University of St. Thomas
2016 Research Symposium

Research: Building Knowledge

April 7, 2016
Poster Reception
4 - 6 PM

April 8, 2016
Oral Presentations
10 AM - 4 PM

Honors Presentation
4 - 5 PM

Poster Judging
5:30 - 8:30 PM
Research: Building Knowledge

“Every year our undergraduate students at the University of St. Thomas amaze me and all our visitors with their imagination, hard work and love of learning. Thanks to the dedication of our faculty, these students have the good fortune to receive invaluable mentoring and instruction allowing them to create such impressive and relevant results.”

Dr. Robert Ivany
President

“America and other post-industrial nations are knowledge societies, wherein knowledge and the building of knowledge are the markers of national wealth and personal flourishing. We as participants in a knowledge society commit to a life of discovery, of learning and re-learning, and sharing our learning in common with others for the benefit of the community. The annual Research Symposium showcases how students at the University of St. Thomas become active citizens in our knowledge society. In the process they grapple with the perennial questions that form the essence of a Catholic liberal arts education: questions of value, self-discovery, vision, and belief. In other words, the very things that hold our society together and provide meaning for our lives.”

Dr. Dominic Aquila
Provost and Vice President of Academic Affairs

“At this moment, we have several buildings under construction on the UST campus. Each of the buildings begins with a firm foundation, then they move upwards into the air with supports, and then they are covered with an exterior and roof. Within each area of study at the University, we work in much the same way. We begin by building a firm foundation of general knowledge of the subject, scaffold from that knowledge into the framework for future study, and then let our students move from there by allowing them the chance to complete their own exteriors through research within their fields.”

Dr. Maury Harris
Chair, Committee on Student Research
POSTER PRESENTATIONS

Thursday, April 7, 2016
Poster Reception, 4 – 6 p.m.
PRESENTERS SHOULD ATTEND
Jerabeck Gymnasium

Friday, April 8, 2016
Posters on Display, 9 a.m. – 4 p.m.
Jerabeck Gymnasium

Friday, April 8, 2016
Poster Judging, 5:30 p.m. – 8:30 p.m.
ALL PRESENTERS ARE REQUIRED TO ATTEND
Jerabeck Gymnasium

NOTE:
POSTERS MUST BE REMOVED AT 8:30 P.M.

ORAL PRESENTATIONS

Friday, April 8, 2016
Ahern and Old Bookstore
Oral Presentations, 10 a.m. – 3:00 p.m.

HONORS COLLOQUIUM

Friday, April 8, 2016
Honors Colloquium
Jones Hall
4 p.m. – 5 p.m.
ORAL PRESENTATIONS

Friday, April 8, 2016
Ahern, Crooker

10:00 AM  Barnes, Alyssa, Persian Slippers in the Polis: The Perfect Possibility, Tom Harmon, Michael Boler, Undergraduate Theology, Honors Independent Study.

10:20 AM  Kyle, Joni, A Structural Criticism: The Universal truth of the Mentally Ill in the Late Nineteenth and Early Twenty, Shannon Forbes, English, Nichole Casarez, Communication, Capstone.


11:00 AM  Otero, Cristina, The Beginning of Modern Consciousness: Intra-Psychic Conflict In Shakespearean Tragedy, Clinton Brand, English, Capstone.


11:40 AM  Reinhardt, Heidi; Lam, Quy; Ledesma, Elmer; Rosell, Rosemarie C., Determining Toluene’s Effect on Drosophila melanogaster’s Fecundity and Offspring Development, Rosemarie C. Rosell, Biology, Elmer Ledesma, Chemistry and Physics, Capstone.

NOON  LUNCH, Jerabeck Gymnasium

1:00 PM  Garcia, Cristina; Ufomadu, Ezinne; Rosell, Rosie; Larios-Sanz, Maia, Metagenomics approach provides insight to microbiomes of Houston mosquitos, Maia Larios-Sanz, Rosmarie C. Rosell, Biology.

1:20 PM  Chidi, C.; Chandra, R.; Ribes, A, Evaluation of Antioxidant Protection in Human Serum Via a Ferric Reduction Assay, Richa Chandra, Chemistry and Physics, Albert Ribes-Zamora, Biology, Capstone.

1:40 PM  Garza,Kyana; Hameed, Samee A.; Jurica, James M.; Mittal, Chandra K.; Chandra, Richa; Mellis, Birgit, Remnant Lipoprotein Size Distribution Profiling via Dynamic Light Scattering Analysis, Richa Chandra, Chemistry and Physics.

2:00 PM  BREAK

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<td>2:40 PM</td>
<td>Castellanos, Anabel, <strong>Christian Iconography in William-Adolphe Bouguereau's Notre Dame des Anges (Our Lady and Angels)</strong> Charles Stewart, Art History.</td>
</tr>
<tr>
<td>3:00 PM</td>
<td>Douglas, Rebekah, <strong>2nd Language Learning</strong>, Elizabeth Coscio, Modern and Classical Languages, Capstone.</td>
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<td>3:20 PM</td>
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<td>3:40 PM</td>
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<tr>
<td>10:00 AM</td>
<td>Alalsayednasser, Zahra; Phung, Truc; Onuchic, Lucas; Flagg, Mary, <strong>Power domination and zero forcing</strong>, Mary Flagg, Mathematics.</td>
</tr>
<tr>
<td>10:20 AM</td>
<td>Cagyle, Katie, <strong>Imperialism, Nationalism, and the Balfour Declaration</strong>, Thomas Crow, Lee Williams, History, Capstone.</td>
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<tr>
<td>10:40 AM</td>
<td>Erickson, Caprice, <strong>A Pathway to Peace: The Life of Gerry Adams</strong>, Lee J. Williams, History, Lori M. Gallagher, Irish Studies, Capstone.</td>
</tr>
<tr>
<td>11:00 AM</td>
<td>Whitaker, Jesse, <strong>Victory and Defeat: How the Russian Revolution Left a Legacy of Anti-Semiticism in Europe &amp; America</strong>, Lee Williams, Thomas Crow, History, Capstone.</td>
</tr>
<tr>
<td>11:20 AM</td>
<td>Sleezer, Allyssa, <strong>Common Core: Controversy and Clarifications</strong>, Rick Krutchinsky, Education, Honors.</td>
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<td>1:00 PM</td>
<td>Vauk, Evan; Sharaf, Sarah, <strong>#Trump &amp; #Hillary: Sentiment Analysis of Presidential Candidates</strong>, Jack Leonard Follis, Mathematics.</td>
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<td>1:20 PM</td>
<td>Hameed, Samee, <strong>An Exploration of Avicenna and His Canon of Medicine</strong>, R. E. Houser, Terry R. Hall, Philosophy, Capstone.</td>
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<td>Time</td>
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<td>Nash, Kathleen</td>
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<td>2:00 PM</td>
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<td>Singh, Rubaina</td>
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<td>2:40 PM</td>
<td>Ontiveros, Sarah</td>
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<tr>
<td>3:00 PM</td>
<td>McCormack, William; Cawley, Andrey; Foust, Henry</td>
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<td>3:40 PM</td>
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Friday, April 8, 2016
4 PM – 5 PM
Honors Colloquium
Jones Hall
4:00 PM

**Presenters:** Barnes, Alyssa Marie; Do, Tony Dang; Hameed, Samee Abdul; Jurica, James M.; Lam, Quy Nguyen; Logue, Emmalee Claire; Nguyen, Thy Thanh; Reinhardt, Heidi Marie-Ling; Sleezer, Allyssa Marie; Vass, Elizabeth Ashley; Vo, Jacqueline; Webb, Jasmine Sarah

**Faculty Sponsor:** Jo Ann Meier-Marquis

**Title:** AMBITION: MAKING AMERICA GREAT AGAIN?

**Abstract:** Ambition has fueled the American lifestyle. From technology, mass media, and even within our homes, ambition is ingrained into the American mind. In addition to focusing on the social progress that has resulted from this ambitious American mindset, we provide a cautionary tale about the dark side of ambition and the consequences of unbound ambitious desires. Overall, we will address the following issues: 1) If ambition is progressive or regressive; 2) If ambition is a distinctly human quality; and 3) If ambition needs to be moderated.
Poster Presentations and Titles

1. Abdulaziz, Sarah; Della Costa, Jessica; Hinh, Steven; Nguyenphat, Richie; Novak, Erin; Sdringola, Chiara; Vo, Jackie. **Diversity of the microbiome of the sea anemone, Aiptasia pallida**, Maia Larios-Sanz, Rosemarie C. Rosell, Biology.


3. Akpati, Lois; Shamoon, Ushna; Tirgar, Reyhaneh; Nam, Edward, **Replication stress attenuates planarian regeneration**, Edward Nam, Biology.


5. Fahmy, Nicole; Zaibaq, Pilar; Pham, Quoc-Khanh; Castle, Eric; Vu, Kimberly; Guirrette, Melanie; Ruff, Aaron; Aviles, Yicenia; Jain, Renu; Hou, Jianyi; Jabbur, James; Ribes-Zamora, Albert, **XLF and XRCC4 Interact with Telomeric Proteins**, Albert Ribes-Zamora, Biology.

6. Farmer, Taylor; Rubio, Anabel; Larios-Sanz, Maia, **Development of an Experimental Microbial System to Evaluate Bioresistant Additives in Metalworking Fluid**, Maia Larios-Sanz, Biology.

