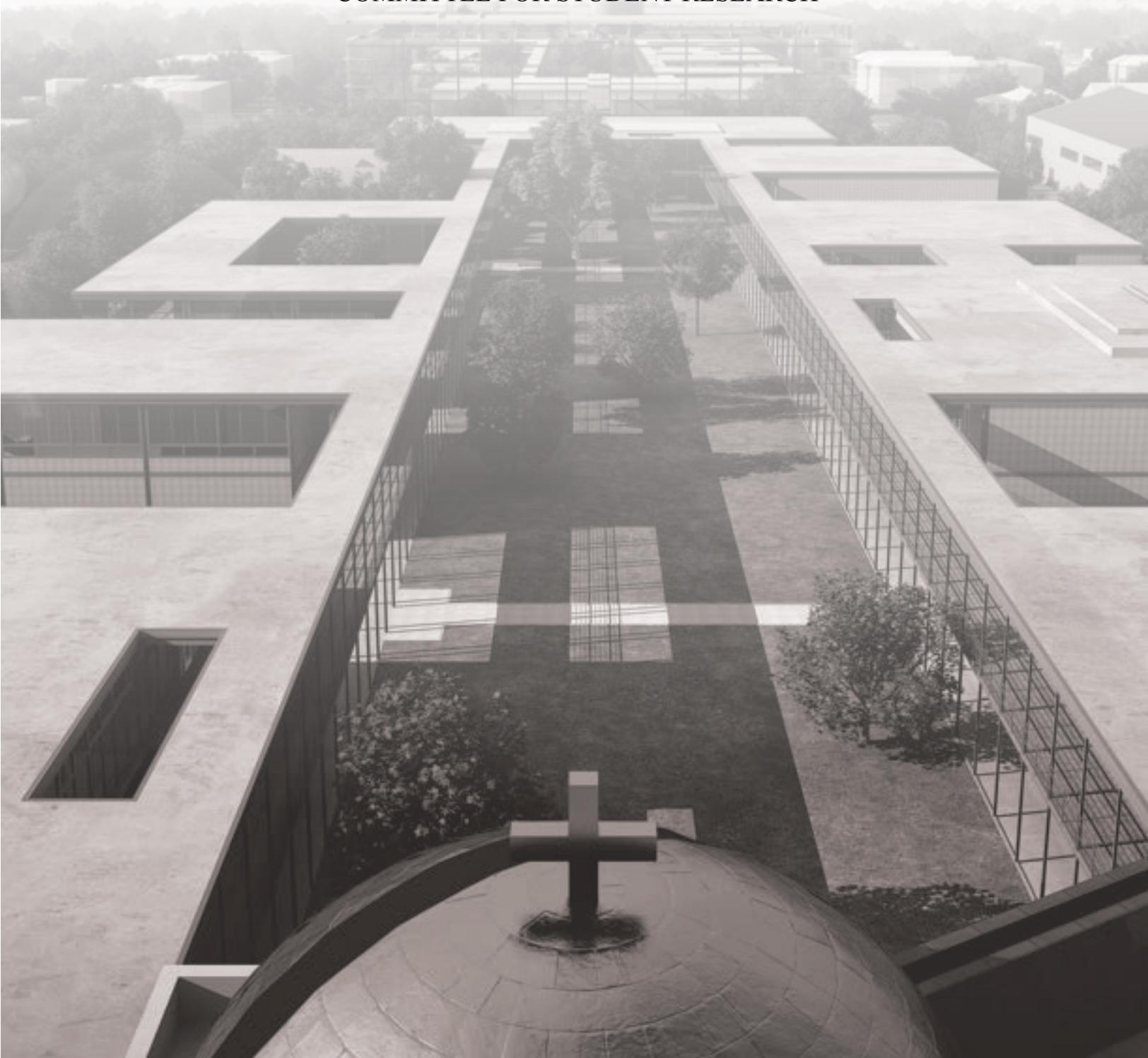


# 2022 Research Symposium Book of Abstracts

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COMMITTEE FOR STUDENT RESEARCH



## **Committee for Student Research (CSR)**

Undergraduate and graduate students at UST have the opportunity to collaborate with faculty on original work. Student-faculty work embodies our mission to pursue academic excellence, the thrill of discovery, and the creation of an authentic learning community. The Committee on Student Research strives to ensure faculty-mentored student projects remain a key ingredient of the UST experience.

We fund students to conduct research and present at local and national conferences. Each year hundreds of UST students in the sciences and humanities share their discoveries and creations at the UST Research Symposium. At these symposia and conferences, students advance their research, hone communication skills, and gain valuable professional development and networking opportunities.

As students engage in UST programs, they learn the essential elements of scholarship and inquiry. Through a mentoring relationship, students progress to become contributors of knowledge in their fields of study with opportunities to publish in noteworthy publications. Each faculty-student relationship is a collaborative endeavor towards discovery and mastery. We invite students to apply for funding and encourage faculty and staff to become a part of this unique and impactful experience.

