; this can result in significantly lower survival rates and susceptibility to neurological disorders, seizures, and cognitive dysfunction. Recent studies have provided substantial evidence that Brain-Derived Neurotrophic factor (BDNF), a neurological growth factor typically known for its role in cognitive thinking and long-term memory, helps facilitate the growth and recurrence of TNBCs. In my project, I investigated the effect of BDNF on brain-targeting TNBCs by administering BDNF to breast cancer cells harvested from the brain. Analysis of my cells after treating them with BDNF not only revealed accelerated cancer migration but also an increase in the population of cancer stem cells. Based on these results, I have concluded that when breast cancer spreads to the brain, it can become even more aggressive and chemotherapy-resistant due to the presence of BDNF. Furthermore, I believe that developing a treatment regime that targets BDNF will offer a patient-specific solution to breast cancer cases where standard chemotherapy is ineffective.

**Yuqing Liu**, Department of Biochemistry

**Faculty Mentor:** Dr. Miriam Rafailovich

**Title:** Effects of Time-Mediated Addition of TiO<sub>2</sub> Nanoparticles on the Differentiation and Proliferation of Human Dental Pulp Stem Cells

Dental pulp stem cells (DPSCs) have therapeutic promise due to their rapid proliferation and multipotency but require further research to reach their full potential. Titanium dioxide nanoparticles (TiO<sub>2</sub> NPs) possess properties for cell tracking and imaging, but their harmful effects on cell viability and function pose roadblocks to their usage. This study aims to investigate the timing of TiO<sub>2</sub> NP addition to DPSCs, a commonly neglected variable when testing NP toxicity, and its effects on DPSC

proliferation and differentiation. Based on preliminary testing, DPSCs can respond to polybutadiene substrate mechanics after a 4-day incubation period. Accordingly, TiO<sub>2</sub> NPs will be added on both days 1 and 4 (NP-1 and NP-4, respectively) after plating DPSCs on hard polybutadiene films. Through the lens of mechanical properties, this study will explore the influence of time-mediated TiO<sub>2</sub> NP addition and examine its effects on DPSC viability, proliferation, and differentiation before and after recognition of polybutadiene-coated substrate. Results are expected to show that NP-4 had substantially reduced harm to DPSC proliferation and differentiation as compared to NP-1, which will suggest that time-mediated addition can prevent adverse effects of TiO<sub>2</sub> and NPs as a whole. These results can be translated to many other applications including drug delivery, developmental biology, biosensing, and biological imaging.

**Idalia Maciel**, Department of Psychology

**Faculty Mentor:** Dr. Michael Barnett

**Title:** The Primal Scene Phenomenon: Witnessing Parental Sexual Activity and Sociosexual Orientation

Sigmund Freud coined the term “primal scene” to describe the experience of children witnessing their parents engaging in sexual activity. We examined the historical context in which the primal scene emerged, considered contemporary views of the primal scene, and conducted two empirical studies (N = 961, 1390) to investigate Freud’s proposition that children who witness the primal scene would later be prone to “attacks of falling physically in love,” which we operationalized as sociosexual orientation. In both studies, individuals who witnessed the primal scene as children had a more unrestricted sociosexual orientation than those who did not. Additionally, men had a more unrestricted sociosexual orientation than women. Altogether, these results suggest a possible link between primal scene exposure and sociosexual orientation. In contrast to psychoanalytic theories, we offer psychodynamic and normative social explanations of the primal scene phenomenon.

**Peter Martinez**, Department of Philosophy

**Faculty Mentor:** Dr. Irene Klaver

**Title:** Towards a New Reunion with the Trinity River

The Trinity River in Dallas has historically been the site of competing, utopian political and economic visions. One of the earliest settlements in the Dallas area was by a group of utopian socialists, many followers of Charles Fourier. Established in 1855, the colony was called La Réunion, and within 3 years of its founding it collapsed. The primary cause of their failure was the harsh Texas environment, which the colonists hadn’t considered when moving. More the 150 years later, the Trinity River Corridor Project envisions a different sort of utopia. In my paper, I compare and contrast the goals of the utopian vision of La Réunion with the slightly utopia, but profoundly capitalist and utilitarian urban renewal projects around the Trinity River in the 21st century. I argue that La Réunion’s ideology can provide a better framework for city planning in contemporary Dallas, a city dealing with gentrification and the surveillance of the poor.

**Holly McClarin**, Department of Linguistics, Honors College

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** The Terminology of Fan Fiction and Its Role in the Organization of Online Works

The current study is a qualitative linguistic analysis of the terminology used to categorize and describe English-language fan fiction on online hosting websites. "Terminology" here refers to words and phrases used specifically to organize fan works online. This study will be an in-depth look at the similarities and differences these terms have with the terms by which fiction is classified in other domains such as bookstores; how the terms which are unique to the fan fiction community function and assist the categorization of their works; and why is it necessary for fan fiction to have its own unique terminology? Data will be collected from fan fiction works posted on websites such as Fanfiction.net (FF) and Archiveofourown.org (AO3), collecting terms from the 'browse', 'filter' and 'tag' sections of the sites, and terms which are used to describe fiction on the websites of bookstores such as BarnesandNoble.com (BN). Preliminary results reveal that bookstores organize fiction primarily by terms determining their genre. These terms do have overlap in the organization of fan fiction sites, however, beyond these genre terms, fan fiction is organized in a much more detailed way which involves a complex tagging system used to describe the characters and their relationships, and the plot devices contained within the works. The unique terminology of fan fiction is a little-researched area in linguistics and this study can aid in the further investigation of this subject.

**Paul McCormick**, Department of Economics, Honors College

**Faculty Mentor:** Dr. Waquar Ahmed

**Title:** Seeds in the City: Victories, Losses, and Opportunities for Community Gardens in Denton, Texas

The globally dominant systems of food production and consumption in the 20th and 21st centuries have produced a commendable amount of technological advancements as well as increased nutrition for many populations. In developed countries, however, this has been accompanied by a separation of large portions of the population from the food they eat, whether from changing employment patterns toward manufacturing and services, or from globalization of commodity markets. This alienation has not been without consequences, and as early as the 1960s has been resisted in various ways. Urban Agriculture, for example, has sought to reintegrate food production and consumption in (sub)urban settings, places conventionally designated unsuitable for agriculture, often with an eye toward empowering or otherwise aiding the urban poor. While much of the theoretical groundwork has been laid within Geography, application to a greater number of cities and urban agriculture projects will bolster the scholarly understanding of the factors influencing urban agriculture's success in challenging the commercial food system. In my research I examine the role of urban agriculture, practiced through the format of community gardens, in the food system of Denton, Texas, to address the following: do community gardens in Denton meaningfully challenge the commercial food industry, and if not, what factors contribute to their inability to do so? In answering this question, I employ a qualitative approach which incorporates photography of garden sites and aerial imagery of the city, which spatially and visually frames the current political economy of food within Denton; and a textual analysis of the programs, statements, and laws of the city of Denton, the community gardens within its city limits, and other interests such as real estate and Homeowners' Associations, to enhance the existing discussion on urban agriculture in the developed world.

**Tess McCoy**, Department of Art Education and Art History

**Faculty Mentor:** Dr. Denise Baxter

**Title:** The Creation of Women's Identity in Fashion: Objectification Within Norman Norell's Classic Silhouette

In this paper I study the mid twentieth American fashion designer Norman Norell, the classic silhouette that he often worked in, and his commentary on the fashion industry, his costumers, and his designs. Using Joanne Entwistle's article "Fashion and the Fleshy Body: Dress as Embodied Practice" as the preliminary understanding of femininity, women's identity, and fashion, I am able to reinvestigate Norell's work as a perpetuating factor of misogyny in fashion. Beyond explaining Norell's relationship to and opinions of feminine identity in fashion, I explore modern fashion and the similarities and differences of misogyny in this field since the classic silhouette of Norman Norell, specifically within *Vogue* and other fashion advertisements and campaigns.

**Jonisha McKiddy**, Department of Linguistics

**Faculty Mentor:** Dr. Shobhana Chelliah

**Title:** An Optimality Theoretic View of Reduplication in Lamkang

This research proposal examines reduplicative change through an Optimality Theoretic eye in Lamkang, a language within the Naga Kuki Chin family in India. Through thorough background understanding of the reduplicative process, universal grammar and Optimality Theory, we offer fresh insight as to what counts as reduplication within Lamkang, why certain constraints exist on reduplicated forms and how it differs from other Naga tribes. Because Lamkang offers semantically weighty partial and total reduplication, there's significant morphological processes that are happening and can be surveyed language specifically as a part of universal grammaticality. Specifically, this proposal aims to predict full and partial reduplication as a morpho-phonological process through patterned constraints.

**Glen McLaren**, Department of Linguistics, Honors College

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Comedians in the Age of Political Correctness

This study will look at how modern comedians have adapted their humor styles to be accepted by the politically correct society of today. Basing off of combinations of research into the linguistics of humor and the effects of political correctness on modern language use, the goal is to give a qualitative study of how multiple comedian's shows have been written in response to political correctness, also known as offensive language. The data that will be studied will be taken from comedian shows that have been posted to YouTube. The data will be analyzed by looking at word and tonal choices made by the comedians in both an offensive clip and an unoffensive clip. The adjustments made by the comedians within these word and tonal choices to make his or her show more acceptable to politically correct audiences will show a pattern of what comedians have had to do to make their shows fit within political correctness. My results so far have allowed me to identify two methods most commonly used by comedians, using a different voice and exaggerating the offensiveness. This will be one of the first studies specifically on political correctness' effect on humor.

**Meredith Monroe**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** The Semantic Properties of Emojis in Text-based Communication

This study is an analysis of the affective meaning of emojis, the power they hold over semantic change, and the shift in their meaning across different phone providers. A multitude of studies have been conducted on emojis, many focusing on their positive and negative sentiments, stating the basis that emojis do have meaning attached to them. This study will take a closer look at the more nuanced emotions attached to emojis through the use of an online questionnaire. Participants, categorized by the age ranges >19, 20-29, 30-39, 40-49, and 50<, will be shown various emojis from different phone providers (some by themselves and some attached to various texts) and asked about their opinion and interpretation of the emoji. Preliminary results show that emojis do have a semantic definition that can change the meaning of the text that they are paired with though the exact definition varies among users. This supports our hypothesis that the variation of emojis across providers can disrupt the intended interpretation of the user while also showing that interpretations can be misunderstood within the use of the same provider. The findings of this study will have substantial implications to the field of semantics and it will increase the amount of data linguists have regarding emojis. The data regarding the differences across cell-phone providers will have a heavy effect on the future of our cell-phone operating systems and the way we communicate through texting.

**Jessie Mortensen**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Palatalization in Yiddish

This research will cover the usage properties of palatal sounds ( such as /j/, <y> in <yes>) in the modern-day Yiddish language. We plan on answering the following questions: What palatal sounds occur in Yiddish, where do they have a preference to occur, and are they more prevalent in different dialects? We will collect and analyze a word-set to be derived from the Wexler Oral History Project produced by the Yiddish Book Center. This study will explore the patterns of palatal sounds in Yiddish, and this data will attempt to help prove or disprove the claims made by Wexler, on the genetic relations of Yiddish. Wexler claims that Yiddish is actually a Slavic language descended genetically from Sorbian, and that this relationship is reflected in the retention of palatal sounds in the northeastern dialects of Yiddish, but not the southeastern dialects. Palatal and palatalized sounds will be analyzed in environment, voicing, and its historical value (if it has been recorded, i.e. the palatalized /fotografæ\_es/ from /fotografs/). The data will be an intense case-study of one Polish (southeastern) dialect speaker and one Litvish (northeastern) dialect speaker. Preliminary results show a strong prevalence in both dialects for /j/ over all other palatal(ized) sounds, with more frequent usage of palatals in the northeastern dialect, as is consistent with Wexler's research; however, the words with palatal presence tend to have strong slavic morphological holdovers, which indicate that they were recently borrowed, which defaults Wexler's claim.

**Akila Muthukumar**, Texas Academy of Mathematics and Science

**Faculty Mentor:** Dr. Kent Chapman

**Title:** Evaluation of Cottonseed Protein and Oil Reserves in Wild Accessions Cotton grown under Rain-fed or Irrigated Conditions

Cotton (*Gossypium* sp.) is farmed for its spinnable fibers, however cottonseeds left over from ginning are a valuable co-product that can be utilized for their oil and protein. The objective of this study was to measure cottonseed oil and protein reserves in wild accessions of cotton (*Gossypium hirsutum*) obtained from the USDA exotic cotton landrace collection, representing 30 different countries across 6 continents. Replicated plots were grown under irrigated or rain-fed conditions. Using non-destructive time-domain <sup>1</sup>H nuclear magnetic resonance (TD-NMR), we quantified seed oil and protein content from 224 accessions to test for variation among genotypes and under different watering regimes. On average, protein from seeds of the rainfed plots was 6.75% higher than those of the irrigated seeds. Conversely, the average oil content from seeds of the irrigated plots was 3.3% higher than those of seeds matured under rain-fed conditions. Comparing accessions between irrigated and rain-fed conditions, there was no observable trend in protein content, whereas there was a slight positive relationship in oil content. Additionally, in each watering condition we identified accessions that contained high-protein, high-oil, or high-protein and oil phenotypes. Accessions also were identified that had high oil and protein phenotypes in both watering conditions. Identifying the genetically favorable traits from these wild accessions that influence seed reserve accumulation under adverse environmental conditions could support efforts by breeders to improve yields under water limiting environments.

**Laurie Nguyen**, Integrative Studies

**Faculty Mentor:** Dr. Tom Miles

**Title:** Cultural Stereotypes, Domestic Abuse, and HIV

This paper will go into the societal effects that both cultural stereotypes and domestic abuse have on families who are already at risk for HIV. This can include cultural stereotypes, which further promote prejudice and discrimination, and domestic abuse, which reinforces gender stereotypes and fear of promoting safe sex techniques. Because of these two factors, families have an increased risk in attaining HIV through misinformation, mistaken perceptions, and victimization.

**Corey Olszewski**, Department of Emergency Administration and Planning

**Faculty Mentor:** Dr. Laura Siebeneck

**Title:** Emergency Management Collaboration: A Review and New Framework Cycle

Collaboration has long been recognized as an essential component in comprehensive emergency management and in enhancing community resilience to disasters. Throughout the four phases of the disaster life cycle, collaboration is a key element in planning and implementing mitigation and preparedness strategies as well as responding to and recovering from disasters. Good collaborations are built upon time and trust, and rarely are they one-time relationships that end after a single project. Rather, they often grow and expand beyond their original purpose to include new missions, goals, projects, and activities. Despite this reality, the research literature related to emergency management collaboration does not approach this process as being a continuous cycle. This paper builds upon previous research literature pertaining to collaborations and offers a new framework which visualizes collaboration as a trust building-trust outcome cycle, which moves through four repeating phases:



initiation, inclusion, execution, and evaluation. This new cyclical visualization provides a framework through which practitioners can prepare for each process or stage of the collaboration by understanding how collaborations progress and transform, and where repeat processes occur. This preparation can allow for clearer guidance, more effective planning, appropriate hand-off between agencies or organizations, and the reduction of interruptions to collaborative activity. This will facilitate greater collaborative continuity during each phase of disaster between local, state, federal governments, private institutions, and non-profit organizations.