7. Foss, K.; Guardado, C.; Rodriguez, O.; Baenziger, E.; Ribes-Zamora, A.; Simmons, A D., **Phylogenetic placement of Gongora species (Orchidaceae) relative to other orchid subfamilies using D**, Alexandra Simmons Nout, Albert Ribes-Zamora, Biology, Capstone.

8. Foss, Keagan; Guardado, Christopher; Rodriguez, Olivia; Baenziger, Edward; Ribes-Zamora, Albert; Simmons, Alexandra, **Phylogenetic classification of Gongora species (Orchidaceae) using DNA barcode regions matK, rpoB, r,** Alexandra Simmons Nout, Biology, Rev. Edward Baenziger, CSB, Modern and Classical Languages.

9. Ladner, Aaron; Shields, Kelly; Gonzalez, Jonathan; Nguyen, Landon; Vaughan, Ellen; Martinez, Antoinette; Shivis, Amin; Larios-Sanz, Maia; Sen, Pramila; Johnson, Cassidy, **Researching the Relationship Between Tall Grass Prairie Microbial Landscapes and Plant Diversity**, Amin Shivis, Maia Larios-Sanz, Biology, Capstone.

10. Martinez, Antoinette; Leemann, Kate; Solis, Minerva; Amin, Shivis, **Selection of Psychrophilic E. coli via Mutational Screening**, Shivis Amin, Biology.
11. Nguyen, Sandra; Nguyen, Gina; Tran, Tam; Kral, Jessica; Dodge, Jason, Restriction mapping of a 'trembler' mutation of *C. elegans*, Alexandra Simmons Nout, Biology, Capstone.


13. Pinzon, Karina; Flores, Maria; Truong, Anh, Investigation of DNA repair systems in *Escherichia coli*, Shivas Amin – Biology.

14. Ribadeneyra, Clara; Hamor, Clark; Amin, Shivas., EWSR1 potentially functions as an RNA chaperone in the stress response, Shivas Amin, Biology, Capstone.

15. Rollo, Debra; Larios-Sanz, Maia, Aerosolized bacteria from a freshwater fish tank as a possible source of acquisition and colonization of *Pseudomonas aeruginosa* in cystic fibrosis patients, Maia Larios-Sanz, Biology.

16. Trivino, Vanessa; Hebert, Luke; Reinhardt, Heidi; Lam, Quy; Lodhra, Zara; Castillo, Laura; Donnelly, Anna; Nguyen, Tang; MacGregor, Michael; Nunez, Brenda, Determining Toulene's Effect on *Drosophila melanogaster*’s Fecundity and Offspring Development, Rosemarie C. Rosell, Biology, Elmer Ledesma, Chemistry and Physics.

17. Dang, Phuong; Evans, Elena; Nguyen, Andrew; Young, Crystal, Poly(phenylene vinylene) PPV derivatives and their solubility effects in organic light-emitting diode (OLED) devices, Crystal Young, Chemistry and Physics.

18. Hernandez, Ana; Do, Tony; Chandra, Richa, Separation of Lipoproteins Using HPLC, Richa Chandra, Chemistry and Physics.

19. Johnson, Tretitia; Flores, Elaine; Gueverara, Astrid; Heerensperger, Laura; Palasota, John A., Salicylic Acid Determination In Face Wash By HPLC, John A. Palasota, Chemistry and Physics.

20. Jurica, James; Samee, Hameed; Birgit, Mellis; Richa, Chandra, Remnant Lipoprotein Size Distribution Profiling of Serum Samples of Varying Metabolic Disorders via, Richa Chandra, Chemistry and Physics, Capstone.

21. Loth, Matthew; Gibbons, Chad; Belaitez, Sami, Moments of Chaos, James Clarage, Chemistry and Physics.

22. Nguyen, Thy; Hollingsworth, Jarvoris; Mellis, Birgit, Enhancement of Monodispersity During the Synthesis of Gold Nanoparticles with Cyclodextrin Derivative, Birgit Mellis, Chemistry and Physics, Capstone.
23. VanderWal, Arica; Urbaningsih, Mustika; Grisales, Sara; Steiger, Michelle; Mellis, Birgit, *Photothermal Effects of Biotinylated Gold Nanoparticles on Cell Viability*, Bitgit Mellis, Michelle Steiger, Chemistry and Physics.


25. Cancelled.


27. Flores, Jallesse; Perez, Stephanie, *Predictors of Relational Satisfaction*, Carl W. Scott, Psychology, Capstone.


32. Grant, Robyn; Escoto, Maria; Ardila, Vanessa, *Interpretations of Cross-Sex Friendships*, Elizabeth Woods, Psychology, Capstone.

33. Pinzon, Karina, *An Examination of Assertiveness in Relation to Social Rank Mentality and Self-Compassion*, Jo Anne Meier-Marquis, Psychology, Capstone.


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<td>Nguyen, Megan; Tran, Vivian</td>
<td>The Effects of Sleep Interventions on College Students</td>
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<td>Parrish, Alexandria G.; Keller, Sydney C</td>
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<td>40</td>
<td>Ramirez, Deanna</td>
<td>Self-Monitoring and the Perception of Job Applicants Based on Style of Clothing</td>
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<td>41</td>
<td>Sanchez, Veronica; Velasquez, Cassandra</td>
<td>Dating Experiences and Technology Use Among College Students</td>
<td>Srijana Shrestha</td>
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<td>Tlapanco, Carina; Razuri, Carlos</td>
<td>College Experiences of First-Generation College Students</td>
<td>Srijana Shrestha</td>
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<td>43</td>
<td>Vass, Elizabeth</td>
<td>Gun Control and Gun Laws: Attitudes of Students at a Private Institution</td>
<td>Jo Anne Meier-Marquis</td>
<td>Psychology</td>
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<td>44</td>
<td>Vauk, Evan; Garcia, Stephanie; Habet, Analisa</td>
<td>Reactions to Social Situations: Understanding the Link between Information and Behavior</td>
<td>Carl W. Scott</td>
<td>Psychology</td>
<td>Capstone</td>
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Alalsayednasser, Zahra; Phung, Truc; Onuchic, Lucas; Flagg, Mary, **Power domination and zero forcing**, Mary Flagg, Mathematics.

Power domination and zero forcing are two discrete mathematical concepts which are applied to real life application such as efficiently monitoring and electric power grid. The power domination number of a graph is the minimum number of vertices needed to be chosen to monitor the whole graph according a set of rules. We found bounds for the power domination number of special graphs such as: cycle ciclos, house ciclos and complete ciclos using the connection between power domination and zero forcing. In the process, we have found and proved the exact power domination number for cycle ciclos and some complete ciclos.

Barnes, Alyssa, **Persian Slippers in the Polis: The Perfect Possibility**, Tom Harmon, Michael Boler, Undergraduate Theology, Capstone.

The question of who should rule the polis is a perennial question. Since the greatest power the ruler possesses is that of education, the question of who should rule becomes who should control education. In “The Clouds” the poets are the educators providing an attachment to one’s own, which destroys the family. In the “Republic” the philosophers use a poetic education for an attachment to the good, rather than one’s own; however, such a city can only exist in speech since it neglects both human nature and the philosophic nature. Thus, I shall examine how “The Clouds” presents the dangers of the poet’s city; then, I will show how, in the “Republic” the philosopher moderates poetry but neglects human nature; consequently, I will show how both regimes fail and that human nature makes it necessary for the marriage of the philosophers and the poets as the rulers.

Cagyle, Katie, **Imperialism, Nationalism, and the Balfour Declaration**, Thomas Crow, Lee Williamses, History, Capstone.

On November 2, 1917, the foreign secretary of Great Britain Arthur James Balfour penned a letter to Baron Lionel Walter Rothschild, a well known patron of the British Zionist movement. The letter stated that the United Kingdom would support the establishment of a Jewish homeland in the Middle East. The letter is comprised of two short paragraphs and is simple and straightforward. The events leading up to the creation of the document were complex and circuitous. British and French imperialism played a role, as did Jewish Nationalism and Arab Nationalism. Deception and intrigue were prevalent and contemporaries were unsure whether or not the declaration would ever come to fruition. The Balfour Declaration was the first major step in the creation of Israel but it was far from a guarantee that such a state would ever exist.
One of the most remarkable images of the Virgin Mary was created by the notable French painter—William-Adolphe Bouguereau (1825-1905). The painting, titled Notre Dame des Anges (Our Lady of the Angels), invites the viewer to identify key virtues of the Blessed Virgin. Obedience, faith, purity, and grace, are abstract concepts that are manifested through its tangible style, manner, and gestures of these painted figures. Though this canvas is calmly silent, it visually beckons the viewer to stop, contemplate, and eventually to pray in devotion. The artist painted several representations of the Blessed Virgin Mary, invoking her title as Theotokos (Mary as Mother of God)—as signified by the infant Jesus cradled in her arms—but this example is only one of two life-size compositions.

Bouguereau was perhaps the most-celebrated academic painter in late-19th century France, even if art historians today often overlook his work or dismiss him as “too sentimental”. Nevertheless, the artist was a master-craftsman, technically-flawless in painting idealized-human figures that personified classical and Christian concepts. This paper discusses the subtle, yet clear message that the artist communicated using conventional symbols and artistic forms. In painting Notre Dame des Anges Bouguereau was not only creating an artwork, but rather composing a then-contemporary, modern icon, using the illusion of atmospheric perspective. His combination of Christian iconography and Greco-Roman classicism summed-up previous 19th-century movements (neoclassicism, romanticism, and realism) while forming a new style all of his own. All the elements— colors, figure-placement, gestures, texture, and symbols—led viewers to experience “Our Lady”, paradoxically and poetically, in both a physical and mystical way. Despite the apparently static scene, there is a dynamic message worth exploring. The main thesis is that Bouguereau was not only conveying his own religious beliefs, but he was advocating traditional Catholic practices. That is, the painting Notre Dame des Anges served Pope Leo XIII’s mission to strengthen Marian devotion in response to radical modernism that distracted people away from prayer and, ultimately, salvation.

Chidi, C.; Chandra, R.; Ribes, A, Evaluation of Antioxidant Protection in Human Serum Via a Ferric Reduction Assay, Richa Chandra, Chemistry and Physics, Albert Ribes-Zamora, Biology, Capstone.

This research examines the protective effects of various natural antioxidants with different structural properties in serum and alone via chemical oxidation coupled to an adapted measured colorimetric ferric reduction known as the ferric reducing ability of plasma (FRAP). We focus on catechin and resveratrol as hydrophobic antioxidants and compare these to the highly hydrophilic ascorbic acid. We developed this method at the microscale and adapted it to the serum environment through time-based studies. Our results indicate that catechin, the most hydrophobic antioxidant examined, displays enhanced antioxidant activity in the biological serum environment. The evaluation of the protective effects of antioxidants through the FRAP
assay is an inventive tool that provides useful information on the potential therapeutic value of different antioxidants in native biological environments.


This presentation covers the study of learning a second language. This study will survey when psychology meets language learning. Many different teaching methods have been tried to help students acquire a second language. However, many have proven unsuccessful. Recently psychologists have began to study what it is that happens when acquiring a language and found that children acquire languages sometimes more than one much faster than adults, and they look to find out how to transfer that ease to adults. Psychologist found that the social environment is one of the best methods for acquiring a language but it was not the first learning method used. I wish to explore the history of language learning and its evolution to know be examined under a psychology microscope.


Gerry Adams stands as a compelling figure in Irish history and politics through his involvement in the Northern Ireland conflict known as “the Troubles,” his role in facilitating a peace agreement and a power-sharing government in Northern Ireland, and as a politician in the Republic of Ireland as President of Sinn Féin, the only all-Ireland political party. His reputation is dualistic; he is either reviled for his advocacy of violence to achieve independence for Northern Ireland from Britain or revered as an Irish revolutionary fighting to achieve a free and united Ireland. He continues to dedicate his life to Ireland and Irish unification in the Republic of Ireland's government, the Dáil Éireann, and, despite his controversial reputation, remains one of Ireland's most prominent political and historical figures of the late twentieth and early twenty-first centuries. His pathway to peace interests me because I interviewed him on Study Abroad in Ireland.

Garcia, Cristina; Ufomadu, Ezinne; Rosell, Rosie; Larios-Sanz, Maia, *Metagenomics approach provides insight to microbiomes of Houston mosquitoes*, Maia Larios-Sanz, Rosemarie C. Rosell, Biology.

Metagenomics is a novel sequencing approach to study the complete genetic content of a sample. Metagenomics has both ecological and industrial applications, as it allows for the characterization of uncultured microbe populations found everywhere from within the gut in humans to the hidden corners of Earth. This approach is revolutionary because it provides insight into immensely diverse microbial communities that had gone largely undiscovered. For example, it has been used to characterize viral populations, which have been traditionally difficult to study. In this talk, we will present an overview of metagenomics and its use in the characterization of the viral ecology of Houston mosquitoes, which can transmit serious emergent diseases like Zika, West Nile, Dengue and Chikungunya.
Remnant lipoproteins (RLP) are a metabolically derived subpopulation of triglyceride-rich lipoproteins (TRL) in human blood that are involved in the metabolism of dietary fats or triglycerides. RLP, the smaller and denser variants of TRL particles, are strongly correlated with cardiovascular disease (CVD) and were listed as an emerging atherogenic risk factor by the AHA in 2001. Varying analytical techniques used in clinical studies in the size determination of RLP contribute to conflicting hypotheses in regard to whether larger or smaller RLP particles contribute to CVD progression, though multiple pathways may exist. The work presented here demonstrates a unique combinatorial bioanalytical approach involving the preparative immunoseparation of RLP, and dynamic light scattering for size distribution analysis. This is a new facile and robust methodology for the size distribution analysis of RLP that in conjunction with clinical studies may reveal the mechanisms by which RLP cause CVD progression.

Hameed, Samee, An Exploration of Avicenna and His Canon of Medicine, R. E. Houser, Philosophy, Capstone.

The purpose of this talk is to elucidate Avicenna’s Canon of Medicine, and to provide a thorough explanation of his theories regarding human physiology. In addition, I will explore how Avicenna, using the postulates derived from his treatise. The Physics of the Healing, is able to make conclusions concerned with human physiology throughout his Canon of Medicine. Finally, I will compare his assertions dealing with human physiology with the current scientific knowledge we have, and reflect on how we have grown both scientifically and philosophically with our endeavors in medicine.

Kyle, Joni, A Structural Criticism: The Universal truth of the Mentally Ill in the Late Nineteenth and Early Twentieth, Shannon Forbes, English, Nichole Casarez, Communication, Capstone.

“Lady Audley’s Secret,” “Mrs. Dalloway,” and “The Yellow Wallpaper” are authored by female writers in the late nineteenth and early twentieth centuries that explore the ramifications of mental illness. The presentation of my thesis aims to examine the universal truth that those suffering from mental illness should be excluded from society. The emergence of this universal truth is gathered from critically studying the works through a structuralism lens. Further, the presentation of this thesis explores if this universal truth does justice to the mentally ill based on the first investigate journalist, Nellie Bly, in her writings of “10 Days in a Mad-House.”


The purpose of this thesis is to examine three ballads of the sixteenth century surrounding the site of Marian devotion in England: Our Lady of Walsingham. These poems chronicle the Marian
pilgrimage site before and after its destruction by Henry VIII in 1538. The Pynson Ballad recounts and defends the construction of the shrine in the year 1061, while The Arundel Ballad mourns the recently destroyed Holy House and Abbey at Walsingham five centuries later. Closing the collection is The Ralegh Ballad which is written as an exchange between pilgrims during Elizabethan rule. I will read and analyze these poems with an understanding of the sixteenth century English political and religious environment in order to address how the three Ballads together illustrate the metamorphoses within the English heart away from the universal religion toward a religion of both private devotion and nationalism.


How can firms increase positive attitudes toward branding and business through communication with consumers? Language Expectancy Theory analyzes the ways in which individuals develop communication expectations and how speakers can use those expectations in order to persuade or create a positive response from the audience. This theory was applied to current business practices by analyzing specific propositions, then applying those propositions to existing marketing campaigns. The results have shed light on what has and has not been successful in regards to previous marketing campaigns, and recommendations have been made that identify ways for businesses to increase positive brand identity.


Last summer, Dr. Foust went to Wright Patterson Air Force Base to learn about detonation engines. He developed a model that determines the entropy change for a given temperature rise within the heat addition step. The relationship between percent reaction complete versus T (temperature) for a rotational detonation engine (RDE) during the heat addition step was determined. This involved knowledge of thermodynamics around RDE’s, combustion chemistry, solving stiff Ordinary Differential Equations [ODE’s], and numerical analysis schemes. When the working fluid within the combustion chamber is assumed to an ideal, perfect gas, then the energy and entropy equations are algebraic. When the working fluid is an imperfect gas, then the energy and entropy equations are differential equations that include combustion chemistry. This results in a system of stiff ODE’s, which were solved using Matlab’s ODE Solver using a form of Rosenbrock’s method (implicit Runge Kutta Method).

Nash, Kathleen, *The Food Crisis and Indigenous Populations in Northern Canada*, Kelly Bronson, Science and Technology Studies, St. Thomas University, Canada.

In Northern Canada, Indigenous communities are facing many health problems such as Type II diabetes and heart disease as a result of a lack of healthy food choices in grocery stores and the introduction of processed foods into northern food environments (Rudolph and McLachlan,
Mainstream technological approaches to food-related health crises around the world tend to focus on the food choices that individuals made and they ignore the food system’s place in the problem. These approaches focus on solving the problem through existing policies, corporations and regulatory agencies (Edson Jones and Davidson, 2014). Taking a socio-technical approach to the food-related health crisis among Aboriginal communities in Northern Canada, my paper not only looks at existing policies but also the social situations that have contributed to this problem. The food crisis that is currently plaguing aboriginal communities in Northern Canada can be attributed to a lack of access to healthy, fresh foods as well as the high rates of unemployment and poverty that these communities are experiencing. Both of these are associated with historical injustices that have troubled aboriginal communities such as the residential school system, as well as resource extractions that have changed the environment within which they live (Rudolph and McLachlan, 2013).

Ontiveros, Sarah, Japan in Retrospect, Jim Kumahata, Modern and Classical Languages, Capstone.

As a student majoring in English, with a concentration in Creative Writing, I made the decision to write a creative and expressive piece about my recent trip to Japan with the University of St. Thomas. It is a personal, although researched, exploration piece that is something akin to a travel article, divided into three chapters. The first chapter, is an introduction to the Kakehashi Project, a cultural exchange under “Japan’s Friendship Ties Programs” launched by the Ministry of Foreign Affairs of Japan. It is also a recollection of my exposure to the Japanese people and their culture while a part of the Kakehashi Project. In the second chapter of my thesis project, I explore one of Japan’s biggest cultural staples, matcha tea. I will discuss the tea’s history, origins, how its exportation has positively affected the United States, and finally, my own experience with matcha. In the final chapter I will discuss Japanese literature and how it compares and contrasts with what I have learned as a student studying Western literature. Overall, it is a thesis project geared towards the understanding and appreciation of the Japanese culture and the importance of our united future.