**Sahil Patel**, Texas Academy of Mathematics and Science

**Faculty Mentor:** Dr. Carlos Ordonez

**Title:** Design and Simulation of a Novel Concentric Cone Antihydrogen Gravity Experiment

The gravitational behavior of antimatter has never been conclusively determined by experimentation and therefore has long remained elusive. Various experiments have been proposed to ascertain such, yet they are all critically limited in experimental feasibility. Thus, the objective of the research was to design and simulate a novel antihydrogen gravity experiment that would determine the directionality of the gravitational acceleration of antihydrogen and further exhibit significant potential for feasible experimentation. The hypothesized configuration of the apparatus consisted of a point antihydrogen source located at the common vertex of an azimuthally-symmetric series of concentric detection cones confined within a cylindrical vacuum chamber. The Monte Carlo method was utilized in the simulation of the experiment, the associated computational algorithm involving the definition of parameters, generation of antiatoms, and evaluation of detection. An optimization of the experimentally adjustable parameters was conducted followed by a suite of statistical, graphical, and parametric analyses. In conclusion, it was found that at the relatively high temperature of 4 K, the apparatus requires only 1357 antiatoms to indicate the direction of the acceleration of antimatter due to gravity, findings that not only exceeds those of proposed experimentation, but further lie within reasonable limit of current antihydrogen production. Therefore, to this extent, the novel concentric cone antihydrogen gravity experiment demonstrates exceptional promise of experimental feasibility and thus may lead to the first definitive test of the gravitation of antimatter, the results of which could revolutionize the field of physics at large and our understanding of the universe itself.

**Gabriel Puche**, Department of English, Honors College

**Faculty Mentors:** Dr. Amos Magliocco and Dr. Jackie Whipple-Walker

**Title:** Escaping Reality: A Threat to American Identity

In the African-American short stories of James Baldwin and J. California Cooper, the common desire of escaping violent realities by lingering in and clinging to past events is strongly apparent, and as a result, the characters experience an intensification of their obliviousness to their surroundings and of their hinderance to the successful adaptation and progress of their individual American identity. Although ostensibly not narratives of violence and despair, “Going to Meet the Man” by James Baldwin and “Sins Leave Scars” by J. California Cooper are narratives where characters take violence of their past and justify such presence to escape the imperfections of their present. Jesse, a deputy sheriff in Baldwin’s work, constantly remembers beating criminals in order to become sexually functional; meanwhile, Lida Mae, a young girl in Cooper’s work, seeks refuge in the arms of older married men in order to escape and cope with the sexually abusive environment of her childhood. With a literary analysis of two modern American short stories, not only can the reader see the harm of the actions of their distracted

characters but also see their effects on the characters' interactions with others, leading to the conclusion that both Jesse and Lida Mae are, in fact, damaging to themselves and to those around them. Consequently, their actions embody the objective of this analysis, built to show that escaping reality weakens the identity of every American, regardless of age, gender, and economic status.

**Joshua Santos**, Department of Linguistics

**Faculty Mentor:** Dr. Konstantia Kapetangianni

**Title:** Frequency and Purpose of Taboo Language Use by Teenagers

Up-to-date (im)politeness research is currently scant, as the topic itself is particularly young, even within the budding linguistic subfield of sociolinguistics. Rarer still is the study of taboo language, of which fuck and its various forms (fucking, fucked, fucker, etc.) are an archetypal example. This research project will use both quantitative and qualitative observations of spontaneous conversations recorded (audio only) by groups of two participants (dyads) and three participants (triads), all friends, to examine at what age occurrences of fuck are most frequent and for what purposes fuck is most often being used. Participants will be American English (AE) speaking teenagers of three ages: 14, 15, and 16 years old (a total of thirty participants) with subgroups of five participants for male and female speakers of which each will be separated by conversation type: dyadic or triadic (a total of twelve groups). Occurrences of fuck will be classified according to the nine sociolinguistic categories introduced in McEnery and Xia's (2004) study and by form. These data will be coded and analyzed statistically to draw conclusions about fuck's behavior. We expect to find that fuck occurs most frequently at age 14, given the conclusions reached in Stenstrom's (2006) study, and is used primarily as an intensity device that is mainly phatic (socially motivated) in nature. This research will provide the field of sociolinguistics with vital insights about the behavior of taboo language in AE, including the specific age at which fuck is most likely to occur, and the purpose of teenage swearing.

**David Skiles**, Department of Biochemistry

**Faculty Mentor:** Dr. Tom Miles

**Title:** Astroglia - The Future of Neural Medicine?

Astroglia (also known as astrocytes) are a subtype of glial cell present in many forms with diverse functions. Despite their varying interactions, the principal function of these cells is to maintain homeostasis in the brain-- the loss of which underlies the cause of all brain disorders. Consequently, astroglial alterations contribute to both the cause and effect of neurological diseases. Known collectively as astrogliopathy, these astroglial alterations are the focal point of new treatments for various diseases of the central nervous system. In this paper, I will define the various functions of astroglia, identify the dysfunctions consistent with brain disorders, and propose future treatments targeting these dysfunctions.

**Ally Smith**, Department of Biological Sciences

**Faculty Mentor:** Dr. Tom Miles

**Title:** "Made to Order": The Role of Personalized Medicine in Genetic and Epigenetic Analysis Technologies

How can modern genetic and epigenetic analysis technologies be applied to advance personalized psychiatric treatment? By understanding the biological mechanisms underlying various psychiatric illnesses, we can alter the current approach of symptomatic-based treatment to one that is individualized

at the genetic level. Many studies describe the procedures and applications of emerging analysis technologies. However, there is limited research on the feasibility of implementing these technologies beyond the academic world. In this paper, I will compare the logistical features of neuroimaging, chromatin immunoprecipitation, and bisulfate sequencing for DNA methylation to determine which technology is best suited for furthering the field of personalized medicine. I expect to find that bisulfate sequencing for DNA methylation would be the most successful in a clinical setting due to its relatively low cost, ability to analyze patterns of DNA methylation, and applications in combination with other methods.

**Megan Sullivan**, Department of Art Education and Art History

**Faculty Mentor:** Dr. Denise Baxter

**Title:** Jean Paul Gaultier and the Illusioned Body: Exploring Power and Femininity Within Fashion

In 2007, the retailer Neiman Marcus celebrated their 100th anniversary. As part of their centennial celebrations, Neiman Marcus created an exhibition entitled "Future Fashion", which showcased the visions of major designers and fashion houses for the next 100 years of fashion. Tasked with creating a garment that represented his vision for the future of fashion, French designer Jean Paul Gaultier designed a nude illusion dress to represent his intention for the next 100 years of fashion. Gaultier's idea of future fashion encouraged women to reclaim their sexuality. This paper examines the designs of Jean Paul Gaultier to study his intentional unorthodox treatment and representation of the female body, in order to better understand how Gaultier's designs contributed to the normalization of female sexuality within fashion. By using object based research, feminist theory, and gender studies, I investigate how Gaultier's nude illusion dress created for the Future Fashion exhibit empowers women, as well as challenges contemporary notions of sexuality and gender.

**Daniel Witt**, Department of History

**Faculty Mentor:** Dr. Christopher Fuhrmann

**Title:** Belief and Unbelief in Divine Intervention among Ordinary Romans

This paper is about the attitudes of ordinary people in the Roman world toward the possibility of divine intervention as an actual, present-day phenomenon.

**Ashley Yarbrough**, Integrative Studies

**Faculty Mentor:** Dr. Irene Klaver

**Title:** Skating along the River of Death: A Personal Examination of Fort Worth's Role in Reframing the Trinity River's Place

In the early 20th century the Texas Department of Health termed the Trinity River "the Mythological River of Death" because of hazardous pollution. Even though I grew up in Fort Worth I was scarcely aware of the Trinity River as good or bad. Throughout the past decade initiatives, events, and opportunities for citizens to engage with the Trinity River have been designed by the Trinity River Vision Association (TRVA) and the Tarrant Regional Water District (TRWD), Fort Worth's central organizations responsible for the culture and perception of the Trinity River. In my paper I describe how as a teenager I stumbled with my friends upon those initiatives and started to enjoy and get to know the Trinity without knowing about the TRVA and/or TRWD. In a personal narrative I give an ethnographic account of experiencing and connecting with the Trinity. I analyze the historic record of the TRVA and

examine how a growing enthusiasm for the Trinity River shifted the identity of the city of Fort Worth. I assess the river's transformation from being merely utilitarian and functional to being a source of dynamic enrichment of Fort Worth's natural and cultural values. In so doing I show the city of Fort Worth's role in reframing the Trinity River's position in socio-political consciousness.

# RESEARCH POSTER ABSTRACTS

University Union Ballroom

2:30-4:30

**Aditya Paul**, Texas Academy of Mathematics and Science

**Title:** An Innovative Blockchain-Based Education Platform

In this project, we present an innovative system to track student records through a university. The student's records are stored in an Ethereum-based blockchain network, using specific blocks to represent specific academic achievements, like the completion of a course, a dissertation, etc., each signed off by a professor's private key. A customized algorithm is used to calculate a score for each topic. The blockchain can be sent to prospective employers who can select employees based off of the scores in these topics. Students can also get certified based off of the scores calculated for each topic. A Hyperledger-based framework is used to store grades, however, in which professors and students agree on grades.

**Soumitra Anand**, Department of Biological Sciences

**Title:** Identification of Novel Genes Linked to Inflammation-Driven Lung Tumorigenesis via a Tested, Lightweight RNA-Sequencing Aligner

Lung cancer is the deadliest form of cancer worldwide, accounting for more deaths than colon, breast, and prostate cancer combined. Recently, pulmonary inflammation associated with chronic obstructive pulmonary disease (COPD) has been demonstrated to increase the risk of lung cancer. Through RNA-Sequencing (RNA-Seq) analysis, a novel set of house mouse (*Mus musculus*) genes differentially expressed during 4-(methylnitro-samino)-1-(3-pyridyl)-1-butanone (NNK)-induced lung tumorigenesis and tumorigenesis enhanced by the inflammatory agent lipopolysaccharide (LPS) was identified. *Ighv13-85* was also identified as a novel highly expressed gene in the NNK+LPS treatment and established its role in prevention against COPD. Furthermore, the role of pseudogenes traditionally left out of RNA-Seq studies was explored.

**William Archuleta**, Department of Psychology

**Title:** Politics on the Mind: Reinforcement Sensitivity Theory and Political Conservatism

Background: Previous research has found neurological and personality differences between conservatives and liberals. However, no extant research has investigated political ideology through the lens of reinforcement sensitivity theory, which proposes that separate brain systems regulates approach, avoidance, and fight/flight/freezing. Given that previous research has found that conservatism is associated with high conscientiousness and lower openness to experience, we expected that conservatives would show higher approach tendencies. Previous research has also found that conservatives have greater limbic activity; therefore, we expected an association with the Fight-Flight-Freeze System (FFFS). Method: Undergraduate students (N = 630; 75.2% female) completed a survey that included the Revised Reinforcement Sensitivity Questionnaire (rRST-Q) and the Social and Economic Conservatism Scale (SECS). Results: Behavioral activation was associated with higher social and economic conservatism. No relationship was found between political ideology and FFFS.

Discussion: Overall the results suggest conservatives may be more sensitive to reward. This is consistent with research linking conservatism with conscientiousness or striving for achievement. However, the FFFS was insignificant when analyzing its association to political ideology, which has been found to be positively associated in prior research. This may be attributed to using a self-report measure to assess personality, which can be susceptible to bias.

**Rebekka Auer**, Department of Speech-Language Pathology, Honors College

**Title:** Sound Sequences in German Children's Early Word Productions

The goal of this research was to investigate specific phonetic patterns in German children's first words and to compare the results to English-speaking children. The target words were categorized based on the patterns of sound sequences. The results indicate that the most frequent and the least frequent sound sequences are similar between the two languages, but there are some differences between German and English and therefore the results show the importance of cross linguistic comparisons.

**Weston Baccus**, College of Education

**Title:** The Impacts of Co-Teaching on Clinical Teaching

**Jessica Barba**, Department of Biochemistry

**Title:** Isolation and annotation of the Bacteriophage EGole

This article will explain the reason for studying bacteriophages, what *Streptomyces griseus* is used for and why it is used as the bacterial host for the research. The materials and methods used for this research has all been provided by the SEA-PHAGES program and can be found in the Phage Discovery Guide. The results that are provided in the article all show how the bacteriophage EGole works in the lab. All of the results were recorded as they were found and any alterations to the procedures are specified due to the fact that these alterations may have affected the outcomes of these tests. The results provide specifics about the specific characteristics of EGole like the morphology of the plaques, the titers, and the DNA concentration. The discussion portion of this article shows the importance of the results and why EGole is either unique or a common bacteriophage. Other different types of hosts were tested to see whether EGole would infect the other *Streptomyces* bacterium. The DNA, genome, and different hosts that were used are specified and analyzed.

**Katherine Benzinger**, Ecology for Environmental Sciences

**Title:** Status and Density of Breeding Painted Buntings (*Passerina ciris*) at the Lewisville Lake Environmental Learning Area

The western population of Painted Buntings (PABU) utilize scrub thicket habitats and forest edges (Lowther et al. 1999). They are sexually dimorphic, with bright, colorful males (Fig. 1) and more subtle, yellowish-green, females (Fig. 2). Also, the first-year male plumage is essentially identical to that of the female. Our objective was to document status and density of breeding PABUs at the Lewisville Lake Environmental Learning Area (LLELA) to set the stage for future intensive studies of their breeding ecology. We created two study grids with areas of 24 and 20 ha and walked loose transects, recording instances of observations or heard songs. Ultimately, our data show that both grids support an extremely dense population of PABUs and that LLELA seems to provide an ideal habitat for this species.

**Mithilesh Bhaskaruni**, Texas Academy of Mathematics and Science

**Title:** A Novel Hypothesis for the Role of MyBP-C in Modulating Myofibril Contractility

Many cardiomyopathies have been linked to mutations found in the myosin subfragment-2 (S2) region of the myosin molecule. Myosin binding protein C (MyBP-C) is a protein anchored in the thick filament of striated muscle that binds to S2, an action that has been thought to induce the myosin heads to bend back into the "off state". This makes MyBP-C a force regulator that controls the ability of myosin heads to bind to actin and cause muscle contraction. The study observed the effect of monoclonal antibody MF 30, which is known to bind to a similar region of S2 as MyBP-C, on the contractility of a whole myofibril. MF 30 was found to have a destabilizing effect on the myosin S2 region, increasing the actomyosin interaction and thus, the resulting muscle contraction. These results led to the formulation of a novel hypothesis that MF 30 acts as a competitive inhibitor to MyBP-C, interfering with the supposed stabilizing function of MyBP-C. This lends support to the belief that MyBP-C plays a critical role in the regulation of muscle contraction. The discovery associated with the function of MyBP-C is applicable to further research on the biochemical basis of hypertrophic cardiomyopathy.

**Shashank Bhavimane**, Texas Academy of Mathematics and Science

**Title:** Computer Simulation of the Solar Wind: H<sup>0</sup>-H<sup>+</sup> Elastic Collisions, Charge Transfer, and Transport Cross Sections

A quantum mechanical scattering approximation is used to find the cross section of a hydrogen atom colliding with a proton at high energies to aid in modeling the solar wind's propagation through the solar system. An accurate potential is used in place of an approximate one used by previous authors to find a more precise representation of the cross section. A computer model of the solar wind is created by using a Monte Carlo simulation to create projectile trajectories for hydrogen protons being emitted from the sun as they collide with hydrogen atoms in space.