Otero, Cristina, The Beginning of Modern Consciousness: Intra-Psychic Conflict In Shakespearean Tragedy, Clinton Brand, English, Capstone.

This project attempts to analyze Shakespeare’s five tragedies – Hamlet, Romeo and Juliet, Macbeth, Othello, and King Lear – from a modernist perspective, exploring the intra-psychic conflict each play creates in their dramatic situations: The psychology of consciousness (Hamlet), Eros (Romeo and Juliet), guilt (Macbeth), and masculine honor (Othello and King Lear). In these works Shakespeare creates characters of psychological complexity, inhabiting different states of consciousness, and poses ethical and moral questions through the dramatic situations of his plays. In that sense Shakespeare is the first of the early writers to show a more modern view of man: Self-divided, susceptible to passion, but capable of change and of achieving and occupying higher or lower states of consciousness. This view contrasts with the hero of antiquity defined and subsumed by his ideals, and is characteristic of a modern age that has
steadily rejected and deconstructed traditional moral systems, embracing individual subjectivity and moral ambiguity.

Reinhardt, Heidi; Lam, Quy; Ledesma, Elmer; Rosell, Rosemarie C., Determining Toluene’s Effect on *Drosophila melanogaster*’s Fecundity and Offspring Development, Rosemarie C. Rosell, Biology, Elmer Ledesma, Chemistry and Physics, Capstone.

Toluene is an air toxic chemical that negatively affects reproductive functions of humans. Toluene metabolites damage DNA in testes, as well as adversely affect ovarian cells, which may cause defects in the offspring. To study this, we are using the model organism, *Drosophila melanogaster* because its reproductive structures function similarly to humans. We hypothesize that toluene exposure to fly parents will cause a decrease in fecundity, pupation rate, and morphological changes in offspring. We have developed a system that delivers specific concentrations of gaseous toluene to *D. melanogaster* and have determined the LC50, the concentration of toluene at which half of the population dies, to be 279 ppm. We are completing developmental studies on the first generation of offspring from males and females exposed to the LC50 toluene concentration by scoring fecundity of exposed parents by counting the number of offspring at each developmental stage. These data, with microscopy to observe morphological effects, were used to determine if and when development processes were affected in offspring.

Singh, Rubaina, An Intersectional Feminist Discourse Analysis of the documentary film, “*India’s Daughter*”, Karla O’Regan, Criminology and Criminal Justice, St. Thomas University, Canada.

My thesis is about *India’s Daughter*, a documentary film, based on the brutal gang rape of Jyoti Singh that happened in India in 2012 and sparked protests and serious debate about gender inequality across India, attracting national and international attention. The Indian government banned this documentary even before it was released. This sparked international rhetoric about ‘India’s Rape problem’. I have transcribed the entire documentary, including both words and visual images (e.g. use of light, music, etc), using a critical discourse analysis. It uses intersectional and postcolonial feminism to thematically code the documentary. These themes help us understand the complex interplay of factors that construct the status of women in India in a way that sanctions sexual violence against them. My work also seeks to understand how this status is challenged both within India and the larger international community by both men and women in ways that cater to a ‘western gaze’ or ‘colonial lens,’ positioning violence against women as a problem that is inherent to Indian culture.

Sleezer, Allyssa, Common Core: Controversy and Clarifications, Rick Krutchinsky, Education, Honors.

The Common Core Education Standards are a controversial topic in the United States. There are extremely vocal proponents and critics of the standards on either side of the political spectrum, many of whom do not display an understanding of what Common Core really is. Polls continue
to show that American citizens are split on this issue. But what exactly is Common Core, and why are there so many misunderstandings surrounding it? With this presentation I seek to 1) Provide a clear and concise overview of what the Common Core Education Standards are; 2) Analyze how they have been put into place in the 43 states that have adopted them; and 3) Provide arguments both for and against the standards.

Stevenson, Connor, Study of the Spanish Identity of Federico García Lorca, Elizabeth Coscio, Rev. Edward Baenziger, CSB, Modern and Classical Languages.

In this project, I will study the native culture of Federico García Lorca – that of Andalucía and Spain in general – and what role it plays in his literary works, and also the interactions that he had with foreign cultures, namely those of France and the United States. The goal in studying these interactions in his work is to prove that he stayed true to his Spanish roots; while his interactions with France meshed well with his native culture, those with the United States caused a profound breakdown in the author, causing him to reevaluate and reaffirm his identity as a Spaniard, which produced some of his most brilliant and challenging works.


My symposium presentation is an excerpt from my thesis, The Foreverland Chronicles, a collection of prose stories written in partial fulfillment of the requirements for my Bachelors of Arts in English degree with a Writing Concentration. Each of the five stories centers on different members of a fictional family. The collection is prefaced by a short essay exploring semi-autobiographical and literary influences throughout the work. Unlike Peter Pan’s Neverland, which we abandon with age, Foreverland exists eternally in our souls; it is a place we always remember as if we are looking back on a wonderful thing that has been lost. These are the moments when time stands still because we are moving forward, when we catch up with the spinning of the Earth and leave our old selves behind.

Vauk, Evan; Sharaf, Sarah, #Trump & #Hillary: Sentiment Analysis of Presidential Candidates, Jack Leonard Follis, Mathematics.

In the field of Data Science, researchers utilize a variety of methods to draw meaningful conclusions from even the most abstract data they collect. The 2016 race for the United States Presidency has generated a great deal of statistical information. In this exploratory visual analysis, we will use R Statistical Package to gather tweets and metadata from Twitter regarding each of the main candidates from Democratic and Republican parties. The data will be analyzed for daily changes in sentiment over a two week period by using sentiment analysis packages.

The October Revolution of 1917 in Russia produced an anti-Semitic backlash from the Europe to the United States. This can be witnessed in four incidences: in Berlin with Rosa Luxembourg and Karl Liebknecht; in Munich with Eugen Leviné; in Hungary with Béla Kun; and in the United States with the Rosenbergs. These occurrences strengthened anti-Semitism in the West. This was seen in two major countries: Germany with Adolf Hitler and the United States in the First and Second Red Scares. After WWII, America witnessed a resurgence in anti-Semitism in Joseph McCarthy and even more so with George Lincoln Rockwell. Rockwell’s American Nazi Party would later metastasize into the many white supremacist organizations that Americans and Europeans witness in contemporary society.
Poster Abstracts

Biology


The sea anemone Aiptasia pallida serves as a model organism for the study of the symbiotic relationships of coral reefs with algal and bacterial partners, as both coral reefs and sea anemones expel their symbiotic partners during environmental stress. The purpose of this research is to identify the microbiota of A. pallida in order to study its role. We hypothesize that resident bacterial communities within A. pallida are diverse and provide additional metabolic abilities. Whole sea anemones from a commercial source were homogenized and total DNA was extracted. Bacterial DNA was amplified using universal 16s rDNA primers. The PCR products were sequenced and bacterial species identified using BLAST analysis. Several marine bacterial species were found, many of which possess unique metabolic capabilities. Further research will compare microbiota in commercial and wild-caught anemones, and treat anemones with antibiotics to test the effect of a reduced microbiome on health.


In medical toxicology, compounds are tested for efficacy and lethality in pathogenic organisms and their hosts. In collaboration with Texas Southern University, we tested a compound that is a Mycobacterium tuberculosis methionine aminopeptidase (MtMetAP1) inhibitor, which blocks the removal of N-terminal methionine of nascent polypeptide chains. Previous knockdown studies indicate that the removal of MtMetAP1 decreases M. tuberculosis viability. The follow-up study was to find the concentration of drug that killed half of the mammalian cell population in vitro, the LC50. To determine this value, we exposed H1299 lung carcinoma cells to different inhibitor concentrations, and found the LC50 at 11.35 µM for this cell line. Future studies will rule out cell line-specific responses. Additionally, two other MetAP inhibitors will be tested for their comparative LC50’s. Ultimately, these in vitro studies will be used as a reference point for in vivo studies.

3. Akpati, Lois; Shamoon, Ushna; Tirgar, Reyhaneh; Nam, Edward, Replication stress attenuates planarian regeneration, Edward Nam, Biology.

Adult stem cells (SCs) divide many times over an organism’s lifespan to renew tissues. The reduced capacity of adult SCs to regenerate old and damaged tissue results in aging. Replication stress, DNA damage during cell division, is one mechanism central to aging.
Replication stress can cause loss of adult SCs accompanied by a decline in tissue renewal and an increase in aging. In contrast, planarians possess SCs called neoblasts that exhibit unlimited regenerative potential, and planarians do not age. However, it is unknown whether replication stress affects neoblasts and planarian regeneration similar to organisms that age. Our preliminary results show that replication stress delays planarian regeneration. Surprisingly, worms exposed to replication stress died after regenerating while non-regenerating worms with replication stress did not die or died later. Our results suggest replication stress-induced stem cell loss and aging also apply to planarians and may establish a novel aging model system.


Houston's hot, humid environment serves as an optimal habitat for mosquitos. As an international hub, the city's population is susceptible to global epidemics such as Dengue, West Nile, Zika and Chikungunya, which are transmitted via mosquitos. With the increasing number of viral outbreaks, it is imperative to advance our understanding of the virus populations carried by mosquitos. One way to do this is through the use of metagenomics: the study of the collective genomes in an environmental sample. Here, we present the beginning of a metagenomic approach to analyze sequence data from total DNA and RNA isolated from mosquitos captured in Houston.

5. Fahmy, Nicole; Zaibaq, Pilar; Pham, Quoc-Khanh; Castle, Eric; Vu, Kimberly; Gurette, Melanie; Ruff, Aaron; Aviles, Yicenia; Jain, Renu; Hou, Jianyi; Jabbur, James; Ribes-Zamora, Albert, XLF and XRCC4 Interact with Telomeric Proteins, Albert Ribes-Zamora, Biology.

Non-Homologous End Joining (NHEJ) is a double-strand break DNA repair pathway that is found mutated in patients suffering from Severe Combined Immunodeficiency. This pathway recruits 3 subunits of the DNA-PK complex (Ku70, Ku80, DNA-PKcs) and the XLF/XRCC4/LIG4 complex to sites of DNA damage. Since several NHEJ proteins can also be found at telomeres, we hypothesized that XRCC4 and XLF may also be present at the telomere through interactions with TRF1 and TRF2, two members of the Shelterin complex present at the end of chromosomes. Using protein-fragment complementation assay, we have found that mammalian cells transfected with V1-XRCC4 or V1-XLF and V2-TRF1 or V2-RAP1 show high fluorescence intensity, suggesting an interaction. Furthermore, co-localization studies with dsRed-TRF2 showed that this interaction is occurring at telomeres. We are currently using co-immunoprecipitation studies using magnetic beads tagged with Flag epitopes to confirm the interactions of XLF and XRCC4 with RAP1 and TRF2.
6. Farmer, Taylor; Rubio, Anabel; Larios-Sanz, Maia, Development of an Experimental Microbial System to Evaluate Bioresistant Additives in Metalworking Fluid, Maia Larios-Sanz, Biology.

Metalworking fluids (MWF) are used in industrial machining to cool and lubricate metal work pieces. MWF can be biodegradable, which is an advantage for safe disposal but makes them highly susceptible to microbial contamination in use. This can hamper MWF utility, causing damage and loss of performance of metalworking processes. Biocides can be added to prolong MWF utility but have been found to cause dermatitis through exposure to MWF. We developed an experimental system using common MWF contaminants to evaluate amines in metalworking formulations. Mixed bacterial (Escherichia coli and Pseudomonas putida) and fungal (Candida and Saccharomyces) cultures were conditioned in 3% MWF prototype and then subjected to MWF containing amines of test. Direct plating methods were used to determine microbial log counts. We have successfully conditioned bacterial and fungal cultures that will be used to evaluate the efficiency of these amines in controlling microbial growth in the MWF environment.

7. Foss, K.; Guardado, C.; Rodriguez, O.; Baenziger, E.; Ribes-Zamora, A., Simmons; A D., Phylogenetic placement of Gongora species (Orchidaceae) relative to other orchid subfamilies using D, Alexandra Simmons Nout, Albert Ribes-Zamora, Biology, Capstone.

From its taxonomic inception two and a half centuries ago, the classification of orchids has evolved from being primarily morphologically based to now using phylogenetic molecular analysis to help validate or improve upon previous classification schemes. Robert Dressler created an in-depth morphological classification standard amongst orchid enthusiasts by publishing his Phylogeny and Classification of the Orchid Family book (Dressler 1993). This provided the impetus for more conclusive species classifications, leading to phylogenetic investigations based on DNA analysis which provide better taxonomic resolution (Chase 2015). To that end, we compared over two dozen individual species from various subfamilies of orchids to a previously established clade of Gongora. To increase the taxonomic resolution, we used a multi-locus approach incorporating four plastid DNA barcode loci: matK, trnH-psbA, rpoB, and rpoC1 (Siripiyasing et al 2011). We expect that the Gongoras will remain in a clade relative to the other orchid subfamilies.

8. Foss, Keagan; Guardado, Christopher; Rodriguez, Olivia; Baenziger, Edward; Ribes-Zamora, Albert; Simmons, Alexandra, Phylogenetic classification of Gongora species (Orchidaceae) using DNA barcode regions matK, rpoB, r, Alexandra Simmons Nout, Biology, Rev. Edward Baenziger, SCB, Modern and Classical Languages.

Members of the Orchidaceae family, commonly referred to as “orchids,” comprise one of the oldest and most diverse families amongst the flowering plants. Within the Orchidaceae group we find the genus Gongora, whose members exhibit such striking similarities that classifying them based on morphological differences alone is challenging even amongst
experts. Similarly, the phylogenetic relationships amongst Gongoras based upon their morphology are questioned. Given the growing success of DNA barcoding to distinguish between organisms based upon specific conserved genetic regions, the goal of our project is to use matK, trnH-psbA, rp0B, and rp0C1 plastid barcode sequences to explore the phylogenetic relationship between 38 different Gongora species.

9. Ladner, Aaron; Shields, Kelly; Gonzalez, Jonathan; Nguyen, Landon; Vaughan, Ellen; Martinez, Antoinette; Shivas, Amin; Larios-Sanz, Maia; Sen, Pramila; Johnson, Cassidy, Researching the Relationship Between Tall Grass Prairie Microbial Landscapes and Plant Diversity, Amin Shivas, Maia Larios-Sanz, Biology, Capstone.

The coevolution of plants and bacteria has been established in previous studies; however, little is known about how soil bacteria diversity influences the reestablishment of tallgrass prairies. To study this relationship, we collected soil samples from several restored and remnant prairies around Houston. We will extract total DNA from the soil and use high-throughput sequencing to determine bacterial diversity within these quadrants. Using this methodology, we hope to identify coevolutionary relationships that exist between specific plant types and bacteria in these restored prairies. By identifying these patterns, we can help local conservationists refine future prairie reestablishment methods by advising them about which bacteria specific plants need to thrive.

10. Martinez, Antoinette; Leemann, Kate; Solis, Minerva; Amin, Shivas, Selection of Psychrophilic E. coli via Mutational Screening, Shivas Amin, Biology.

Many adaptations that allow life to persist in psychrophilic conditions have been identified. Studies have suggested that impaired protein folding alone is the limiting barrier to growth at cold temperatures. In particular, the expression of the Oleispira antarctica Cpn60 and Cpn10 proteins, homologs of the GroEL/ES chaperone system, is sufficient for growth at cold temperatures (≤ 4º C) in E. coli. In order to validate these findings, we created four different plasmids containing the O. antarctica Cpn60/Cpn10 system. Interestingly, all 4 systems have failed to permit growth at 4º C. It is possible that previous studies that demonstrated the cryoprotectant properties of the Cpn60/Cpn10 system may have isolated adaptive mutants. To test this hypothesis we are conducting a mutational screen by inserting the Cpn60/Cpn10 plasmids into the mutD5/mutL E. coli strain and screening for growth at 15ºC and 4ºC. Using this methodology, we hope to isolate a cold-adapted strain.

11. Nguyen, Sandra; Nguyen, Gina; Tran, Tam; Kral, Jessica; Dodge, Jason, Restriction mapping of a 'trembler' mutation of C. elegans, Alexandra Simmons Nout, Biology, Capstone.

CMW230, a strain of model organism Caenorhabditis elegans, has a mutation that causes the worms to have continuous muscle spasms, which is why we call it a trembler mutant. The final goal of our research is to find and describe the gene that causes trembling in CMW230 worms. So far, through snip-SNP gross mapping, we located the causal mutation on
chromosome III of the organism and concluded that the mutation is recessive. The results also support that the phenotype is most probably caused by a single mutation. The next step of our research is to confirm the restriction snip-SNP patterns of the N2 strain of *C. elegans*, as well as describe the restriction pattern of the CMW230 strain. Once we complete this step, we expect to begin using RNAi to fine map the causal mutation on chromosome III.


Genetics is a very complex and challenging subject to teach in Biology. A Genetics Lab was developed a few years ago in the Biology Department. With the purpose of understanding the impact of the Genetics Lab on the overall comprehension of Genetic concepts, we have collected anonymous data over 2 semesters (141 students) to compare pre-test and post-test scores of students that did or did not take the laboratory. The Genetics Laboratory is taught in the context of a research project (DNA barcoding) instead of unrelated experiments. Additionally, it includes other activities, like one using PyMol, which we have demonstrated increases understanding of the connection between genotype and phenotype. We believe taking the genetic lab reinforces and expands the concepts covered in the lecture through direct application of knowledge and problem solving. We found that undergraduate students who took the Genetic Lecture and the Lab concurrently have a higher average post-test grade than students who only took Genetics lecture course. However, this difference is not statistically significant. Further data analysis will allow us to understand if the lab activities only enhance performance of students with specific GPA’s, and the impact of reading comprehension and quantitative skills on their scores.


DNA double--stranded breaks are among the most cytotoxic forms of DNA damage. Induced by exogenous factors such as UV radiation, their repair is essential for maintaining genomic integrity and can result in cell death if left unrepaired. In *Escherichia coli*, double-stranded breaks are repaired by homologous recombination via the RecBCD pathway. This pathway is initiated when RecA senses a double-stranded break and recruits RecN to the damage site. RecN facilitates the repair of double-stranded breaks by tethering DNA together and properly aligning the strands during recombination. Therefore, we hypothesize that bacterial strains deficient in RecA or RecN will experience a decrease in cell viability when exposed to UV-radiation. Investigating the requirement of these DNA damage repair systems may reveal insight into how cells protect the integrity of their genome following UV-induced damage.
14. Ribadeneyra, Clara; Hamor, Clark; Amin, Shivas, **EWSR1 potentially functions as an RNA chaperone in the stress response**, Shivas Amin, Biology, Capstone.