**Sarah Blaido**, Department of Biological Sciences

**Title:** The Utility of Classifying Urban Ponds using Chironomidae Pupal Exuviae

The City of Denton, located in a semiarid region of North Central Texas, has over 200 urban ponds. Many of these ponds were constructed for storm-water management. Recent studies have shown that these ponds also have the potential to provide a range of ecosystem services including being an important source of aquatic biodiversity. The overall goal of this study is to identify biological, physical, chemical and pond morphometric factors that influence the structure of the invertebrate community and develop a plan providing management strategies to maximize the conservation value of Denton's urban ponds. To achieve these goals this study, as part of a larger study, monitored the diversity and phenology of the chironomids (Diptera: Chironomidae) in a series of six ponds chosen to represent an urbanization gradient in Denton, Texas. Chironomidae are known to be effective bioassessment organisms because they vary in their tolerance to pollutants and are often the most abundant group of insects in freshwater ecosystems. Monitoring of the chironomids was done by collecting surface floating pupal exuviae between September 2017 and May 2018 using standard equal time and effort techniques. Processing of samples continues, but preliminary results suggest that the highest diversity occurred in those ponds with the greatest variety of aquatic plants. Low diversity and low abundance of chironomids were found in Apogee Pond. This pond has the most urban influences and had the least abundance of pupal exuviae during the sampling events.

**Sierra Burrier**, Integrative Studies

**Title:** We Still Have Mutual Friends

As part of the Undergraduate Research Fellowship Program, for the past year I have done qualitative research on sexual assault. Interviewing women on their experiences, their background, how they've coped, and all the things they've had in common. I have interviewed close to thirty women, interviews ranging from an hour to six hours. Every person is different, in demographic (and experience), but they all share a similar story: what it's like to be afraid. The interviews are comprehensive and detailed, and will be laid out in graphs and quotes. Each anonymous person had a chance to tell their story, and this poster will represent that.

**Eryn Butler**, Human Development and Family Sciences, Honors College

**Title:** Safe and Sound: A Human Trafficking Prevention Program for Parents

Numerous classifications exist for human trafficking: sexual exploitation, forced labor, organ trafficking, and people smuggling. Collective definitions of human trafficking include the use of force (beatings, confinement), fraud (false offers), and/or coercion (threats, manipulation; Chung, 2006). Human trafficking is now the fastest-growing source of profit for organized criminal enterprises in the world, bringing in profits estimated around 9.5 billion dollars per year (Weitzer, 2015). With growing concern from society and the government, individuals are seeking to determine what increases the risk of being trafficked as a child. The goal of Safe and Sound is to bring awareness to the human trafficking epidemic, and provide practical solutions for decreasing risk factors for adolescents. The program is a two hour educational session where parents can learn about human trafficking, and create an awareness within themselves of risk factors that could affect their own children.

**Christina Cantu**, Applied Arts and Sciences

**Title:** A Matter of Belief or Disbelief? Cognitive Religious Beliefs & Attitudes Towards Euthanasia

Physician assisted death is currently legal in five states, with eight states considering legislation to legalize the practice. It is established that religiosity is one of the strongest predictors of attitudes toward euthanasia (ATE; Burdette, Hill & Moulton, 2005) and is a strategy to cope with death anxiety (Dezutter et al, 2007). Previous research regarding ATE and religiosity has considered affiliation and participation (Danlyiv & O'Neil, 2016) but not the nature of religious belief or disbelief. The purpose of this exploratory study is to investigate the relationship between cognitive religious beliefs and ATE. Cognitive religious beliefs may be understood as how an individual processes religious content (Duriez, et al., 2007). The participants consisted of 632 undergraduate students (73.57% female) enrolled in a psychology course at a large public university in the southern U.S. All participants were recruited online through the university's psychology department research website. This study was approved by the university committee for the protection of human subjects; the survey was administered online (remotely) and participants received course credit for participation. The survey included Attitudes Toward Euthanasia (ATES; Wasserman, Clair & Ritchey, 2005) and Post-Critical Belief Scale (PCBS; Duriez, Soenens & Hutsebaut, 2005). Using regression analysis on ATE and the four subscales of PCBS, Orthodoxy, Second Naivete, External Critique, and Relativism, (Duriez, Soenens & Hutsebaut, 2005) we found the external critique dimension, or a literal disbelief of transcendence, was associated with more approving ATE. These results suggest that approving ATE may be more closely linked with disbelief than disapproving ATE is linked with belief. With declining religious belief and participation, there may be a greater trend toward more accepting ATE.



**Francesca Cape**, Department of Linguistics

**Title:** Hegemonic Masculinity in Advertising and its Effect on Homosociality

This study seeks to investigate the masculinity displays in advertising, centered around hegemonic masculinity, and their detrimental and alienating effects on male homosocial relationships. Hegemonic masculinity, as represented by Connell (1987), is defined as an institutionalized display of dominance over femininity. Bird (1996) further breaks down the notion of hegemonic masculinity into the defining characteristics of emotional detachment, competitiveness, and the sexual objectification of women. These characteristics are prevalent in male centered advertising (advertisements featuring men and geared toward a male audience) and focus specifically on dominance and power exhibited in detachment, competition, and exclusivity or membership in class.

**Natasha Chugh**, Undeclared

**Title:** B<sub>2</sub>O<sub>3</sub> ALD for Advanced Doping Applications: The Roles of Free Radical Precursors and Surface Composition

Atomic layer deposition (ALD) of boron oxide (B<sub>2</sub>O<sub>3</sub>) on silicon and silicon oxide (SiO<sub>2</sub>) substrates is the subject of extensive investigation for ultra-shallow Si doping applications. Such films, however, generally require capping barriers to passivate against air exposure. This presentation explores ALD of thermally stable BN as a B<sub>2</sub>O<sub>3</sub> capping barrier, as such films may inhibit upward B diffusion through the capping barrier at temperatures generally used for shallow B diffusion/doping applications. Using in situ x-ray photoelectron spectroscopy (XPS), ~ 5 monolayers (ML) of BN can be deposited by BCl<sub>3</sub>/NH<sub>3</sub> on a B<sub>2</sub>O<sub>3</sub> film by ALD at < 350 C, passivating B<sub>2</sub>O<sub>3</sub> against boric acid formation upon ambient exposure. B<sub>2</sub>O<sub>3</sub> was formed by BCl<sub>3</sub> deposition on SiO<sub>2</sub> and subsequent reaction with O<sub>2</sub>, followed by UHV annealing at 380 C to remove remnant Cl. XPS shows such films to have B 1s and O 1s binding energies and B/O stoichiometries indicative of B<sub>2</sub>O<sub>3</sub>. Subsequent exposure of B<sub>2</sub>O<sub>3</sub>/SiO<sub>2</sub> to ambient results in H<sub>3</sub>BO<sub>3</sub> formation, identified by changes in XPS core level spectra. BCl<sub>3</sub>/NH<sub>3</sub> ALD on a B<sub>2</sub>O<sub>3</sub> film at 327 C results in the layer-by-layer growth of stoichiometric BN, as characterized by XPS. Subsequent exposure of ~ 5 ML BN on B<sub>2</sub>O<sub>3</sub> to ambient resulted in slight BN oxidation (mainly at N sites), and no observable H<sub>3</sub>BO<sub>3</sub> formation. The above findings indicate that continuous BN films can be formed by ALD at moderate temperatures on B<sub>2</sub>O<sub>3</sub>, protecting the oxide from hydroxylation or contamination during ambient exposure.

**Kayla Corley**, Department of Psychology, Honors College

**Title:** Conservative Millennials Dislike Millennials: Political Ideology and Intergenerational Attitudes

System justification theory research has found that politically conservative individuals from high status groups tend to display more ingroup favoritism, whereas those from low status groups tend to display more outgroup favoritism. The purpose of this study was to investigate whether this phenomenon would manifest in the relationship between political ideology and intergenerational attitudes among younger adults. We expected that college students would see themselves as a low status group, and therefore that more politically conservative college students would express outgroup favoritism in that they would have more positive evaluations of generations other than their own. Method: College students (N = 624) completed a survey that included the 12-Item Social and Economic Conservatism Scale as well as a modified version of the General Evaluation Scale in which participants rated their attitudes toward generations: millennials, Generation X, Baby Boomers, and the Greatest Generation. Results:

Conservative political ideology was associated with more negative attitudes toward millennials but more positive attitudes toward Generation X, Baby Boomers, and the Greatest Generation. Conservative millennials have more negative attitudes toward their own generation and more positive perceptions of other generations. Consistent with the system justification theory, conservative millennials displayed outgroup favoritism. Conservative millennials may experience less generational solidarity and identify with older age cohorts. Future research could investigate this among other age groups as well as explore what factors mediate the relationship between conservative ideology in millennials and their view of their generation.

**Katheryn Cruz**, Department of Chemistry, McNair Scholar

**Title:** High Performance Supercapacitor Based on Two-Dimensional Molybdenum Ditelluride (MoTe<sub>2</sub>) Film

Two-dimensional (2D) layered transition metal dichalcogenides (TMDs) materials have unique physical and chemical properties which make TMDs a promising candidate as an electrode for supercapacitors. Supercapacitors have advantages over other energy storing devices such as excellent power density, fast charge and discharge times, long life cycle, and relatively low cost. Development of 2D TMDs and their fabrication techniques, for high capacitance supercapacitor electrodes, will provide new opportunities for high-efficiency supercapacitors. 1T<sup>′</sup>-MoTe<sub>2</sub> has favorable electrochemical properties due to the overlap of energy bands near the Fermi level and is semimetallic which aids in the conductivity, making 1T<sup>′</sup>-MoTe<sub>2</sub> a promising electrode material in supercapacitors. Here, we have grown molybdenum ditelluride (MoTe<sub>2</sub>) directly onto molybdenum using a magnetron sputtering technique. The synthesized electrodes were then used in a double-layer supercapacitor configuration using a gel electrolyte/separator made of PVA and LiOH between the two electrodes. The configuration provides a small, flexible energy storage option that would be ideal for future flexible, wearable electronics. The supercapacitor has shown an areal capacitance of 35.21 mF/cm<sup>2</sup> for a sample of 450nm thickness. An efficient MoTe<sub>2</sub> electrode for supercapacitors could open a new area of high-efficiency flexible energy storage devices.

**Ian Dadeboe**, Department of Chemistry, Honors College, McNair Scholar

**Title:** Sleep Characteristics and Dropout Rates in College Students

Previous studies have linked sleep variables like insomnia, sleep duration, and chronotype to academic performance and retention. However, to date no study has examined these sleep factors as a predictor of college degree completion. The current study seeks to understand the relationship between insomnia, sleep duration (mean and variability), and chronotype as predictors of college degree completion after controlling for cumulative grade point average (GPA). Participants were 543 college students (76% female; mean age 20.7 years [SD = 3.7]) who were administered a paper-and-pencil psychosocial questionnaire battery including the Insomnia Severity Index and a reduced Morningness-Eveningness Questionnaire. Sleep duration was assessed with one week of daily sleep diaries, and both mean and standard deviation were used in the model. Degree completion information and GPA was obtained from the registrar's office. The omnibus logistic regression was significant,  $F(5,537) = 16.7, p < .001$  and accounted for 13.5% of the variance in degree completion ( $R^2 = .14$ ). The only meaningful predictors were variability in total sleep time and GPA. Surprisingly, the results demonstrated greater variability in total sleep time was related to higher likelihood of earning an undergraduate degree, which may reflect study habits, lower vulnerability to sleep loss, or greater sleep flexibility. Mean sleep duration,

chronotype, and insomnia symptoms were not significant predictors of degree completion. These results highlight the importance of examining variability in sleep variables in predicting outcomes. Future research should use a combination of objective and subjective measures to explore the impact of sleep factors including variability on degree completion and other important academic metrics.

**Jessica De La Garza**, Department of Psychology

**Title:** The Big Five Demonstrate Different Relationships with Ageism and Aging Anxiety

Ageism is one of the most common forms of prejudice, and it negatively impacts the lives of older adults (Nelson, 2016). The purpose of this study was to investigate links between the Big Five personality traits and both ageism and aging anxiety among younger adults. Previous research has found links between ageism and agreeableness and openness to experience, as well as links between aging anxiety and neuroticism (Allan et al. , 2014; Harris & Dollinger, 2001). Determining which personality traits are associated with ageism and aging anxiety may clarify the nature of both constructs. Younger adults age 18-29 (N= 645) completed a survey which included the BFI-2-XS, the Anxiety about Ageing Scale, and the Fabroni Scale of Ageism. Results of a multiple regression analysis found the Big Five accounted for 5. 1% of the variance in aging anxiety, and 18. 2% of the variance in ageism among young adults. Neuroticism demonstrated the only significant relationship with aging anxiety. However, agreeableness, openness, and conscientiousness demonstrated significant relationships with ageism. Among younger adults, ageism was associated with lower agreeableness and openness. These basic personality traits may promote empathy (Allan et al. , 2014). Fewer friendships, an inability to understand, and a lack of interaction with older adults may enable the establishment of misconceptions and prejudice. The link between neuroticism and aging anxiety suggests that concerns about growing older may reflect deeper underlying emotional vulnerabilities. Overall, the results suggest that ageism and aging anxiety are associated with different core personality traits.

**Ashley Denney**, Interdisciplinary Education 4-8th Mathematics, Honors College

**Title:** Impact of Co-Teaching on Clinical Teaching

Data and descriptions about how the teaching strategies were beneficial to the student teacher and the students.

**Leo Dong**, Texas Academy of Mathematics and Science

**Title:** Degrowth in Planarians *Schmidtea mediterranea* and *Girardia dorocephala*

In recent years, planarians, free-living aquatic flatworms forming the class *Turbellaria* of the phylum *Platyhelminthes*. have become recognized as an important animal model for regeneration, neurotoxicology, and development. They possess the remarkable ability to regenerate a complete, functioning body from one neoblast cell and are the only known organism that contains pluripotent stem cells in adult organisms. Planarians also undergo a remarkable process termed “degrowth” to lower metabolic demands in response to starvation, in which they reduce their cell count, decrease in size, and in sexually reproducing strains, reabsorb their reproductive organs. Little is known about the degrowth process, thus this experiment sought to establish the rate of degrowth in the planarians *Schmidtea mediterranea* and *Girardia dorocephala*. Mass was measured at 1, 2, 3, 4, and 5 weeks post-feeding for sexual *S. mediterranea* (n=11) and asexual *S. mediterranea* (n=8), and at 1, 2, and 3 weeks post-feeding for asexual *G. dorocephala* (n=6). Degrowth in sexual *S. mediterranea* was significant,

decreasing by 33% from 1 to 5 weeks post feeding ( $P < 0.001$ ). Degrowth in asexual *S. mediterranea* was not significant from 1 to 5 weeks. Degrowth in *G. dorocephala* was not significant from 1 to 3 weeks post-feeding (measurements were discontinued at 3 weeks due to density induced fissioning). This data suggests that degrowth rates are species dependent and asexual *S. mediterranea* have a greater ability to control metabolic rate in response to starvation.

**Savannah Donnelly**, Department of History, Honors College

**Title:** Not That Far Beyond the Wire

This poster presents a cohesive summary of the research I have done under the supervision of my mentor professor, Dr. Cox. The purpose of this poster is to show how defeating the enemy abroad during World War 2 required simultaneously housing and providing for the enemy within our borders within the 650 POW camps. The intention of this research is to provide context with how POWs were perceived and utilized by American employers and to show the way POWs interpreted American society. I used a case study of Camp Huntsville, a POW camp in Huntsville, Texas to better understand my material.

**Stormie Garza**, Department of Biomedical Engineering, , Honors College, McNair Scholar

**Title:** Relationship between Sodium and Cholesterol Levels, Insomnia and Sleep Parameters in College Students

Previous studies have demonstrated a relationship between sleep patterns and objective health markers, such as serum lipids, lipoproteins, and body mass index. These studies have primarily investigated these characteristics in working adults and school-age children, but to our knowledge none have examined the emerging adult population. The purpose of the current study is to examine the association between sodium and cholesterol levels and insomnia in college students. College students demonstrate unique sleep patterns and previous studies have shown that they have a very high prevalence of sleep disturbances. Using regression, analysis was conducted on a dataset consisting of sleep duration, insomnia status, and their interaction as the independent variables, and cholesterol and sodium as the dependent variables. The results of this study demonstrated little to no association between the independent variables (sleep duration and insomnia status) and the dependent variables (sodium and cholesterol). There are several potential explanations for these null results, such as restriction of range due to the general health of college students. In the future, the study can be broadened to include a broader range of health status in this population or focus on other indicators of healthy function.

**Mary Katherine Gowdy**, Department of Linguistics, Honors College

**Title:** The Thing Is

My poster is about the modern usage of the word "thing", especially when it is been modifying by other words. I collected and analyzed data from the TV show Friends and the Corpus of Contemporary American English (COCA). My hypothesis is that people are using the word "thing" to speak about topics they don't want to talk about blatantly but need to say. Also, people that know each other well are able to employ this words and still understand what is meant based on context.

**Gillian Graham and Karina Barbosa** (McNair Scholar), Ecology for Environmental Science  
**Title:** Urban Ponds: An Important Source for Dragonfly Diversity and Conservation in Denton, TX

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.

**Riley Hamilton**, Integrative Studies, Honors College

**Title:** The Trinity's Trajectory from Trash to Treasure: The Dallas Audubon Center and Re-connecting to the Urban River

Throughout the history of the Dallas-Fort Worth area, the Trinity River has been rerouted and abused. For decades, citizens of lower socioeconomic standing suffered on the banks of the Trinity River because of floods and toxic pollution. The Texas Department of Health referred to the Trinity in the 1920s as the "Mythological River of Death." Today, the Trinity River has been reclaimed; safe and controlled, it has become a vibrant vector of urban renewal. Citizens of Dallas are becoming increasingly interested in the history and natural potential of the Trinity. With this poster, I present observations and qualitative findings developed at the Trinity River Audubon Center, a former toxic dumping site. I show education topics and the vitality of continued educational development surrounding the Trinity River. I also envision natural and cultural possibilities for the future of the Trinity River, as Dallas citizens become more conscious and concerned about the well-being of their Trinity River. Last, but not least, I touch on the gentrification and environmental issues that accompany the new interest in the Trinity.

**Sarah Hancock**, Department of Chemistry, Honors College

**Title:** Synthesis of  $\mu$ -extended Porphyrins as Sensitizers for Dye-Sensitized Solar Cells

Dye-sensitized solar cells (DSSCs) have attracted much attention in the science community as a promising alternative to the traditional silicon-based solar cells. Since the invention of DSSCs, there has been much investigation into suitable organic dye candidates for the photovoltaic cells. Porphyrins are favorable organic dye candidates for dye-sensitized solar cells due to their well-known light-harvesting ability in natural photosynthetic systems. Meso- functionalized porphyrins have been extensively investigated, and while there is synthetic ease and high photon to current efficiency, the synthetic routes are lengthy and the dyes are unstable in the solar cells. This work focuses on the synthesis of functionalized tetra(4- isopropyl)phenyl and tetra(3,5-di-tert-butyl)phenyl monobenzoporphyrins. The multi-step synthesis entailed a vicinal dibromination, followed by a double Heck reaction along with cyclization and aromatization to fuse the benzene ring to the porphyrin

periphery. The UV-vis absorption spectra and fluorescence spectra displayed characteristic red-shifting. This corresponds to smaller HOMO-LUMO gaps, which are favorable for electron transfer in the DSSCs. The bands were also broadened as the conjugation increased, which allows for better overlap with the solar spectrum. This work demonstrates the potentials of monobenzoporphyrins as sensitizers for dye-sensitized solar cells.

**Shreya Hariharakumar**, Texas Academy of Mathematics and Science

**Title:** Poly (methyl methacrylate) Nanoparticle Characterization Profile

Nano-therapy is an emerging field of interest within the realm of cancer therapy. The synthesis of such nanoparticles has taken many creative forms, including being composed of derivatives of common metals or even complex polymers. However, the potential of the nanoparticle to target specific cells is contingent upon the functional properties of these nanoparticles to elicit changes on the cellular level and to maintain biological homeostasis to the utmost possible degree. At the interface of inorganic chemistry and oncology, the engineering of nanoparticles is becoming a more common feat, however a characterization profile that analyzes the properties and potential of these nanoparticles is a major deficiency that still exists within the field. This poster will present a very detailed characterization profile, detailing a synthesis procedure for poly (methyl methacrylate) nanoparticles, the size/zetapotential/absorption range of the nanoparticles, the cytotoxicity assays conducted on the effect of these nanoparticles on vital organs, and other pertinent information regarding the characteristics of the nanoparticles. This investigation has also strived to allow others to replicate the procedures delineated, and to learn about correlation curves to be able to extrapolate future metrics from the current data set. This investigation has culminated chemical principles, biological laws, statistical analysis, and a holistic approach to creating a very detailed poly (methyl methacrylate) nanoparticle characterization profile.

**Mikayla Haynes**, Texas Academy of Mathematics and Science

**Title:** Synthesis of Chiral Chromans

My poster will explain my teams efforts toward synthesizing three-ring chiral chromans. Chromans demonstrate affinities to various receptors, enzymes and ion channels, making them potential therapeutics in the future to treat various diseases. Our efforts involve using a two component reaction reaction of salicylaldehydes and cyclic ketones resulting in a three ring fused chromans. This reaction is catalyzed by a system involving  $\text{Cu}(\text{SbF}_6)_2$  and a bidentate ligand and the reaction was designed to used substrates that are all commercially available.

**Taylor Hood**, Department of Biological Sciences, Honors College

**Title:** Citrate Synthase Activity in Response to Varying Thyroid Hormone Levels in Developing Pekin Ducks

In this research, the citrate synthase activity in the heart and thigh tissues of developing Pekin ducks are examined in order to determine how hypothyroidism and hyperthyroidism affect enzymatic activity in the mitochondria. The overarching theme is that enzymatic activities of tissues are lowered in relation to low thyroid hormone levels and elevated under the effect of high thyroid hormone levels. The methodology used will allow us to calculate the activity of citrate synthase, a biochemical marker for

mitochondria number, and determine how thyroid hormones influence the changes that occur during hatching in ducks.

**Kody Hughes**, Department of Biochemistry, , Honors College, McNair Scholar

**Title:** Upland Cotton (*Gossypium hirsutum*) Bast Fiber Modification

Cotton, like hemp, jute, and kenaf, produces long fibers in the bast layer of stalks. These fibers are left to rot in the field after the bolls are harvested, and the high lignin content makes them too stiff for many textile uses.

**Stefanie Hustotf**, Department of History

**Title:** *Loving v. Virginia* and its Local Impacts in Texas

The poster will contain a description of the background of the *Loving v. Virginia* case, comparisons to how various demographics in Texas covered the case in newspaper media, the impacts of the case after it was decided, as well as concluding thoughts on the research.

**Brittany Jandick**, Department of Geography

**Title:** Ethics in the Barnett Shale: Comparing Transparency Practices Among Operators

Ethical behavior among U.S extractive industries is difficult to identify and implement. This is partly due to the differing perspectives on the definitions of ethical behavior. For example, the ethics of transparency and the chemicals used in hydraulic fracturing, or fracking, differ depending on viewpoint or which perspective. How can operators behave ethically if ethical behavior can be defined in different ways? In this study, I examine the ethics of transparency and the disclosure of fracking chemicals among Barnett Shale operators. I examine operator ethics from three perspectives: business, justice, and political. The purpose of this study is to advance understandings of ethics in US extractive industries, particularly among oil and gas operators. It also contributes to broad discussions on the ethics of oil and gas development in local communities and how to approach environmental policymaking. To determine if definitions of ethical behavior overlap, I am going to compare the behavior among operators without Corporate Social Responsibility (CSR) statements to those with CSR statements, as well as compare who and who does not disclose chemical information on FracFocus. Findings suggest that depending on which perspective ethics of transparency are viewed from, some operators are ethical while others are not. Most likely operators will be ethical from a business perspective, not ethical from a justice perspective, and it will be mixed from a political perspective.

**Carly Jewett**, Department of Biological Sciences, Honors College

**Title:** The Future of Stem Cell Research

Could stem cells eventually replace antibiotics for treating bacterial infections and regulating inflammatory responses? Many studies exist today sharing the latest findings on various medical uses for stem cells, such as their potential in tissue regeneration and the treatment of autoimmune diseases. However, not many studies exist on the potential of stem cells to replace our current use of antibiotics to treat infections and control inflammatory responses. As increasing resistance to antibiotics becomes more common, finding alternatives to mediate bacterial infections could prove to be a necessity. The intention of this paper is to produce evidence supporting the hypothesis that stem cells produce effects

on the body's immune system similar to that of modern antibiotics. To achieve this, experiments would need to be conducted to show the stem cells' ability in inhibiting bacterial growth and reducing inflammation without compromising overall immune function.

**Kelsie Jurek**, Department of Speech-Language Pathology

**Title:** Preliminary Outcomes for an Auditory Processing Training Model for Individuals with ASD

This presentation will describe the primary findings from a study designed to determine the efficacy and effectiveness of an intensive auditory processing model for individuals with ASD. An overview of the model as well as preliminary findings will be provided. Implications for future research and intervention programming will be discussed.

**Ambika Kapil**, Texas Academy of Mathematics and Science

**Title:** Physiological Biorhythms in Chicken (*Gallus gallus*) embryos.

In this experiment, I studied the circadian rhythms of layer chickens (*Gallus gallus*) under the influence of different light cycles. The light cycles used were 24 hours of light exposure (LL), 12 hours dark and 12 hours of light exposure (LD), and then 24 hours of no light exposure (DD). Through literature written on other vertebrates, it is understood that the production of melatonin, a hormone made by the pineal gland that controls a cycle of sleeping and waking hours, is the most important connector between the internal clock and physiological functions (Nichelman et al., 1999). Following this notion, the three light models (LL, LD, and DD) provided the atmosphere for separate batches of eggs in incubators which had the same humidity levels and temperature for 16 days. On Day 16, one group from each incubator was transferred to either of the other two incubators (e.g. One group incubated in LL was transferred to the LD incubator until they hatched) and we measured heart rate on Day 17, 18, and 19. We specifically measured these days to see if the chickens had entrained circadian rhythms. To have an entrained circadian rhythm entails that the groups transferred would show the same pattern of heart rate as previously recorded in their original incubator (LL group left in LL incubator); however, if there was no entrained circadian rhythm found, the heart rate measurements of the different groups would mimic that of the eggs in in the corresponding incubator (LL group in LD incubator will show similar heart rate of LD group in LD incubator). So far, we have learned that the eye weight of the group exposed to 24 hours of light had a significantly lower value compared to the other two groups. The heart rate data is under analysis and a more thoroughly developed conclusion is being developed at this time.

**Pratik Kelkar**, Texas Academy of Mathematics and Science

**Title:** A Novel Approach to ALS Communication by Analyzing Electroencephalogram Signals using an Optimized Support Vector Machine

In this study, we developed a novel approach to communication for ALS patients by applying machine learning to electroencephalogram signals, establishing a brain-computer interface that can accurately categorize fine-grained thoughts. We used an optimized Linear Support Vector Machine (SVM) to learn neural representations of concrete nouns by processing electrical data collected from a 256-electrode electroencephalogram (EEG). We extracted features from this data by isolating signals in the frequency, time, and scalp location domains, and selected features by considering SVM and Pearson Correlation Coefficient (PCC) based methods. We used these features to train the optimized SVM classifier to distinguish between pairs of semantic categories. The classifier averaged 68.4% across all category pairs, with individual pairs reaching up to 90% accuracy. Our results demonstrate that the PCC feature



analysis method is a powerful indicator of learnability in EEG data and can be used in conjunction with an SVM to accurately classify thoughts of concrete nouns into semantic categories. Our proposed approach requires significantly less time and effort than current solutions for ALS patient communication.

**Conner Kennedy**, Department of Biochemistry, Honors College, Terry Scholar, McNair Scholar

**Title:** Air Pollution-Mediated Alterations in CYP Enzyme Expression Dependent Upon Age and Diet in the Brains of C57B16 Wild Type Mice

**Purpose:** Traffic-generated air pollutants are an increasing concern for mankind, including deleterious effects on the central nervous system (CNS). As 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, we chose to investigate the effects of inhaled traffic-generated air pollutants on expression of these enzymes in the CNS on the blood brain barrier and the AhR. **Methods:** Young (2 mo) or aged (18 mo) male C57B16 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 g/m<sup>3</sup> of mixed exhaust emissions or filtered air (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 immunofluorescence, to detect variation in enzyme expression in the cerebrum and/or blood brain barrier (BBB), as a direct result of exposure. **Results:** We found alterations in CYP enzyme expression resulting from MVE exposure in the CNS of C57B16 mice, which we predict will be exacerbated with age and/or concurrent high fat diet. **Conclusions:** Our preliminary data shows some statistical differences in the cerebral expression of CYP enzymes in the young vs. aged mice, related to MVE-exposure (decreased expression in young; increased in aged mice). Future directions include utilizing the high fat diet mice in these studies, as they are hypothesized to show exacerbated trends, and are more reflective of human models. These will allow further studies in immunofluorescence and cell imaging, as well as in vitro BBB co-culture, to isolate and identify alterations in structure and inflammatory signaling.

**Zain Khoja**, Texas Academy of Mathematics and Science

**Title:** EarBud. An Auditory Display

Speech readers are a means to an end for most visually impaired people but are not necessarily the most productive tools for comprehension and usability. The auditory display project at the University of North Texas investigates the use of auditory cues to encourage innovation in accessible tools. The display allows structure with flexibility, testing various types of sounds: simple speech provided by the screen reader; spearcons, sped up versions of the traditional speech; and earcons, abstract sounds without correlation to real-world objects. During the ideation phase of the project, I developed a testing procedure for qualitative and quantitative data collection. Moreover, I worked on creating the visual design and user experience of navigation. For example, once a user selects a category of blocks, the cursor jumps to a sub-selection of automatically. The auditory display enables visually impaired students to learn code and create their own, personalized accessibility tools.

**Kate Landers**, Department of Geography

**Title:** Predicting Runoff Potential Based on Land Cover and Soil Infiltration Capacity on the University of North Texas Main Campus

The University of North Texas (UNT) is a patchwork of soil and land cover types, much of which is human-made with extreme variations in infiltration capacity and runoff generating capability. As the UNT campus continues to expand and add new developments, such as dormitories, research facilities, parking lots, Greek housing, and so on, natural land cover and vegetation are being replaced by human-made materials, threatening the natural hydrology of the area. Soil data and maps from the University of California, Davis' California Soil Resource Lab and the National Cooperative Soil Survey were used in conjunction to Google Earth to define land patches within the area of interest. Historic precipitation data from the National Oceanic and Atmospheric Administration (NOAA) and an infiltrometer were used to estimate infiltration capacity and runoff at representative sample locations in each category of land patch. The ultimate objective of this research is to predict the impact of land conversions on campus and propose low impact alternatives, but it may also serve as a reference case study used to inform decisions made by other college and university campuses that share similar characteristics, including but not limited to student body size, expansion plans, impervious surface cover, and total area.