EWSR1 is a human RNA-binding protein known to drive cancers such as Ewing sarcoma [1] and thought to promote protein aggregation in Lou Gehrig's disease [2]. However, despite its clear involvement in driving disease, a normal physiological function has yet to be established for EWSR1 or any of the closest homologs. To solve this problem, we performed simple yet directed bioinformatic analysis to identify distantly related homologs with experimentally validated functions. We specifically identified a family of glycine-rich RNA binding proteins in Arabidopsis thaliana which have a similar domain composition to EWSR1, as well as similar domain associations. These proteins are known to act as RNA chaperones, which help RNAs to fold and process properly under stress [3]. Based on the similar domain composition and interactions, we hypothesize that EWSR1 functions in humans as an RNA chaperone, ensuring correct folding of RNAs, and may have enhanced activity under stress conditions.

15. Rollo, Debra; Larios-Sanz, Maia, **Aerosolized bacteria from a freshwater fish tank as a possible source of acquisition and colonization of Pseudomonas aeruginosa in cystic fibrosis patients**, Maia Larios-Sanz, Biology.

*Pseudomonas aeruginosa* is the main pathogen associated with deteriorating lung function and high mortality rates in patients with Cystic Fibrosis (CF). Although the mode of transmission is relatively unknown, water vessels such as pet feeding bowls and sinks have long been implicated as reservoirs. A previous study suggested that CF patients with in-home aquariums equipped with aerator systems may be at a greater risk of colonization due to aerosolization of bacteria present in the tank. In an attempt to validate this claim, we used standard microbiology techniques to isolate bacterial contaminants from a room housing an aquarium equipped with an aerator. Four distinct colonies were isolated from the plate closest to the tank. The isolates were characterized using both physiological tests and 16S rRNA sequence analysis. Identifying these environmental isolates will help us determine if *Pseudomonas* and related contaminants enter the environment via aerosolization and if fish tanks are indeed reservoirs.

16. Trivino, Vanessa; Hebert, Luke; Reinhardt, Heidi; Lam, Quy; Lodhra, Zara; Castillo, Laura; Donnelly, Anna; Nguyen, Tang; MacGregor, Michael; Nunez, Brenda, **Determining the Correlation between Drosophila melanogaster Toluene Exposure and the Resulting Toxicity Effects on Fly Survival and Fecundity**, Rosemarie C. Rosell, Biology, Elmer Ledesma, Chemistry and Physics.

Toluene is a volatile hydrocarbon found in industrial settings and in household products. Our purpose is to investigate the effects of toluene on a population of the model organism, *Drosophila melanogaster*. Since humans and *D. melanogaster* have similar nervous system structure and function, and exposure to toluene results in permanent damage to the central nervous system, we anticipate that *D. melanogaster* will show similar results. We developed a
continuous flow system that delivers known concentrations of gaseous toluene to populations of *D. melanogaster*. We have interpolated the lethal concentration of gaseous toluene that kills 50% of the population (LC$_{50}$) to be 279 ppm. Adults exposed at concentrations in the LC$_{50}$ range were mated and the resulting offspring were counted at egg, larval, and pupal stages. These data allow us to track fecundity and progression of fly development under the influence of parental toluene exposure. In addition, light microscopy is used to observe the effects of toluene exposure on the offspring larvae’s morphology in comparison to the morphology of larvae from unexposed parents. Interpreting the data will allow us to identify the developmental stage(s) at which fruit flies are affected by toluene exposure.

**Chemistry and Physics**

17. Dang, Phuong; Evans, Elena; Nguyen, Andrew; Young, Crystal, **Poly(phenylene vinylene) PPV derivatives and their solubility effects in organic light-emitting diode (OLED) devices**, Crystal Young, Chemistry and Physics.

Poly(phenylene vinylene) (PPV) derivatives are a common light-emitting component in organic light-emitting diode (OLED) devices. One way to enhance the performance of OLED devices is to alter the solubility of the PPV derivative. Side chains play a major role in PPV derivative solubility. Our goal is to investigate different side chains to increase solubility, resulting in an improved device performance. We are currently investigating three PPV derivatives. Poly[2,5-(3-heptyloxy)propyl-1,4 phenylene vinylene] (PHOPPV), poly[2-methyl-5-(2-octyloxyethyl)-1,4-phenylene vinylene] (MOOPPV), and poly{2,5-bis[4’-(2’ethylhexyloxy)phenyl]-1,4-phenylenevinylene} (BEHOPPV) will be synthesized by Horner-Emmons polycondensation. PHOPPV has two alkoxy side chains with the placement of oxygen three carbons away from the ring. MOOPPV relocates the oxygen in PHOPPV to the gamma position of the benzene ring. While BEHOPPV changes the side chains to include an additional aromatic ring with a branched side chain. Intermediates will be characterized by gas chromatography-mass spectrometry (GC-MS), nuclear magnetic resonance (NMR) and infrared spectroscopies.

18. Hernandez, Ana; Do, Tony; Chandra,Richa, **Separation of Lipoproteins Using HPLC**, Richa Chandra, Chemistry and Physics.

Cardiovascular disease remains one of the leading causes of mortality and although in decline, it is necessary to further our knowledge of it for further prevention. The purpose of this research is to develop a method to analyze and isolate lipoproteins (HDL, LDL, VLDL, and chylomicrons) in human serum samples. We are modifying a published technique involving high performance liquid chromatograph (HPLC) and adapting the scale and detection method utilizing a fluorescent probe, NBD C-6 ceramide. Our method development shows promise in that serum albumin is detected through UV absorbance and fluorescence. The lipoproteins show affinity to the fluorescent probe, and we are currently focusing on modifications to our sample preparation and calibration of the technique.
utilizing lipoprotein standards. The research will further clarify our understanding of the
development of CVD and via bioanalytical methods provide potential clinical applications in
the diagnosis, treatment and prevention of CVD incidence.

19. Johnson, Tretitia; Flores, Elaine; Gueverara, Astrid; Heerensperger, Laura; Palasota, John A.,
Salicylic Acid Determination In Face Wash By HPLC, John A. Palasota, Chemistry and
Physics.

In this study, salicylic acid in Neutrogena's® Oil-Free Acne Wash is isolated and quantified
via reversed phase high performance liquid chromatography. The purpose of this
experiment is to determine whether the amount of salicylic acid present in over-the-counter
cosmetic products is safe and effective. The sample is prepared by solid phase extraction
using a C18 stationary phase. Calibrations, ranging from 0.30 to 1.5 mg/mL produced a
linear curve with a 0.9997 coefficient of correlation. Using these calibrations, the
concentration of salicylic acid is determined to be 0.77 mg/mL. This concentration
correlates to 1.71 % of salicylic acid recovered. From this, it is determined that the amount
of salicylic acid present in Neutrogena's® Oil-Free Acne Wash is indeed safe and effective
and regulatory standards imposed are being met.

20. Jurica, James; Samee, Hameed; Birgit, Mellis; Richa, Chandra, Remnant Lipoprotein Size
Distribution Profiling of Serum Samples of Varying Metabolic Disorders via, Richa
Chandra, Chemistry and Physics, Capstone.

Remnant lipoproteins (RLPs), which are involved with the transport of dietary fats in blood
circulation, are strongly correlated with cardiovascular disease (CVD). It is hypothesized
that the atherogenic nature of RLP can be attributed to its size, composition, and potentially
its retention in the arterial intima or faulty metabolism by the liver. For this reason I am
examining the RLP size distribution of prevalent metabolic disorders; namely
hypertriglyceridemia, diabetes mellitus, coronary artery disease and normolipidemic
controls. We report a robust method for sizing RLP, by performing a preparative
immunoseparation followed by a size distribution analysis using dynamic light scattering.
We postulate that this methodology will help to elucidate the metabolic connections
between RLP size and its atherogenic potential.

21. Loth, Matthew; Gibbons, Chad; Belaiter, Sami, Moments of Chaos, James Clarage, Chemistry
and Physics.

Our research reinforces that moments of inertia play a crucial role in both chaos and
stability theories for objects tossed into the air (books, bricks, laptops) or space (asteroids,
satellites). We mapped the instability of a rotating object (in our case a smartphone) about
each of its principle axes, using the inertial sensors built into the phone's onboard
orientation and navigational system. This research demanded the integration of several
branches of experimental and theoretical study, including Newton's and Euler's equations
for the dynamics of a rotating body with zero torque, statics, coupled systems of differential equations, computational methods, and chaos theory. Our comparison of experimental and calculated centripetal accelerations of the phone, under varying initial conditions, verifies the classically expected result that a rigid body (in this case an ordinary smartphone) can exhibit both stable and chaotic motions. Future research will model other effects such as aerodynamics.

22. Nguyen, Thy; Hollingsworth, Javoris; Mellis, Birgit, Enhancement of Monodispersity During the Synthesis of Gold Nanoparticles with Cyclodextrin Derivatives, Birgit Mellis, Chemistry and Physics, Capstone.

Gold nanoparticles exhibit many useful optical, electronic, and chemical properties that are important for potential applications in catalysis, sensing, and biomedicine. In this study we demonstrate the synthesis of gold nanoparticles using various derivatives of the biomolecule cyclodextrin, which acts as a reducing agent as well as a ligand. Also, due to their nontoxicity, these biomolecules are excellent ligands for biomedical applications as shown in previous studies, where cyclodextrins were used as a drug carrying agent. In our experiments, gold nanoparticles were synthesized with distinct cyclodextrins composed of 6, 7, and 8 glucose subunits (alpha, beta and gamma respectively). To determine the necessary circumstances for enhancing monodispersity of the gold nanoparticles, the synthesis was performed under various reaction conditions. The photophysical properties and size distribution of the prepared nanoparticles were characterized using ultraviolet-visible spectroscopy (UV-Vis) and dynamic light scattering (DLS). Stability measurements were also conducted as part of the study.

23. VanderWal, Arica; Urbaningsih, Mustika; Grisales, Sara; Steiger, Michelle; Mellis, Birgit, Photothermal Effects of Biotinylated Gold Nanoparticles on Cell Viability, Birgit Mellis, Michelle Steiger, Chemistry and Physics.

Over the past decades, gold nanoparticles (AuNPs) have emerged as promising agents for therapy. Due to the effect of surface plasma resonance, the AuNPs heat up the cells’ immediate surroundings if excited by light of a certain wavelength. We are investigating the effectiveness of this interaction in diminishing cell viability. In this study, we compare the effects of AuNPs with two different ligands, citrate and cyclodextrin on H1299 cell viability. The AuNPs are crosslinked to biotin and streptavidin for labeling. Following an analysis of the bioconjugated system with dynamic light scattering (DLS) and UV-Vis spectroscopy, the nanoparticle solution is applied to the cells and undergoes laser heat treatment of various time increments using a MGL III 532nm-300mW laser. After an incubation period the cell viability is analyzed quantitatively.
Mathematics

24. Maksymiak, Jenna; Pollack, Jared; Quinones, Erin, Teaching Math Online: Being Correct, Complete, and Effective, Mary Flagg, Mathematics.

For the past few decades, methods of academic learning have been drifting away from classrooms and textbooks, and advancing towards online education resources. Web instruction has made notable strides adapting to the new learning landscape, but it has yet to supplant traditional approaches to teaching. To maximize the effectiveness of web-based instruction, the instruction itself must be credible, and the website must adhere to sensible web-design principles. Mathematical content in particular demands a presentation marked by precision and fluidity. Using a customary topic in high school algebra – quadratic equations and the quadratic formula – our research examines the effectiveness of several popular online teaching tools in an effort to determine the most favorable instructional methods and pinpoint areas in need of refinement.

25. Cancelled

Political Science


Does public opinion really influence rationality towards the government and politicians? The political realm consists of a number of factors from ideology, to actual party affiliation, to voter turnout and approval, including numerous other variables. In addition, the objectivity and rationality of voting age adults in the general population of the United States can often be skewed by individuals’ age, gender, race, political affiliations, and beliefs on major social and economic concerns. How do the aforementioned factors affect approval of government and politicians? This study argues that public opinion along with an individual’s political involvement, background and affiliation can often be highly influential and tends to skew the rationality or objectivity of the voting age population regarding the government and politicians.

Psychology

27. Flores, Jallesse; Perez, Stephanie, Predictors of Relational Satisfaction, Carl W. Scott, Psychology, Capstone.

Previous research found that adult attachment style strongly predicted relational satisfaction. However, researchers have neglected other potential predictors like gender, ethnicity, sexual orientation, and age. We surveyed the attachment styles and relational satisfaction of adults and university students, and included additional demographic
predictors. We will compare two models for predicting relational satisfaction: type of adult attachment style or demographics. Potential uses of this research include the consideration of these predictors in relationship counseling to better understand and help improve relational satisfaction.

28. Garcia, Carlos; Mendez, Francisco, **College Students' Attitudes Toward Lesbian, Gay, and Bisexual Individuals**, Elizabeth Woods, Psychology, Capstone.

The current study examines college students’ attitudes toward lesbian, gay, and bisexual (LGB) individuals in a private educational institution. At least 50 participants will take a survey that includes demographic information and the Homosexuality Attitude Scale (HAS; Kite & Deaux, 1986). Results will be analyzed using a regression to determine which variables are most predictive of attitudes towards LGB individuals. With previous literature in mind, we predict that overall attitudes towards LGB individuals will be moderately negative. We hypothesize that age and religiosity will have a negative association with attitudes towards LGB individuals. Secondly, we hypothesize that gender, familiarity, and education will have a positive association with attitudes towards LGB individuals (Chonody et al., 2009; Hinrichs et al., 2002; Lambert et al., 2006). Findings will aid in understanding campus climate towards LGB individuals, which affects the ability of LGB students to reach their full potential (Gortmaker & Brown, 2006).


Acculturation describes the changes that a person experiences when migrating to a new culture. Many studies have examined the acculturation of the Hispanic community in the U.S. Few acculturation researchers have considered the influence of relative urbanization in assessing immigrants' adjustment, even though some researchers have identified the importance of urbanization. This study examines the relationship between urbanization and acculturation in Mexican immigrants. Immigrant adults will complete a survey in Spanish with multiple measures of acculturation and urbanization. If urbanization is an important predictor of acculturation, this study can help providers of immigrant support to improve their services.

30. Garcia, Cassandra; Aguilar, Jason, **Mexican Immigrants' Perspective on Current Political Debate Over Unauthorized Immigration**, Srijana Shrestha, Psychology, Capstone.

In the recent presidential race, immigration is on the forefront of political discourse and is a controversial topic. Mexican immigrants make up approximately 49% of undocumented immigrants in the U.S and 5.1% of the U.S. workforce (Pew Research, 2015). The purpose of our qualitative study was to examine Mexican immigrant’s perspectives on the current political debate on immigration, analyze their experiences and motives for migrating to the US and prejudices they may have experienced in the current political climate. Participants
were identified using snowballing and convenience sampling. Common themes identified in the narratives included challenges assimilating to U.S. culture, reasons for migration to the US, viewpoints of immigration reform, and political views concerning the current presidential race. The interviews showed that immigrants were hopeful about immigration reform, thought mass deportation was unfeasible, and had multiple suggestions for immigration reform.


The purpose of the current investigation was to examine body image dissatisfaction in females, allowing for categorization by race and ethnicity. The categorization included Hispanic and non-Hispanic. Participants were recruited from a small, private, Catholic, liberal arts university. The requirements for participation were participants must be females and enrolled as an undergraduate. Participants completed an online survey with the Body Shape Questionnaire (BSQ-34) (Copper, Taylor, Z. Copper & Fairburn, 1986) and demographic questions. The questionnaire measured body dissatisfaction by using a 6 point scale ranging from 1 (never) to 6 (always). Higher ratings in the BSQ-34 meant higher body dissatisfaction. The results of the study showed that there was no significance between ethnicity and body dissatisfaction, t(108)=-.22, p>.05. However, there was a significance between race and body dissatisfaction, t(74)=2.135, p=.036. The results of the study correlated with past literature; females who are non-white have a low body dissatisfaction.
Late adolescence and early adulthood is a crucial time for developing social relationships with the same and opposite sexes. Previous research has evaluated intimacy in friendships and found that females have a higher level of intimacy. However, it is unclear if intimacy in cross-sex friendships is interpreted differently by males and females. The present study considers multiple factors that could influence how people interpret the intimacy of their cross-sex friendships, including number of close friends, length of the friendship, and our main variable of interest, the sex of the participant. Students from the University of Saint Thomas between the ages of 18-25 completed an online survey with questions about themselves and their closest non-romantic cross-sex friendship. Statistical analyses will examine how the sex of the participant influences interpretations of intimacy. It is hypothesized that females’ interpretation of intimacy in cross-sex friendships will be greater than males'.

Recent studies show that self-compassion has been negatively associated with the social ranking variables of self-criticism, shame, and negative social comparisons, which allow individuals to experience greater life satisfaction and increased social connectedness. To date, no study has explored the relationship between assertiveness and self-compassion. The present study examined assertiveness in relation to self-compassion and variables of social rank mentality. 208 college undergraduates completed measures assessing assertiveness, self-compassion, external shame, social comparison, and self-criticism. The results show a close, negative relationship between respondents’ perceptions of inferior social rank and their levels of assertiveness and self-compassion, thus demonstrating that assertiveness favors self-compassion levels and is associated with a decrease in social rank mentality. Beyond demonstrating the association between assertiveness and self-compassion, these findings can facilitate the work of therapists and researchers as they specify classes of behaviors that influence low levels of self-compassion and maladaptive forms of social rank mentality.

Past research has shown that major life changes, such as moving to another country, can reduce well-being. This study explores how personality predicts acculturative stress. I expect that people with high agreeableness or openness to experience and low acculturative stress would have the highest life satisfaction. The study used multiple measures of acculturative stress, personality, and life satisfaction. International students at the University of St. Thomas participated using Survey Monkey. Demographics--nationality,
age, time spent in the US, and classification—provided a more complete description of the participants. This research seeks to ease the challenges of adjusting to a new country.


This study investigates the relationship between self-esteem and perceptions of stigma toward mental health services. Past studies have identified a relationship between two types of stigma: self-stigma and public stigma. However, the relationship between self-esteem and stigma has not been examined. Undergraduate students at UST will complete three scales: The Rosenberg Self-Esteem Scale (1965), The Self-Stigma of Seeking Help Scale (Vogel, 2006), and The Perceptions of Stigmatization by Others for Seeking Psychological Help Scale (Vogel, 2009). Regression analyses will determine the relative contribution of self-esteem, gender, political orientation, and ethnicity on self-stigma and public stigma. It is hypothesized that all independent variables will predict self-stigma and public stigma. The exploration of these variables is important as it could suggest ways to decrease stigma towards mental health services.