**Joseph Lee**, Texas Academy of Mathematics and Science

**Title:** Brain-Derived Neurotrophic Factor (BDNF) is a Potential Therapeutic Target in Brain-seeking Triple-Negative Breast Cancer

Breast cancer continues to rise at an alarming rate in the U.S. According to the National Cancer Institute, the number of American women diagnosed with breast cancer is expected to increase by as much as 50% by 2030. Triple-Negative Breast Cancer (TNBC), one of the more aggressive forms of breast cancer, will account for 15% of these breast cancer cases. Women diagnosed with TNBCs are at a high risk of their cancer recurring in the brain; this can result in significantly lower survival rates and susceptibility to neurological disorders, seizures, and cognitive dysfunction. Recent studies have provided substantial evidence that Brain-Derived Neurotrophic factor (BDNF), a neurological growth factor typically known for its role in cognitive thinking and long-term memory, helps facilitate the growth and recurrence of TNBCs. In my project, I investigated the effect of BDNF on brain-targeting TNBCs by administering BDNF to breast cancer cells harvested from the brain. Analysis of my cells after treating them with BDNF not only revealed accelerated cancer migration but also an increase in the population of cancer stem cells. Based on these results, I have concluded that when breast cancer spreads to the brain, it can become even more aggressive and chemotherapy-resistant due to the presence of BDNF. Furthermore, I believe that developing a treatment regime that targets BDNF will offer a patient-specific solution to breast cancer cases where standard chemotherapy is ineffective.

**Marcela Leon**, Department of Psychology, McNair Scholar

**Title:** Gender Role Ideologies, Attachment, and Intimate Partner Violence Attitudes among College Students

Traditional gender role ideologies (TGRI) and insecure attachment have each been identified to be positively correlated with attitudes condoning intimate partner violence (IPV). However, existing studies often fail to include variables that measures female gender role attitudes or exclude women from their samples altogether. Furthermore, no studies can be located that examined the possible interactional

effect of TGRI and insecure attachment on IPV attitudes. The present study aims to evaluate the direct effect of TGRI on IPV attitudes, using a sample with both female and male participants and measuring both male and female gender role attitudes. The moderator role of adult attachment for the path between gender role ideologies and IPV attitudes was also examined. It was hypothesized that high TGRI would predict greater acceptance attitudes of IPV and that insecure attachment would moderate this relationship.

**Caroline Leung**, Department of Chemistry, McNair Scholar

**Title:** Computational and Theoretical Studies of the Stability and Kinetics of NO<sub>2</sub> - Acetylene Intermediates

Collaborating with researchers at the Technical University of Denmark (DTU), our goal is to conduct computational studies to determine the stability and reactivity of short-lived molecules important in combustion chemistry, with a focus on the oxidation of acetylene by nitrogen dioxide (NO<sub>2</sub>). Using computational methods implemented with the Gaussian 2009 and 2016 programs, we simulate and optimize potential molecular structures and energies of molecules and connecting transition states through the means of B3LYP, M062X, CBS-QB3, CCSD(T), CBS-APNO, and ROCBS-QB3 methods. From the data then gathered, we can determine the possible reaction pathways of NO<sub>2</sub> with acetylene. We have determined that the optimum pathway, with the lowest overall energy barrier, begins with an attack by an O atom in NO<sub>2</sub> to make an initial intermediate with a C-O bond which can then isomerize. The rate determining step is analyzed to determine the kinetics of this process.

**Jeffrey Li**, Texas Academy of Mathematics and Science

**Title:** Synthesis and Characterization of a Novel Lithium Germanium Phosphate (LAGP) Solid-State Electrolyte

In modern society, the field of technology aims to integrate humans and their devices in ways that we have never imagined. As a byproduct of this, devices are constrained into smaller sizes, consequently decreasing the volume of their batteries while simultaneously demanding more power from them. The conventional lithium-ion batteries of today are simply unable to keep up with these demands mainly due to the liquid-based electrolyte material used. I have proven that a Lithium Germanium Phosphate (LAGP) solid-state electrolyte is a viable option to rectify this need, as it not only provides sufficient ionic conductivity but also brings a plethora of other benefits in terms of stability, longevity, and capacity in comparison to conventional electrolytes. This LAGP electrolyte that I have optimized holds the key to the miniaturization of future energy storage devices, and with further research and optimization, can be adapted into usage in new solid-state lithium batteries.

**Sven Lohse**, Texas Academy of Mathematics and Science

**Title:** Mechanical Finishing and Ion Beams Application to Cold Working Tool Steels: Consequences for Scratch Resistance

My team and I explored the effects of subjecting Sverker 21 and Vanadis 6 steel specimens to focused ion beams of helium or krypton up to fluences of 10<sup>15</sup> ions/cm<sup>2</sup>. This exposure to ion beams took place after both samples had gone through mechanical finishing operations such as grinding, turning, and turning followed by slide burnishing. Scratch resistance testing was then performed on the samples to reveal that samples which were exposed to focused ion beams of krypton had reduced microcracks through their surfaces and that samples which were exposed to focused ion beams of Helium were

almost completely free of imperfections. Through Optical microscopy we were also able to discern that samples which were exposed to focused ion beams of Helium had a higher than normal resistance against scratching and that samples which were exposed to focused ion beams of krypton experienced the opposite effect.

**Jonathan Lu**, Texas Academy of Mathematics and Science

**Title:** Laser-Assisted Microstructure Modifications on Mg-AZ31B Alloys

Biodegradable bone implants have the potential to save lives by eliminating the subsequent surgeries associated with traditional bone implants. Magnesium-based alloys are advantageous biodegradable load-bearing bone implants because of their similarity to bone mechanical properties, biocompatibility, and nontoxicity. However, their poor formation of the Ca/P crystals necessary for bone regrowth (biomineralization), majorly hydroxyapatite, slow biomineral growth rate, and rapid surface degradation restricts its usage as an implant. Microstructure modifications were made by laser processing to improve wettability and in vitro biomineralization of the Mg-AZ31B alloy. Optimization was performed for the optimal laser power, resulting in a Mg-AZ31B alloy implant with abundant hydroxyapatite formation, increased biomineralization, and reduced degradation, all properties of a practical bone implant.

**Claudia McCown**, Department of Biochemistry

**Title:** Utilization of Codon Bias and Bioinformatics to Predict Host Range of Streptomyces Bacteriophages

Through the SEA-PHAGES program, 150 Streptomyces bacteriophages and counting have been isolated, characterized, sequenced, and logged into the database known as PhagesDB. Streptomyces bacteriophages have been isolated from a variety of approximately 27 different Streptomyces host strains. Currently Streptomyces bacteriophages are categorized into 15 clusters based on genomic similarity. Currently there have been very few studies analyzing the viral infectivity patterns of Streptomyces bacteriophages. Thus, analyzing Streptomyces bacteriophages host range is essential to better understand these bacteriophages. Since few Streptomyces bacteriophages encode their own tRNA genes, many must strictly utilize the replication mechanism of the host that they infect. If a bacteriophage genome is not compatible with the host's replication mechanism, infection is not possible. Because of the nature of bacteriophage replication, codon bias is suggested to be a strong indication of bacteriophage infectivity. Using several bioinformatics tools, a phylogenetic dendrogram was created and used as a prediction tool of Streptomyces bacteriophage infectivity. By comparing the codon bias of Streptomyces hosts to the codon bias of Streptomyces bacteriophages, we can predict the likelihood of infection of hosts by certain bacteriophages. Through our dendrogram of Streptomyces bacteriophages we can hypothesize a range of novel information about the host range of clusters such as the BA, BB, and BC clusters as well as support the highly infectious patterns of clusters such as the BD cluster. This tool could have the potential to predict new Streptomyces hosts for group of bacteriophage as well as predict potential cross genus infection of Streptomyces phage. This tool has the potential to be applied to other groups of bacteriophages outside of the Streptomyces genus as well to indicate different infectivity patterns and expand the knowledge of any type of bacteriophages.

**Kortney Melancon**, Department of Chemistry

**Title:** New Bond on the Rise: d10-d10 Bonding in Heterometallic Complexes

Metal-metal interactions in bimetallic complexes have long been a topic of thorough investigation due to their unique photophysical and structural properties that cannot be attributed to the nature of the coordinated ligands. The initial reaction when one has two filled shells is that no bonding should occur; however, the reality of whether bonding exists depends on the presence, or absence, of sufficient overlap of low-lying unoccupied orbitals with filled orbitals. Indeed, bonding is not expected between two closed-shell metal atoms, therefore the existence of these types of interactions has been both supported and refuted at various levels of theory. While there have been many cases of covalent bonding between open-shell metals, fewer examples exist for covalent bonding between closed-shell and pseudo-closed shell metals. This undertaking is a direct continuation of research inspired by a recent discovery in the Omary Group of a new type of chemical bond between closed-shell d10 metal centers in a hexanuclear cluster complex. Our research is primarily focused on the design of novel molecular materials that exhibit room temperature phosphorescence utilizing metal-centered phosphorescent states in d10 transition metals. This investigation serves as a comprehensive study of potentially new metal-metal bonds in the complexes discussed above and our future efforts to develop synthetic routes to achieve these structures.

**Carolina Menchaca**, Integrative Studies, Terry Scholar

**Title:** The Scientific Discovery of Streptomyces phage Austintatious

What started out as mere plaques on an agar plate could be the key to understanding the secretive world of the most prominent parasites on the planet. The scientific field is always advancing and seeking to find new solutions to new problems. Therefore, research is essential for societal advancement. At the SEA-PHAGES program at the University of North Texas, we conducted research on the most abundant and mysterious parasite on Earth, bacteriophages. The host used in our study, *Streptomyces griseus*, is well known in the microbiology world as being the source of the “magic bullet” antibiotic, streptomycin. This bacterium is commonly found in soil as it helps to decompose organic material, is Gram-positive and has a high G+C content of about 72%. Studying its viruses could help us better understand this important bacterium. This could also lead to discovering how viruses could be defeated as we analyze their genes and functions. The bacteriophage that we annotated is Austintatious, a Cluster BC3 actinobacteriophage that was isolated and sequenced in 2015. Isolated from a soil sample in Denton, Texas, Austintatious is on the smaller end of the genome size spectrum, with 36,213 base pairs. There is a total of 56 genes that have been annotated and the G+C content is relatively high at 72.6%. Although it has been known for bacteriophages to carry tRNAs and tmRNAs, this particular one did not have any. The guide for isolation and annotation can be both found on PhagesDB, SEA-PHAGES Discovery Guide, and SEA-PHAGES Bioinformatics Guide.

**Jonatan Mendoza**, Department of Biological Sciences, Honors College

**Title:** Isolation of the DNA Primase Gene from Streptomyces phage BryanRecycles for Examination of Potential Slippery Sequence

This poster outlines the research conducted to determine the potential existence of a Slippery Sequence in Streptomyces bacteriophage BryanRecycles. This is ongoing undergraduate research being conducted at UNT.

**Raahi Menon**, Texas Academy of Mathematics and Science

**Title:** Determining the Existence of Hysteresis When Uncoiling and Recoiling Tropomyosin

My poster details a research project in which I studied the regulatory contractile muscle protein tropomyosin. Hysteresis is closely related to the stability of the protein, and would be observed if the forces necessary to uncoil the protein consistently differed from forces necessary to recoil the protein. Hysteresis did not seem to be exhibited in tropomyosin, which aligns with preexisting knowledge of related proteins such as myosin.

**Nicholas Mercado**, Department of Biological Sciences, Honors College

**Title:** Isolation and Characterization of Streptomyces phage Salete

Streptomyces phage Salete was isolated from a soil sample using *Streptomyces griseus* as the host. This research was conducted as part of the University of North Texas SEA-PHAGES program. *S. griseus* is characterized as being Gram-positive and having a high GC content. Upon sequencing and annotation, Salete was determined to be a Cluster BG actinobacteriophage containing 70 predicted genes over the span of 57,243 bp, 21 of which were able to be assigned known functions. The genome ends are characterized as being circularly permuted. In addition, the GC content was found to be 69.2%. Salete is a *Siphoviridae* bacteriophage and was determined to be temperate. Bioinformatic comparison of Salete with other BG cluster phages revealed a strong similarity to phages BayC, BabyGotBac, and Maih. Post-annotation analysis of Salete's genome led to the discovery of 10 potential membrane proteins, 2 potential promoters, and 2 potential terminators. There is no evidence to support the presence of tRNAs. It was discovered during annotation that specific sections of Salete's genome act as functional modules, such as genes in the first section pertaining to capsid development. This discovery, in addition to all other discovered characteristics of BG phage Salete, may lead to a further understanding of actinobacteriophage genome structure and function.

**Kennedy Millward**, Department of Psychology

**Title:** Who Wants to Live Forever? Attitudes Toward Anti-Aging Treatment Among Young Adults

Background: The human life span has lengthened considerably, and anti-aging research holds the possibility of even greater gains in longevity. Given these changes, we were curious about attitudes toward a (currently hypothetical) anti-aging treatment. Specifically, we were curious how many individuals would want to live indefinitely by the mechanism of an anti-aging treatment. Additionally, we were curious what the youngest age and oldest age would be that they would wish to take the anti-aging treatment. Method: College students age 18-25 (N = 701) took a survey with an item asking, "If doctors developed a pill that would enable you to live forever at your current age, would you take it?" Next, we asked participants, "What is the youngest age at which you would be willing to live forever?" and "What is the oldest age at which you would be willing to live forever?" Results: 26.8% of participants responded "yes," 47.2% responded "no," and 26.0% responded "unsure." When forced to specify how young they would be willing to live forever, the average age was 24.51 (SD = 9.99), and the oldest they would be willing to live forever was 45.23 (SD = 19.42). Discussion: Only approximately one quarter of participants indicated that they would be interested in eternal life. Additionally, most respondents wanted to live forever around their current age. Of course, if and when anti-aging treatments become available, individuals' behavior may well vary from self-report, particularly if such treatments were to become normative. However, these results suggest that, at least among young adults,

interest in immortality may be lacking.

**Aleece Moerbe**, Department of Political Science

**Title:** Significance of Ongoing Territorial Disputes over the Shatt-al Arab

Rivers serve as a natural border for many countries in the world, and provide natural and economic resources to the nations they flow through. However, rivers are frequently the cause of long lasting territorial issues and disputes. This article will seek to discover how adherence and strict delimitation lines play a role in deescalating a territorial dispute, paying specific attention to the dispute surrounding the Shatt-al Arab. Being that the Shatt-al Arab region has seen several territorial disputes in the past centuries, I will theorize that the region's leaders have steered away from strict and specific delimitation lines in the past in order to maintain a justifiable reason to engage in war on their neighbor.

**Abhishek Mohan**, Texas Academy of Mathematics and Science

**Title:** Development of a Polymeric Ag(I)-Based Protein Corona Biointerface for Versatile Drug Delivery Systems in Vitro

Nanoparticles (NPs) are used within a variety of therapeutics, technologies, and drug delivery systems, providing a array of possible implementations in biological systems. However, as a result of the adsorption of various biomolecules onto the NP surface in the presence of a physiological human environment, forming a layer known as the protein corona, the interaction between NPs and biological fluids within the human body influences the effectiveness and efficiency of the NPs' properties in nanomedicinal applications. In this in vitro study, we conducted an extensive investigation of polymeric Ag(I) nanoparticles, stabilized by polyacrylic acid (PAA), in the presence of three primary biological media (RPMi, King's B, and Lysogeny Broth) to better understand and optimize the Ag(I) nanoparticles for possible implementations in drug delivery systems. The initial matrix of experimentation consisted of two temperatures (23 C, 37 C), four time points (0 hours, 4 hours, 24 hours, 48 hours), and a single conditional gradient ratio (1:1). Characterization methods for the study included Ultraviolet-Visible Spectroscopy (UV-Vis), Dynamic Light Scattering (DLS), and Zeta Potential (ZP), each of which provide extensive quantitative and qualitative information regarding optical, size/distribution, and surface charge properties of the NPs, respectively. An additional investigation was conducted in which further conditional gradients were studied, with ratios of NPs to Media including 1:3 and 3:1. Our results show that the corona formation adds to the size of the NPs, from ~12 nm to ~30 nm on average, maintains a balanced absorbance spectra in the presence of each media, retains surface charge stability and a mono-dispersed solution, in addition to other determined information. Thus, the development of such Ag(I) nanoparticles provides a versatile framework for additional developments and improvements in utilizing the protein corona bio-interface for enhanced drug delivery systems.