Previous research has examined the perceptions of public breastfeeding from men and women in the workplace, people who already have children, and mothers who use other feeding methods such as formula or pumped breastmilk. However, little is known about college students' perceptions of public breastfeeding. The present study aims to gain insight into how students at the University of St. Thomas perceive public breastfeeding, through means of an online survey (SurveyMonkey.com). Half way through the survey, an intervention will be administered in the form of a short video with an expert discussing the benefits of breastfeeding for both mother and child. It is hypothesized that students who are not familiar with the benefits of breastfeeding will initially see public breastfeeding in a negative way, but will change their perceptions post-intervention once they are more knowledgeable about the topic.


The present study examines (1) if previous history with infidelity influences perceptions of cheating behaviors, and (2) whether males and females rate cheating behaviors differently. A total of 83 undergraduate students enrolled in psychology courses volunteered to participate through an anonymous online survey. Overall, individuals rated sexual behaviors as the most indicative of cheating in comparison with emotional behaviors. Victims of infidelity rated sexual behaviors higher than those with no experience with infidelity. Male victims rated sexual behaviors as more indicative of cheating than female victims. Perpetrators of infidelity rated sexual behaviors higher than individuals that have not committed an infidelity. Males who have
not committed an infidelity rated sexual behaviors as less indicative of cheating than any other category. The results provide further evidence that perceptions of cheating behaviors are influenced by gender and one’s own history of infidelity, including both victim and perpetrator viewpoints.


Increasing evidence points to the importance of sleep quantity and quality. Sleep interventions with college students have decreased sleep disturbances and improved their emotional and physical health. Texas college students participated in a sleep intervention, responded to questionnaires related to mental health, and recorded aspects of their daily sleep. The intervention had students increase their sleep quantity by 30 min for one week and another 30 minutes the second week. Each student followed a specific sleep intervention for both weeks, such as avoiding blue screens 30 minutes before bed. Measures tracked changes in sleep quantity and quality, willpower, anxiety, and aggression over three weeks. Effective and low-cost sleep interventions like this can be implemented widely.


We investigated the prominence of indirect aggression in young adult women and ascertained whether behavioral and emotional patterns known in adolescence also persist into adulthood. This research addressed a gap in past literature by focusing upon college-aged females. Undergraduate and graduate female students at a small liberal arts university completed surveys that examined relations among indirect aggression (both target and aggressor), life satisfaction, and academic standing. We expect positive relations among life satisfaction, academic standing, and acting aggressively. We expect a negative relation among life satisfaction, academic standing, and aggression targets. We predict that targets of aggression will have higher levels of aggression towards others. Our findings will contribute valuable knowledge to universities on the relationship between aggression and student success. These results are beneficial to Counseling and Disability Services when assisting students with their overall well-being.


Person perception is influenced by characteristics of the target and characteristics unique to the perceiver. Self-monitoring is related to person perception (Ambady, Hallahan, & Rosenthal, 1995; Snyder, 1974; Snyder, 1987) because high self-monitors may be more skilled at interpreting social situations and judgment of others. High self-monitors tend to value social acceptance more than low self-monitors, (Day, Schleicher, Unckless, & Hiller,
2002) this influence may impact their judgments of others. This research examined the role of an applicant's attire and the employer's level of self-monitoring on the perception of the job applicant. The current investigation tries to determine the influence of both independent variables in terms of how fictitious job applicants are rated on a variety of characteristics. The results suggest that both attire and self-monitoring are statistically significant influences on the perception of job applicants. While both independent variables are significant alone, they both interact to be statistically significant.

41. Sanchez, Veronica; Velasquez, Cassandra, **Dating Experiences and Technology Use Among College Students**, Srijana Shrestha, Psychology, Capstone.

The purpose of the current study is to understand how college students navigate the dating process and use technology in the dating process. Data was collected by conducting open-ended, face-to-face interviews with five participants. Participants consisted of male and female undergraduate students between the ages 18-25, recruited through convenience sampling. The interviews lasted between 30-60 minutes. The responses were transcribed and analyzed to identify common themes. Past and present experiences about dating were examined, as well as technology use and developments throughout participant’s dating experiences. Results showed technology use for communication was common. Common themes across interviews included the role of outside influences (parents and friends) on a potential long-term dating partner, common characteristics of a bad date, the importance of chemistry, positive and negative aspects of social media, gender differences in how men and women planned for dates and the importance of safety concerns for women participants.

42. Tlapanco, Carina; Razuri, Carlos, **College Experiences of First-Generation College Students**, Srijana Shrestha, Psychology. Capstone.

The current qualitative study explored the experiences of first-generation college students (FGS) at a private liberal-arts university. According to Museus (2011), FGS tend to be racial/ethnic minorities with unique needs. Qualitative studies have found that FGS are in need of support (Wang, 2014), lack enough resources to overcome challenges (Tate, 2015), and experience conflict when they are required to decide between school and family (Lowery-Hart & Pacheco, 2011). The increasing number of FGS in higher education makes new research in this group more pressing. By using face-to-face interviews, we aimed to examine the successes and challenges encountered by FGS. Participants were recruited through snowball and convenience sampling. The interviews were audio-recorded, transcribed, and analyzed for emerging themes. Analyses highlighted the following themes: challenges faced in the first year, lack of navigation skills, importance of having a support system, being able to offer a unique perspective, and valuing leadership.
Recently, the Texas Legislature passed the Campus Carry S.B. 11 bill, which covers the topic of the carrying of concealed handguns on the campuses of, and certain locations associated with, institutions of higher education. The purpose of this investigation was to examine private university students’ attitudes towards gun safety, gun laws, and the possibility of private civilians carrying concealed guns on campus. Several factors reliably predict attitudes towards guns and measures to control guns, including political affiliation, geographic location, and gun ownership. Bennet, Kraft, & Grubb (2012) found that a majority of university faculty from Georgia that were surveyed opposed legislations regarding the expansion of locations where concealed handguns may be carried, which included college campuses and churches. However, the researchers also found that support or opposition was significantly determined by political party and gun ownership. Cooke (2004) surveyed young people from the United States, Great Britain, and Western Australia, and she found that American respondents favored gun possession the most. Data were collected during the fall of 2015 when a state-wide mandate to allow open carry on college campuses was being implemented. Participants included 138 undergraduate students. They completed an online survey measuring their political attitudes, with political views measured on a scale from 1 (very conservative) to 5 (very liberal). In addition, the Attitude Toward Guns scale (ATGS, Branscombe et al. 1991; Cooke and Puddifoot, 2000) was used, which measures the extent to which participants feel that guns are necessary to protect oneself and property, gun rights are tied to constitutional rights, and that guns contribute to crimes. Higher scores indicated a lower endorsement of gun rights. Participants also indicated their support of the Campus Carry S.B. 11 bill, which allows the carrying of concealed handguns on the campuses of, and certain other locations associated with, institutions of higher education. Participants indicated on a 5-point scale the extent to which they supported the measure, with higher scores indicating less support (1 – strongly agree with bill, 5 – strongly disagree with bill). A series of correlations were conducted to determine whether attitudes toward control control were related to gender or political affiliation. There was a negative correlation between gender and gun rights, in that males were more likely to endo.

In the digital age, information travels faster than ever before, and we use this information to make decisions about the world around us. Our study evaluates how some information affects behavior. Participants learned of our study through Facebook, and self-selected to participate in an online survey. Through a randomized pretest-posttest design, we gathered two different types of behavioral data. Our results may allow behavioral researchers and healthcare professionals to help people perform more effectively in social situations.
Undergraduate Research at UST
Statement from the 2014 – 2016 Undergraduate Catalog

Engaging in research projects with faculty members provides students with special learning opportunities that deepen their knowledge of a subject. Students develop analytical and writing skills and emerge from the experience as critical thinkers and confident speakers. Undergraduate research is an increasingly important component of students’ educational experience across the curriculum. Most major programs and the Honors Program offer a capstone experience consisting of creative scholarship in the student’s major, guided by a faculty advisor. Annually, during the spring semester, the Committee on Student Research sponsors the University of St. Thomas Research Symposium. Students, both graduate and undergraduate, present the results of their research at this event. Students may also present their research at local, regional, national, and international conferences, and some students publish their findings in peer-reviewed publications.

Most students call their undergraduate research project the highlight of their university experience. The University provides financial assistance to students conducting research through the Committee on Student Research. In addition, the University of St. Thomas is a member of the Council of Undergraduate Research, a national organization that promotes student research across the curriculum as an integral part of the academic experience. Students should consult their academic advisor and/or the chair of the department in which they are interested, or contact the chair of the Committee on Student Research.

The Committee on Student Research organized this 22nd annual symposium to showcase scholarship at the University of St. Thomas. The members for the 2014 – 2015 Committee were:

Maury Harris (Committee Chair, Orals Chair)
Shuoyang Zhang (Research and Travel Subcommittee Chair)
Livia Bornigia (Poster Co-Chair)
Jo Meier---Marquis (Poster Co-Chair)
Bergit Mellis
Janice Taylor
Pamela Hodges
Tim Carrizal
Tom Harmon
Yiying Cheng

The Committee on Student Research thanks members of the staff of Public Affairs, Institutional Advancement, the General Office, Facilities Operations, Media Services and Publications for their assistance in planning and preparing for this event.

Program cover photography taken by Brenda Cooper, program designed and produced by Maury Harris

And, as it should be, we thank the students for their hard work conducting their research projects and their professors for their guidance throughout the process.