**Zera Montemayor**, Department of Chemistry

**Title:** Synthesis of Double Linker azaBODIPY

We work with donor- acceptor systems for energy harvesting. Specifically, we are trying to increase the length of the donor by adding an extra phenyl ring. Does increasing the length of the donor increase the charge separated state? Then, does this lead to a more efficient transfer of electrons from the donor to the acceptor?

**Eduardo Montoya**, Department of Chemistry

**Title:** Computational Study of the Impact of Ancillary Ligands upon a Tungsten (IV) Imide Complex for Catalytic Methane Functionalization

This research investigates the effect of ancillary ligands (trimethylborane = BMe<sub>3</sub>, trimethylamine = NMe<sub>3</sub>, and trimethylphosphine = PMe<sub>3</sub>) on the reactivity of a model tungsten imide complex, (H<sub>3</sub>SiO)<sub>2</sub>W=NMe, with methane. DFT calculations were conducted to calculate the free energies of adduct and product formation, as well as relevant transition state barriers. Among all ancillary ligands, NMe<sub>3</sub> was the most strongly bonded. BMe<sub>3</sub> and PMe<sub>3</sub> had the highest, which were comparable in magnitude. Activation of complexes with NMe<sub>3</sub> and PMe<sub>3</sub> (both Lewis bases) occurs via oxidative addition of methane. However, the adduct of BMe<sub>3</sub> (a Lewis acid), did not undergo oxidative addition, rather adding the methane C-H bond across the W-B bond in a [2+2] fashion. While NMe<sub>3</sub> and PMe<sub>3</sub> ended up attached to W in the final product, BMe<sub>3</sub> instead attached to the imide nitrogen. It is concluded, therefore, that ancillary ligands can have different effects on the activation pathway of a complex that are dictated by the Lewis acid/base properties.

**Aditya More**, Texas Academy of Mathematics and Science

**Title:** Identification and Characterization of Novel Genes Linked to Inflammation-Driven Tumorigenesis in *M. musculus*

Lung cancer is the deadliest form of cancer across the globe, accounting for more deaths than all other forms of cancer combined. Recently, pulmonary inflammation associated with chronic obstructive pulmonary disease has been demonstrated to increase the risk of lung cancer. Through RNA-Sequencing (RNA-Seq) analysis, we identified a novel set of house mouse (*Mus musculus*) genes differentially expressed during 4-(methylnitro-samino)-1-(3-pyridyl)-1-butanone (NNK)-induced lung tumorigenesis and tumorigenesis enhanced by the inflammatory agent lipopolysaccharide (LPS). We identified Ighv13-85 as a novel highly expressed gene in the NNK+LPS treatment and established its role in prevention against COPD. In addition, we explored pseudogenes traditionally left out of RNA-Seq studies and focused on their role in curtailing the levels of LPS leading to inflammatory oncogenesis.

**Pranav Murugan**, Texas Academy of Mathematics and Science

**Title:** Polymer-based Flexible Capacitive Pressure Sensor for Urodynamic Study

In this experiment, the polymer-based flexible capacitive pressure sensor was designed to measure the pressure of bladder accurately for urodynamic study and to overcome the problems of existing methods, such as severe pain of patients and complicated components. In order to determine the dimensions of the pressure sensor, the design parameters are considered for the deflection and capacitance change within working pressure range using the analytical model of the thin plate and its corresponding electro-mechanical relation. The results were verified through the numerical simulation.

**Kaitlyn Myers**, Department of Biological Sciences

**Title:** Potential DNA Primase Frameshift in *Streptomyces* phage BryanRecycles

Bacteriophages can contain programmed translational frameshifts (PTFs) in their genomes. These are programmed shifts in the translational reading frame that cause the ribosome to move by one or two nucleotides, resulting in a new codon that may code for a new protein. Prior studies on Tail Assembly



Chaperones (TAC) were able to confirm the existence of a frameshift at that site. The TAC exhibits one of the most established examples of a frameshift in a phage. Our research focuses on the DNA primase gene in BryanRecycles, a Cluster BD1 phage isolated at the University of North Texas in 2016 by Bryan Burton. The Phamerator map shows 2 consecutive overlapping DNA primase genes, which is highly characteristic of a PTF. We are attempting to experimentally validate the existence or absence of the DNA primase PTF, working in tandem with another group of UNT students that are focusing on the same task with BryanRecycles' TAC gene. Through primer design and PCR, we will isolate the desired section of the genome. The product will be run through a gel, extracted, and run through a double digestion. pGlo vector DNA will be digested with corresponding restriction enzymes and then purified. Finally, the plasmid will be transformed into Escherichia coli DH5 $\alpha$  and used to produce the gene product sizes. Moving forward, we will re-annotate the relevant portion of the genome to reaffirm our results bioinformatically. If our approach is successful, the methods we used can be applied to potential PTFs in other BD1 phages. Standardization of testing methods will save time and resources in the future.

**Karthik Nair**, Texas Academy of Mathematics and Science

**Title:** A Novel Approach to ALS Communication: Data Collection and Analysis of Electroencephalogram Signals

Outlines the procedure for collecting EEG data used in the ALS Communication experiment, as well as various preliminary processing and feature selecting methods used. This is part 1 of the ALS Communication experiment.

**Varun Nayak**, Texas Academy of Mathematics and Science

**Title:** Quantifying Flexibility on Thermochemical and Physical Properties

Brittleness of polymeric materials share an inverse relationship with their flexibility. These properties have a direct relationship with other mechanical properties and ultimately the materials' performance. Although most materials scientists and researchers understand flexibility qualitatively, it has never been quantified by an equation. By creating an equation for flexibility, we are giving researchers the ability to determine a definite quantitative value. We have worked with other researchers at the University of North Texas' LAPOM facility to define and prove an equation which makes this possible. This equation could be used to predict a material's flexibility rather than wasting time testing it. This formula can save the time of materials scientists and researchers. Include numerical values and equation.

**Chase Neill**, Department of Political Science

**Title:** *Citizens United* (2010) and Patronage Appointments

My poster describes a study I conducted which explored the relationship between elite-group election campaign spending (post-*Citizens United*) and presidential patronage appointments. My poster highlights a number of issues, such as: why the C.U. decision is still considered controversial, how it affected campaign finance laws, and how it led to the creation of super PACs. Furthermore, my poster illustrates why elites seek access to politicians, how they gain and use such access, and how this may be affecting the presidential appointment process with regard to unqualified persons being appointed to important bureaucratic positions. Additionally, I provide bar charts which illustrate trends in elite-group campaign spending, and the number of presidential appointment positions by general election cycle.

**Truc Ly Nguyen**, Department of Biochemistry

**Title:** Experiment Demonstrating the Programmed Translational Frameshift in TAC Genes of the Streptomyces Phage BryanRecycles

The programmed translational frameshift in genes encoding tail assembly chaperones of various bacteriophages has previously been characterized. This phenomenon often occurs as a result of a slippery sequence, or a repetitive stretch of nucleotides which causes the ribosome to “stutter” and slip into an alternate reading frame. In the case of BryanRecycles, a phage belonging to Cluster BD1 of the Actinobacteriophages, genes 17 and 18 (which encode tail assembly chaperones) appear to contain a -1 frameshift based on bioinformatics analysis. The purpose of this study is to experimentally demonstrate the frameshift in BryanRecycles using traditional cloning techniques. First, PCR was performed to amplify the target gene, followed by gel electrophoresis and extraction. Primers were designed without sequences that would be digested by the restriction endonuclease, SmaI. The product was again amplified using primers, which resulted in the addition of a His-tag to the N-terminal end of the expected protein product. The PCR product was inserted into the pUC18 plasmid vector. This was done by linearizing the plasmid using SmaI and inserting the phage DNA using T4 DNA ligase. The vector was introduced into chemically-competent DH5 E. coli by transformation. Future work involves blue-white screening to identify recombinant E. coli, followed by protein expression, isolation, and identification techniques. These include induction, SDS-PAGE, and Western blotting. Using these methods, we hope to show experimentally that the frameshift occurs and to identify the exact frameshift location.

**Corey Olszewski**, Department of Emergency Administration and Planning

**Title:** Emergency Management Collaboration: A Review and New Framework Cycle

Collaboration has long been recognized as an essential component in comprehensive emergency management and in enhancing community resilience to disasters. Throughout the four phases of the disaster life cycle, collaboration is a key element in planning and implementing mitigation and preparedness strategies as well as responding to and recovering from disasters. Good collaborations are built upon time and trust, and rarely are they one-time relationships that end after a single project. Rather, they often grow and expand beyond their original purpose to include new missions, goals, projects, and activities. Despite this reality, the research literature related to emergency management collaboration does not approach this process as being a continuous cycle. This poster displays an expansion upon previous research literature pertaining to collaborations and offers a new framework which visualizes collaboration as a trust building-trust outcome cycle, which moves through four repeating phases: initiation, inclusion, execution, and evaluation. This new cyclical visualization provides a framework through which practitioners can prepare for each process or stage of the collaboration by understanding how collaborations progress and transform, and where repeat processes occur. This preparation can allow for clearer guidance, more effective planning, appropriate hand-off between agencies or organizations, and the reduction of interruptions to collaborative activity. This will facilitate greater collaborative continuity during each phase of disaster between local, state, federal governments, private institutions, and non-profit organizations.

**Emmanuel Ortiz**, Department of Biological Sciences, McNair Scholar

**Title:** Cotton's Secret Fiber: Manipulating Lignin Biosynthesis for Bast Development

Cotton (*Gossypium* spp.) is the world's premier fiber crop with molecular tools available to modify its flowering and architecture. In addition to its familiar seed coat fibers, cotton also produces bast fibers along the length of its stalk comparable to those found in jute, hemp, and kenaf. The purpose of this study was to determine if these tools may be applied to modify cotton's lignin biosynthesis, thereby altering the properties of its bast to make it a desirable green-economy fiber. We found tobacco rattle virus to be an effective vector for this purpose.

**William Packer**, Department of Linguistics

**Title:** RITA: UNT's Building Directory Tourist Agent

The poster will provide information about a dialogue system that was organized by myself with the assistance of my professor. It also will display the steps taken to organize this system, what the different modules (parts and pieces) a description, and pictures (if applicable) of them. The poster will be accompanied by the physical representation of a dialogue system on a laptop, which will be able to answer a user's inquiries and provide detailed information, pertaining to certain aspects of buildings around UNT including the building's purpose, physical attributes, and a unique fact.

**Sahil Patel**, Texas Academy of Mathematics and Science

**Title:** Design and Simulation of a Novel Concentric Cone Antihydrogen Gravity Experiment

The gravitational behavior of antimatter has never been conclusively determined by experimentation and therefore has long remained elusive. Various experiments have been proposed to ascertain such, yet they are all critically limited in experimental feasibility. Thus, the objective of the research was to design and simulate a novel antihydrogen gravity experiment that would determine the directionality of the gravitational acceleration of antihydrogen and further exhibit significant potential for feasible experimentation. The hypothesized configuration of the apparatus consisted of a point antihydrogen source located at the common vertex of an azimuthally-symmetric series of concentric detection cones confined within a cylindrical vacuum chamber. The Monte Carlo method was utilized in the simulation of the experiment, the associated computational algorithm involving the definition of parameters, generation of antiatoms, and evaluation of detection. An optimization of the experimentally adjustable parameters was conducted followed by a suite of statistical, graphical, and parametric analyses. In conclusion, it was found that at the relatively high temperature of 4 K, the apparatus requires only 1357 antiatoms to indicate the direction of the acceleration of antimatter due to gravity, findings that not only exceeds those of proposed experimentation, but further lie within reasonable limit of current antihydrogen production. Therefore, to this extent, the novel concentric cone antihydrogen gravity experiment demonstrates exceptional promise of experimental feasibility and thus may lead to the first definitive test of the gravitation of antimatter, the results of which could revolutionize the field of physics at large and our understanding of the universe itself.

**Mira Patel**, Texas Academy of Mathematics and Science

**Title:** The Transgenerational Effects of a High Glucose Diet on the Mitochondrial Unfolded Protein Response of *C. elegans*

In order to better understand gestational diabetes, this experiment focuses on the transgenerational implications of a high glucose diet on the mitochondrial unfolded protein response by quantifying the prevalence of chaperone gene, *hsp6::GFP* using epifluorescence microscopy. Statistical analysis of the results showed a significant increase in this particular stress response in glucose-fed animals compared to those fed a fructose, sucrose, and standard OP50 *E. coli* diet. Furthermore, the chaperone expression plateaued among consecutive generations fed high glucose diets rather than increasing with each subsequent generation. Finally, OP50 fed offspring of glucose fed nematodes had a heightened gene expression without the expected stimulus. This project gives insight into the way Gestational diabetes affects the molecular processes of not only the affected mother, but also the child.

**Emily Peal**, Department of Kinesiology, Honors College

**Title:** Young Adult Perceptions of Tap Water Quality, Safety, and Conservation

The poster will give both qualitative and quantitative data. Undergraduate students wrote essays in response to a question prompt concerning water in their neighborhoods. Textual analysis of archived essays revealed patterns that were incorporated into a survey conducted in a following semester. The data was then used to create a word cloud of the most frequently used terms.

**Hannah Phillips**, Department of World Languages, Literature, and Cultures

**Title:** The Duino Project: Translating Rilke's Masterpiece

This project aims to determine factors which make one translation better than another. Selections from Rainer Maria Rilke's Duino Elegies are compared and analyzed across nine different English translations, in order to figure out which are "good" translations, and why.

**Sanjna Prasad**, Department of Biochemistry

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

Thyroid hormones are important for regulation of bird metabolism and development of endothermy in birds. We examined the effects and influence of thyroid hormones on the development of endothermy in the smallest precocial species, the button quail, by inducing hyperthyroidism in hatchlings and measuring them at ages 1-day post hatch (dph) and 3 days post hatch (dph). We treated king quails in both hatchling and egg form with triiodothyronine (T3) to create hyperthyroidism in the birds and ran the treated birds in a metabolic chamber in order to calculate the metabolic rate of birds with hyperthyroidism. The ventilation rates of both the 1dph and 3dph T3-treated hatchlings were lower than the ventilation rates of the control hatchlings, and the metabolic rates of the T3- treated 1dph and 3dph were lower than the control hatchlings except for a spike in the metabolic rate of the T3- treated hatchlings. Therefore, the use of triiodothyronine (T3) did indicate an effect on the development of endothermy on the hatchlings by showing a decrease in the ventilation and metabolic rates of both the 1dph and 3dph hatchlings when compared to the control's ventilation and metabolic rates.

**Ellen Qian**, Texas Academy of Mathematics and Science

**Title:** A Novel Multifaceted Solvent Selection Process for the Solubilizing Analysis of Esters as Green Substitutes for Toxic Ethers

My research poster details the purpose behind the presented study, and it displays the procedure and results of the study, which show that esters are appropriate solvent replacements for harmful ether solvents. I obtained these results through a combination of bench work and computational work. Through this experiment, I helped develop a new solvent selection method that is different from currently existing methods in that it explores the partitioning ability of a solute-solvent system rather than the current methods, which place a larger focus on health, safety, and environmental factors. This research benefits manufacturers and companies that wish to use green solvents but want to retain the chemical capabilities of the previously used solvent. In addition, the poster discusses the conclusions and implications behind the established solvent selection method and where future studies may lie.

**William Qian**, Texas Academy of Mathematics and Science

**Title:** A Nonstochastic Agent-based Approach to Modeling Viral Outbreaks

Understanding the threats posed by viral diseases has been one of the main objectives of modern research in computational epidemiology. Various techniques have been developed to simulate the trajectory of outbreaks with a set of initial conditions. However, many of the current approaches in modeling viral epidemics either do not account for detailed network structure or are computationally costly. In lieu of population-level modeling and stochastic agent-based modeling, we introduce a deterministic agent-based schema for efficiently calculating the expected outcome of viral outbreaks through partial contacts and partial infections. Using our model in conjunction with the SEIR compartmental framework, we performed an exhaustive analysis of the dynamics of outbreaks at the vertex and community level across networks generated from university enrollment data. The resulting data allowed us to discern a number of properties of graphs that could be used to formulate effective measures of public health intervention and vaccine distribution. We found that outbreaks originating from communities with high average closeness centrality tended to produce more severe outbreaks, and that individuals with high betweenness centralities and low community clustering coefficients were the most appropriate targets for community-level vaccinations.

**Ian Rapp**, Ecology Program, Department of Biological Sciences, Honors College

**Title:** Effects of Drought on Fish Microbiome Composition

Drought conditions are a natural environmental stressor in arid regions, with many species exhibiting adaptations that facilitate population persistence in the face of drought or recolonization following cessation of drought conditions. However, increasing human demands on freshwater resources and global climate change are exacerbating the intensity and duration of drought conditions such that species may be or soon will experience environmental conditions at the extremes of their tolerances. Stressful environmental conditions may affect the interaction between fish hosts and their microbiome, perhaps including increases of microbes that cause disease. Our hypotheses are that drought will result in (1) increased density of fishes isolated in low-flow refugia, (2) decreased physiological condition of fishes, (3) shifts in microbiome composition with homogenization of microbial structure, and (4) increased prevalence of pathogenic bacteria. Field conditions will be monitored during spring and summer and

samples of fish surface microbial communities will be collected from replicate individuals of multiple fish species during non-drought and drought conditions. Samples will be analyzed using NextGen sequencing and OTUs assigned using existing libraries. Statistical analyses will test the aforementioned hypotheses. This research will provide insight into how microbial communities respond to environmental change with potential consequences for their host species.

**Raghuram Reddy**, Texas Academy of Mathematics and Science

**Title:** Detecting Early Corrosion Using Optical Luminescence Sensors

Corrosion is responsible for \$276 billion in the United States alone annually<sup>1</sup>. The purpose of this project was to develop a new corrosion detection system by employing novel environmental sensitive luminescent molecular systems. These materials within the systems exhibit drastic changes in their optical properties with respect to changes in pH, humidity, temperature and also oxygen levels, thereby allowing for detection of different types of corrosion at very early stages which can allow for stopping of corrosion by applying coating or adding a corrosion inhibitor. Using a pH-sensitive polymer and gold nanoparticle precursor for the corrosion detection sensor would be optimal to exhibit these changes. Presence of such an early detection sensor would be highly cost effective as it would allow for detection and replacement at very early stages of onset of corrosion. Such molecular systems can be easily embedded through the process of drop cast technique which allows for coating materials that can provide continuous real-time structural monitoring of heavy equipment, bridges, pipes, and power plants.

**Michael Reyes**, Department of Psychology

**Title:** Examination of Dark Tetrad Personalities in Adolescents

Since its inception, much research has been conducted on the Dark Triad of personalities- narcissism, Machiavellianism, and subclinical psychopathy (Paulhus and Williams, 2002). The addition of commonplace sadism, such as bullying or internet trolling, expanded the Dark Triad to the Dark Tetrad. With a lack of literature on the presentation of Dark Tetrad personality traits in nonclinical adolescents, the proposed exploratory study will examine the prevalence of the Dark Tetrad traits in nonclinical adolescents. Additionally, participants will be assessed on the HEXACO model of personality. It is predicted that adolescents will have a higher prevalence of narcissism as compared to adult samples (Muris et al, 2013). It is further predicted that participants elevated on any of the Dark Tetrad traits will score low on the Honesty-Humility factor (Lee & Ashton, 2014).

**Samantha Rigg**, Department of Biological Sciences

**Title:** Genomic comparison between two closely-related Cluster BD1 bacteriophages, Nabi and Rana, that infect *Streptomyces griseus*.

I conducted a genomic comparison between two closely related bacteriophages by using various bioinformatics tools including Phamerator, BLAST, and PECAAN. Included in the poster are images of the two phages after isolation, gel electrophoresis of the extracted DNA, and comparison of the annotated ORFs. From the draft annotation of the sequenced DNA on PECAAN, the two-phage had 12 potentially different proteins. Based on Phamerator, there were eight ORFs that did not align 100%. Only one of these eight was provided with a function; the other seven were hypothetical proteins. Even though these two phages have similar results in many aspects, they still produced different plaque sizes.

**Ashley Risinger**, Department of Psychology

**Title:** The Correlational Relationship Between Callous-Unemotional Traits and Adolescent Sexual Offenders

Empirical evidence suggests that callous-unemotional traits (behavioral issues such as a lack of remorse or guilt) are associated with a host of antisocial outcomes in children and adolescents (Thornton et al., 2014). Along with these findings, the most prevalent method used were measures to determine the levels of CU (the ICU) and a measure to determine past sexual offenses (JSOAP-II) there is some evidence to suggest CU traits have been utilized to differentiate a subtype of sexual offenders with a unique style of offending and victim selection (Lawing et al., 2010). Given the dearth of literature in this field, the present literature review will examine the relationship between juvenile sexual offending and CU, as well as biological indices associated with CU traits in offenders (e.g., reduced amygdala responses; Kauten et al., 2013; Marsh et al., 2008). Methodological concerns in the measurement and assessment of CU traits will also be considered. Limitations of the current literature and directions for future research will be discussed.

**Ean Robertson**, Department of Mechanical and Energy Engineering, Honors College

**Title:** Pitting Corrosion of All-Aluminum Heat Exchangers

According to a study run by the National Association of Corrosion Engineers, corrosion causes \$2.5 trillion worth of damage globally every year. In particular, the HVAC industry has seen pitting corrosion cause leaks and system failure in units containing heat exchangers made of all-aluminum. Under the direction of Dr. Seifollah Nasrazadani, I assisted in processing corroded samples and other tasks as directed. Additionally, I performed microscopy on the processed samples to document the occurrence of pitting corrosion. The data collected will be used in graphics for the final report.

**Willow Rock**, Department of Biological Sciences, Honors College

**Title:** Development of Bacteriophage Isolated from Soil Sample

This poster will discuss the results of a semester-long project to isolate and characterize a bacteriophage named Connemara.

**Emarlia Russ**, Department of Biological Sciences

**Title:** Isolation and Annotation of the Bacteriophage EGole

This article will explain the reason for studying bacteriophages, what *Streptomyces griseus* is used for and why it is used as the bacterial host for the research. The materials and methods used for this research has all been provided by the SEA-PHAGES program and can be found in the Phage Discovery Guide. The results that are provided in the article all show how the bacteriophage EGole works in the lab. All of the results were recorded as they were found and any alterations to the procedures are specified due to the fact that these alterations may have affected the outcomes of these tests. The results provide specifics about the specific characteristics of EGole like the morphology of the plaques, the titers, and the DNA concentration. The discussion portion of this article shows the importance of the results and why EGole is either unique or a common bacteriophage. Other different types of hosts were tested to see whether EGole would infect the other *Streptomyces* bacterium. The DNA, genome, and different hosts that were used are specified and analyzed.

**Jonathan Salazar**, Department of Biological Sciences, Honors College

**Title:** Examining Macroinvertebrate Taxonomic Resolution for Stream Bioassessments

Poster will emphasize how various types of macroinvertebrates are useful indicators to understand the wellbeing of streams and other bodies of water.

**Thomas Sanders**, Department of Mechanical and Energy Engineering

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

A 2.5 MeV Van de Graaff ion accelerator was restored and installed in UNT's Ion Beam Modification and Analysis Laboratory, under the guidance of Dr. Duncan Weathers, UNT Dept. of Physics. Principal achievements include developing effective repair procedures for accelerators, creating a simulation for predicting beam trajectories, and bringing multiple systems online (vacuum, coolant, beam steering, and more). Some systems are still being calibrated and troubleshot. Other technical difficulties are being solved as they arise. The accelerator facility will be used for routine Rutherford Backscattering analysis, other applied nuclear techniques for materials analysis in research, and classroom instruction.

**Jacob Schaffner**, Department of Chemistry, Honors College

**Title:** Investigation of Push-Pull Porphyrins as Efficient Sensitizers for Dye Sensitized Solar Cells (DSSC)

Solar energy is the most abundant renewable resource with over 16 terawatts of sunlight hitting the Earth's surface each year. Dye Sensitized Solar Cells (DSSC) are efficient, thin-film photovoltaic cells that are cost effective and easy to manufacture. Porphyrins are ideal dyes for these cells due to their higher extinction coefficients and efficiencies, absorption into the NIR region, and can easily be modified. The push-pull functionality helps facilitate electron injection into the semi-conductor of the cell. Characterization techniques including electrochemistry (CV, DPV, and Spectroelectrochemistry), UV/Vis, Fluorescence, and Lifetime were done for all YH compounds. Optimization of the DSSC fabrication process is currently being done using YH4.

**Anna Sever**, Department of Psychology, Honors College

**Title:** Internalized Ageism and Attitude toward Medical Aid in Dying Among Older Adults

Background: Medical aid in dying is currently legal in five of the United States, and the right-to-die movement is growing. Internalized ageism, or older adults' adoption of attitudes that marginalize older people, may cause feelings of burdensomeness to family and society, and the availability of medical aid in dying may be seen as a means of reducing this burden on others. Little extant research has investigated the relationship between older adults' internalized ageism and attitude toward medical aid in dying. Religiosity has consistently been found to be the strongest predictor of attitudes regarding medical aid in dying. The purpose of this study was to investigate, after controlling for religiosity, the relationship between internalized ageism and attitudes toward medical aid in dying. Method: Community-dwelling older adults (N = 358) completed an interview survey that included the Expectations Regarding Aging Scale %U012 (ERA-12; Sarkisian, Hays, Berry, & Mangione, 2005;  $\alpha = .88$ ) and an item assessing attitude toward medical aid in dying: "If I were severely ill with no hope of recovery, I would like a drug at my disposal to end my life when I chose" (Catt et al., 2005). Results:



Religiosity was associated with less approval of medical aid in dying. After controlling for the effects of religiosity, internalized ageism explained additional variance in attitudes toward medical aid in dying. Internalized ageism was associated with greater approval of medical aid in dying. Discussion: Results support the large body of research finding the religiosity is associated with disapproval of medical aid in dying. Results also suggest that internalized ageism is associated with greater approval of medical aid in dying. Older adults who have internalized beliefs that marginalize older people may be more prone to approve of medical aid in dying.

**Rachel Shafer**, International Studies

**Title:** Urban and Rural Goals of Riffian Amazigh Nationalism

In this poster, I assess the threat to stability in the North African states posed by Amazigh nationalist movements, specifically focusing on the Rif movement based in al-Hoceima, Morocco. Amazigh native groups live throughout the Maghreb and constitute significant portions of the population of Algeria, Libya, and Morocco. The Riffian nationalist movement has become more visible and aggressive in recent years. This movement, and those like it, not only call for recognition of the cultural identity of the Amazigh and the Tamazight language, but demand governmental reform and greater material services and development. By studying the demands and capabilities of this movement, I hope to create a better understanding of the challenge Amazigh nationalism poses to the state system in Morocco and across the region.

**Akshat Sharma**, Department of Biological Sciences

**Title:** Identification and Characterization of Novel Genes Linked to Inflammation-Driven Lung Tumorigenesis in *M. musculus*

This experiment identified the genes at the intersection of chronic obstructive pulmonary disease (COPD) and lung tumorigenesis via RNA-Sequence (RNA-Seq) analysis. Prior to this analysis, the best RNA-Seq tool for the study was identified through an alternate comparison on an artificial dataset. The genes that were marked as significantly up-regulated or down-regulated between control and experimental groups had their respective functions further characterized. This characterization brought key discoveries for future lung inflammatory and tumorigenic treatment.

**Austin Sivoravong**, Department of Biological Sciences

**Title:** Screening of Translational Frameshifting in Streptomyces phage BryanRecycles Tail Assembly Chaperone and DNA Primase Genes

Programmed translational frameshifts are naturally occurring phenomena that allow the production of two peptide products for one mRNA transcript. In Streptomyces phages, a translational frameshift has been well documented in the tail assembly chaperone (TAC) genes. However, while the TAC gene's translational frameshift is well documented, frameshifts in other phage genes is less understood. In phage BryanRecycles, we have found a candidate for a potential translational frameshift in its DNA primase gene. The DNA primase gene has similar characteristics to the TAC gene's components that are evident of the translational frameshift. In its currently annotated state, the DNA primase gene has a large gap downstream of the gene which has significant coding potential in a 1 frame starting before the stop codon of the gene. Despite this evidence, a slippery sequence similar to TACs could not be identified in the DNA primase gene. To prove the presence of translational frameshifts in BryanRecycles, our group

is cloning the TAC genes into plasmid pGLO resulting in a protein fusion of the GFP gene with the product of the TAC gene. If the translational frameshift exists, then we will be able to observe two differently sized GFP tagged protein products that share the same N-terminal domain and have unique C-terminal domains. This experimental method is being used in parallel with a companion group who is attempting to do the same with the DNA primase genes. Given the well-characterized nature of the TAC frameshift in other phages, we expect to show the presence of this frameshift in BryanRecycles and show the viability of this method for use with other potential frameshifts in phage genes.

**Rebecca Strange**, Department of Biological Sciences

**Title:** Parental Perceptions of Mental Health Disorders, and the Effect on Their Children

This study has been conducted to determine if there is a correlation between a parent's feelings about people with mental health disorders, and the mental health of their own children. After a series of surveys, the majority of respondents who felt that their parents were uncomfortable with discussing their child's emotions or with the possibility of their child going to therapy also reported that their relationship with their parents affected their mental health negatively.

**Christopher Thang**, Texas Academy of Mathematics and Science

**Title:** Anti-S2 Peptides That Modulate Myofibril Contractility

Cardiovascular disease represents a growing worldwide threat, taking more than 17.3 million lives each year at an increasing rate. Contemporary treatments rely on invasive surgery or pose the risk of drug tolerance. Peptides that targeted myosin subfragment-2 (S2) were developed in the laboratory to modulate actin-myosin interaction. The stabilizing peptide worked to stabilize S2, encouraging myosin heads to bind back onto S2 in an off-state and thus decreasing the extent of myofibril contraction. The destabilizing peptide disrupted the hydrophobic interactions between the S2 coiled coil, preventing the off-state of myosin to allow more heads to bind to actin and thus increasing myofibril contractility. The potency of both peptides was confirmed in myofibril contractility assays. Fluorescent labels were tested on the peptides afterward and were found to have minimal effect on peptide function at high concentrations (200 nM). Results indicate that labeling the peptides to aid in cell penetration and tissue specificity will not impede their desired abilities. These peptides promise future development towards the creation of effective and non-invasive treatments for cardiomyopathies including hypertrophic cardiomyopathy, dilated cardiomyopathy, and congestive heart failure.

**Caitlyn Thomas**, Department of Psychology

**Title:** Adult Attachment, Religious Coping, and Disordered Eating Behaviors in College Students

A poster describing my study over adult attachment, religious coping, and disordered eating behaviors in college students. The poster will contain information about the study and implications of results from an Attachment Theory perspective.

**Brooke Tompkins**, Organizational Behavior and Human Resource Management

**Title:** Dimensional Approaches to Pathological Personality Related to Interpersonal Difficulties Across the Lifespan

Empirical evidence suggests that pathological personality traits negatively impact a person's adaptation across a wide variety of domains, including cognition, emotion, and behavior. Broadly defined, pathological personality traits may be characterized by adaptive inflexibility, vicious cycles of maladaptive behavior, and emotional instability under stress. Although both categorical and dimensional models have been proposed, the present literature review will focus on the Personality Inventory for DSM-5 (PID-5), a dimensional trait approach to conceptualizing personality pathology adopted by the DSM-5. The current literature review examines PID-5 traits across the lifespan, with an emphasis on adolescents and adults with a history of mental health treatment. The evidence examined indicated that there was good to excellent internal consistency and reliability for the majority of the PID-5 facets and a tendency towards structural convergence of the adolescent PID-5 with the adult model. Broad literature review indicates that developmental issues may be responsible for specific differences in the adolescent PID-5 structure, the rather poor discriminant validity and the lower reliability of a small number of PID-5 facets. Limitations with the current literature and future research will be discussed.

**XinYing Tong**, Texas Academy of Mathematics and Science

**Title:** Revolutionizing Environmental Impacts of Pharmaceutical Production With the Replacement of Methyl Ethyl Ketone

In today's environmentally cognizant society, the use of environmentally damaging solvents still somehow remains common in the pharmaceutical industry. Each year, around a trillion gallons of industrial waste and unprocessed sewage are drained into American water alone. Globally, 47,000 people die from acute poisoning, and many more develop life-threatening diseases such as cancer. One such environmentally detrimental solvent is methyl ethyl ketone, a solvent strongly advised against due to its life cycle and waste production. Also called 2-butanone, this chemical is a crucial solvent for the production of drugs such as Dolutegravir-- an HIV/AIDS retroviral. By utilizing the Abraham general solvation model and six dimensional distance formula, alternative solvents that would function virtually the same as 2-butanone in solution yet had a far greener environmental impact were found.

**Kelly Triage**, Department of English, Terry Scholar, McNair Scholar

**Title:** From Tara to Trump Tower: The *Gone with the Wind* Origins of the Rhetoric that Won Donald Trump the 2016 Election

This research investigates works of American best-selling literature from 1926 to 1937 to understand how American citizens perceive class in the face of economic hardship. Specifically, the study analyzes how the Great Depression influenced changes in perceptions of class from the 1920s through the 1930s to understand how financial instability changes the way people view and represent working-class individuals.

**Nishant Tyagi**, Texas Academy of Mathematics and Science

**Title:** A Novel Combination Therapy for Glioblastoma Involving Low-Level Laser Therapy and Silver Nanoparticles: Experimental Study Design

This study investigates a probable treatment for Glioblastoma involving Low-Level Laser Therapy and Silver Nanoparticles. Nanoparticle synthesis and characterization, laser fluence, cell viability, as well as a probable caspase cascade mechanism will be studied. In this poster, Jurkat clone E6-1, an immortalized human T lymphocyte cell line, is used as a proof-of-concept of the experimental study design for this proposed glioblastoma combination therapy.

**Beatriz Vaquera**, Department of Biological Sciences

**Title:** Perceptions of American Dietary Variety and Label Claims Among College Students

The aim of this study is to textually analyze Student Food Rules archived on the UNT Digital Library. A word cloud represented major themes and was used to design a survey that explored perceptions of healthy eating habits and understanding of food labels. Most (63.8%) of the students surveyed (n=392) disagreed with a statement that Americans ate an appropriate amount of food while less than a majority (48.2%) agreed that packaged portion sizes were unrealistically small. A majority (64.2%) agreed that foods labeled “natural” were less processed while 47.0% agreed that packaged foods with restrictions such as “gluten-free” were more processed. Most (53.6%) agreed that Americans ate a more varied diet when compared to five year ago while only 28.8 % agreed that fruit consumption had increased. Our word cloud emphasized fruits, vegetables, processed and sodium. From these results it became apparent that continued improvement of the American diet is needed.

**Zeles Vargas**, Department of Anthropology, McNair Scholar

**Title:** Identity Development among Denton and Dallas Feminist Activists

My research examines local Denton and Dallas feminist groups and gendered spaces as an ethnographic case study of activist identity. Questions being explored include how people negotiate their intersectional identities within activist spaces, how activism provides a space to construct new identities, how activist practices differ within gendered and non-gendered spaces, and how feminist activists are conceptualizing their practices in relation to the social movement. My research is being conducted through participant observation, critical discourse analysis, and a series of interviews. Ultimately, this research seeks insight into what it means to be a feminist, what it means to be an activist, how the movement influences the individual and how the individual changes the movement.

**Kirti Veeramachaneni**, Texas Academy of Mathematics and Science

**Title:** Daily Covariation of Stress and EEG-Determined Sleep

We examined stress and EEG-determined sleep in a population of adults. Using multilevel modeling we examined how insomnia status, age, gender BMI, and daily stressor frequency is associated with Slow Wave Sleep, REM Sleep, Total Sleep Time, Sleep Onset Latency, Waketime After Sleep Onset, and Sleep efficiency. We found that days with more stressors were significantly associated with larger Sleep Onset Latency and marginally associated with larger Waketime After Sleep Onset. This was the first study to examine the relationship between fluctuations in stressor frequency and multiple facets of EEG-determined sleep.

**Alyssa Vigil**, Department of Kinesiology, Honors College

**Title:** Effects of Acute Low-Intensity Cycling on Stress, Arousal, and Cognitive Function

Generally, acute bouts of aerobic exercise have been shown to reduce perceived stress and increase arousal. Interestingly, very few studies have examined cognitive function during exercise and whether changes in stress and arousal may augment adaptations in cognitive demands that are often required during exercise. Furthermore, very little is known about the timing of the effects of exercise on these psychological outcomes. The primary purpose of this study was to examine the effects of low-intensity aerobic exercise on stress, arousal, and cognitive function. A secondary aim was to evaluate the time-course effects of exercise on these primary outcome measures. Thirty-two (Mean Age =  $22.8 \pm 2.8$  years old) college-aged individuals were counterbalanced into low-intensity exercise (LI) 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 of stress, arousal, and cognitive function (i.e., accuracy and reaction time) were assessed at 10-minute intervals throughout each condition via a Visual Analog Scale for Stress (VAS-S), Felt Arousal Scale (FAS), and Modified Oddball Paradigm (MOP), respectively. For the VAS-S, a Time main effect was revealed,  $F(5,27) = 6.86$ ,  $p < .001$ , suggesting general reductions in stress following both LI and SC conditions. A Time main effect was also found for the FAS, and as expected, was superseded by a Condition x Time interaction,  $F(5,27) = 8.18$ ,  $p < .001$ , indicating a greater increase in arousal levels during the LI condition compared to the SC condition. For MOP accuracy, a Time main effect was found,  $F(4,28) = 3.17$ ,  $p = .029$ , indicating general reductions in accuracy across time. Lastly, the results for MOP reaction time did not reveal any Time main effects of Time x Condition interactions ( $p > .05$ ), suggesting no change in response times during either condition. Taken together, the current results suggest that exercise at lower doses (i.e., low-intensity for 20 minutes) may have minimal influence on more complex psychological perceptions of stress and specific aspects of cognitive function. This study may aid in the development of appropriate exercise prescriptions for populations looking to specifically target stress, arousal, and cognition.

**Renzo Villamero**, Department of Geography

**Title:** The Influence of Urban Heterogeneity on the Urban Heat Island

The Urban Heat Island (UHI) is a growing problem that affects cities and the things that live in it. In this research, I observed four weather stations in Houston, TX and collect temperature data from them in the span of four months in the summer. I used Google Earth to capture satellite imagery of the area of the weather stations and looked at what kinds of surfaces and land uses were in those areas and compared them to the temperatures from the associated weather station. Basically, I have found that areas with higher amounts of vegetation and tree cover resulted in much lower temperatures than areas with less vegetation and higher amounts of pavements. The results of this project show that urban development increases local temperatures and the solution to this is by increasing tree cover and green spaces for the benefit of both the city and everything that resides in it.

**Anisha Wadawadigi**, Texas Academy of Mathematics and Science

**Title:** A Multifaceted Solvent Selection Process for the Solubilizing Analysis of Esters as Green Substitutes for Toxic Ether Solvents

Organic solvents are commonly used in everyday products and are essential during chemical manufacturing processes. Although many solvents are fortunate to have low toxicity levels, others are harmful to the workers and environment. In order to overcome these hazards, we formulated a solvent selection process for the replacement of harmful solvents with well-established green solvents for dry solute transfer. We developed an analysis procedure based on the Abraham General Solvation model that allowed us to compare solvents based upon their different properties. This novel research process founded a method, which makes solvent selection feasible and effective, ultimately benefiting several industries and the environment.

**Michelle Wen**, Texas Academy of Mathematics and Science

**Title:** Extracting individual trees and tree groups from light detection and ranging (LiDAR) data

Light detection and ranging (LiDAR) is a remote sensing technology that uses laser beams to acquire three-dimensional information of objects on the surface of the earth. Using LiDAR data covering part of the City of Denton, this project focuses on extracting individual trees and tree groups and producing a canopy height model (CHM) of the study area. The CHM shows not only the spatial distribution of trees but also the height variation of trees and can be used as a baseline for monitoring changes in individual trees and tree groups.

**Delani Woods**, Texas Academy of Mathematics and Science

**Title:** Updated Abraham Model Correlation Coefficients for dry Cyclohexanone Solvents

In order to prevent massive environmental decay, industries have recently begun looking for a way to exchange their environmentally damaging solvents for less damaging alternatives. One of these alternatives, known as cyclohexanone, is environmentally acceptable according to lists published by industries seeking solutions. In order to efficiently lessen environmental harm, a database of many solvent descriptors needs to be maintained. By updating the H-bond acidity factors for cyclohexanone using volumetric titration, utilizing the Abraham general solvation model with SPSS analysis, and eventually comparing cyclohexanone to other solvents using the six-dimensional distance formula, industries will be able to see whether cyclohexanone can function as a replacement for a harmful solvent. As an impact, cleaner, greener solvents will become an option for more industries.

**Maya Xia**, Texas Academy of Mathematics and Science

**Title:** A Novel Approach to the Study of Cellular Mechanisms in Alzheimer's Disease Reveals Defects in Astrocyte Primary Cilia

Primary cilia, which are hair-like, non-motile sensory organelles found in most brain cells, are responsible for regulating signaling pathways in the brain. Previous studies suggest that cilia could be implicated in Alzheimer's disease pathology due to their involvement in cell cycle regulation and astrogliosis. This study analyzed changes in primary cilia morphology as indicators of aberrant cilia in Alzheimer's disease. Multiple cilia were found in astrocytes, and cilia fragmentation was identified in Alzheimer's cilia. This evidence suggests that aberrant cilia in astrocytes could result in faulty cellular

signaling, leading to astrogliosis in Alzheimer's. Additional research is necessary to determine particular signaling pathways affected by aberrant cilia function in Alzheimer's disease.

**Tan Yan**, Department of Biomedical Engineering

**Title:** A Novel, Lightweight Approach to Seizure Detection and Prediction in Ambulatory EEG via Improved CEEMDAN and Automatic Channel S

To facilitate the development of a seizure detection and prediction system that will restore the quality of life to epilepsy patients, I have developed a computationally efficient and patient-adaptive seizure-detection method for multi-channel ambulatory EEG via the use empirical mode decomposition (EMD), random forest (RF) classifiers, and automatic channel selection.

**Aileen Zhang**, Texas Academy of Mathematics and Science

**Title:** A Novel Approach to the Study of Mechanisms in Alzheimer's Disease

While Alzheimer's disease (AD) currently affects more than 5.5 million Americans and incurs more than \$175 billion in Medicare and Medicaid costs, an effective cure for the progressive neurodegenerative disorder continues to elude medical researchers and practitioners. This project aims to investigate the significance of primary cilia in aberrant astroglial division, an inflammatory response to AD-related neurodegeneration. By performing immunohistochemistry on human AD and control brain tissue, our laboratory team circumvented the discrepancies associated with model organism tissues and identified previously unobserved colocalization of primary cilia and astrocytes. Our findings on the significant morphological differences between primary cilia and astrocytes, in AD and in normal brain tissues, offers insight into the convoluted mechanisms of AD-related astrogliosis.

**Jennifer Zhang**, Materials Science and Engineering

**Faculty Mentor:** Dr. Sundeep Mukherjee

**Title:** Chromium-Containing High Entropy Alloys for Biomedical Applications

Due to the increasing life span of humans, there has been an increasing demand for biomedical implants. The current materials used such as 316L stainless steel, cobalt chromium alloys, and titanium-based alloys each have their flaws. Recently, high entropy alloys (HEAs) have been found to have many of the properties of a good biomaterial, with its high strength, high hardness, and excellent biocompatibility. Therefore, we decided to test the mechanical, wear, and corrosive properties of differently processed CoCrFeMnNi high entropy alloys of varying Chromium content to determine their suitability for use as a biometal in comparison to other common options. We tested as-cast and recrystallized CoCrFeMnNi HEAs with compositional ratios of CoCr0.5FeMnNi, CoCr1.0FeMnNi, CoCr1.5FeMnNi. These high-entropy alloys have shown to be a promising, viable option to use as a biomaterial and have potential for being superior to current biomaterials.

**Ted Zhao**, Texas Academy of Mathematics and Science

**Title:** Simulations and Designs of a Destabilizer for Tropomyosin Using MacroModel

This research poster shows the data and conclusions from my research over the summer with Dr. Douglas Root in the Department of Biological Sciences. I spent my research time developing a peptide

using MacroModel and I have presented 4 different peptides all showing some promise. The paper also shows the methods and the details of selecting the peptides.

**Alan Zhu**, Texas Academy of Mathematics and Science

**Title:** Poly (Methyl methacrylate) 50 nm Nanoparticles: Synthesis and Characterization

Cancer resistance to drugs accompanied by subsequent relapse causes many cancer patient deaths (1). The use of nanoparticles (NPs) in biomedical applications, such as cancer, has increased over the last decade, and the unique structural and optical properties of metallic NPs make them favorable candidates for biomedical applications (2). However, there are currently no FDA approved metallic nanoparticles for treatment of cancer (3). We propose in-house synthesis of biocompatible NPs that can be designed and engineered to target and kill cancer cells. This basic science research study is the first required step in design of a therapeutic for FDA approval. We developed synthesis and characterization methodologies of an in-house template Poly (methyl methacrylate) (PMMA) NP to be used as a blueprint to design multi-purpose PMMA-based NPs for therapeutic applications in cancer.

**Sarah Zou**, Texas Academy of Mathematics and Science

**Title:** High-Performance Lithium-Ion Battery Electrode Derived from Pecan Shell

Energy storage systems are crucial to green energy development, smart grid technologies, and electric vehicles. However, to meet the greater energy demands that accompany a growing population, key energy systems such as lithium-ion batteries must be improved to have higher energy density and greater cyclability. I engineered an unlikely biomass-pecan shells into a high-performing lithium-ion battery electrode material by using the facile and environmentally-benign process of self-activation. To evaluate the physical properties of my material, I used SEM and Raman spectroscopy pore structure of the activated pecan shell. To test the electrochemical performance of activated pecan shell, I assembled lithium-ion batteries that underwent cyclic voltammetry, galvanostatic charge-discharge, and electrochemical impedance spectroscopy. The activated pecan-shell electrode proved to have a high capacity of 100 mAh/g for 200 cycles with almost perfect retention, comparably higher than average lithium-ion battery retention of 80% over 200 cycles.