## Summary: 2021-2022 Committee for Student Research

At the UST Research Symposium on April 28, 2022, President Dr. Richard Ludwick welcomed the keynote speaker, Dr. Peter Hotez, Dean of the School of National Tropical Medicine at Baylor College of Medicine, and co-developer of the global COVID-19 vaccine. Dr. Hotez is a nominee for this year's Nobel Peace Prize. He delivered a keynote speech entitled "COVID-19 Vaccines: Science vs. Anti-science. Later that day, 43 in-person student posters were presented at the Academic Mall to crowded and excited audiences. After a long hide-out due to the pandemic, the symposium received 110 research submissions this year for in-person oral and poster presentations spanning 13 departments where 26 faculty members highlighted their engagement in student research. The two-day symposium (April 28-29, 2022) was a tremendous success by drawing great momentum among all students, particularly the seniors, faculty members, and staff with huge attendance. Five winners were judged for the best poster and oral presentations including runners-up.

In addition to the research symposium, the Committee for Student Research invited proposals for funding for student research and travel for the Fall and Spring semesters. A total of 21 proposals were funded across 9 departments supporting 86 students. I hope, in the future, we can build a center for student research where students can meet, network, and exchange ideas for collaborative research for an all-around education experience at the University of St. Thomas for its greater reputation as a leading educational institution.

### **Arati Nanda Pati, PhD**

Chair of the Committee for Student Research

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## Winners for 2022 Annual Research Symposium

### **Poster Presentations:**

Best: Chau Nguyen and Lesley Ojeda – Chemistry

Runner-up: Christopher Alducin – Engineering

### **Oral Presentations:**

Best: Christopher Ian Lama - Mathematics & Computer Science

Runner-up: Fernando Quintero - Computer Science

## 2021-2022 Committee for Student Research Members

### **Dr. Arati Pati (Chair)**

Dr. Matthew Zelisko (Vice-chair)

Dr. Yao-Yuan Yeh

Dr. Michael Boler

Dr. Yiying Cheng

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## About Keynote Speaker

### BIO

Peter Hotez MD PhD DSc (hon) FAAP FASTMH is professor of pediatrics and molecular virology at Baylor College of Medicine, where he is also co-director of the Texas Children's Center for Vaccine Development and Endowed Chair in Tropical Pediatrics. He is a vaccine scientist who led the development of vaccines to prevent and treat neglected tropical diseases and Coronavirus infections. Together with Dr. Maria Elena Bottazzi and a team of scientists, a new Texas Children's CVD COVID19 vaccine has been scaled for industrial production at Biological E (BioE) in Hyderabad, India for pending emergency use listing. Prof. Hotez obtained his undergraduate degree from Yale University and his MD and PhD from Weil Cornell Medical College and Rockefeller University. He is the author of more than 600 scientific articles indexed on PubMed, and 4 single author books. He is an elected member of the National Academy of Medicine and American Academy of Arts & Sciences, and he has been honored by PAHO/WHO, Research America, B'nai Brith, American Society of Tropical Medicine & Hygiene (ASTMH) and other organizations. He is past president of ASTMH and appears frequently on major news outlets (CNN, MSNBC, BBC, NPR) promoting global health, and vaccines and immunizations, countering antivaccine and Antiscience movements.

### More information

[www.peterhotez.org](http://www.peterhotez.org)

## Keynote Speaker



**Dr. Peter Jay Hotez, M. D., Ph.D.**  
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Virology & Microbiology  
Texas Children's Hospital Chair in  
Tropical Pediatrics  
Dean, National School of  
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Baylor College of Medicine

### Title

COVID-19 Vaccines: Science vs Antiscience

### Abstract

The COVID-19 pandemic has exposed a vast global equity gap that failed the low- and middle-income countries in Africa, Asia, and Latin America. Using an approach for low cost global health vaccines Dr. Hotez began as an MD PhD student at Rockefeller University in the 1980s, he will discuss how this applies to a low cost and widely accessible COVID-19 vaccine now released for emergency use authorization in India for children and adult 12 and up. In parallel, he will discuss his efforts to combat rising antivaccine sentiments across the US and globally and how this transformed into a globalized antiscience empire now leading to the deaths of thousands. Together efforts to promote global vaccine equity while countering antiscience aggression reflects his shared commitment to science for the benefit of humanity.

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# SECTION 1

## Biology

### **Toluene Exposure Causes Changes In Egg Production And Offspring Development In The Fruit Fly, *Drosophila Melanogaster***

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#### **Abstract**

Toluene is an aromatic hydrocarbon found in many common household items such as paint thinners and glues. Although it is not carcinogenic, long-term exposure can lead to negative effects on organ functions, fetal development, and changes in hormone levels. Humans and *D. melanogaster* have similar genetic and molecular properties, particularly in their nervous and reproductive systems. As such, we inferred that the effects of toluene exposure in *D. melanogaster* can be correlated with human systems. In previous studies, we calculated the LE50 (50% of the population killed in 24 hours) to be 1000 - 1200 ppm. We hypothesized that the fecundity of the females mated with males exposed to toluene will be reduced and that larval developmental times will be increased.

Male adult flies were exposed to female LE50 concentrations for 24 hours, then mated with unexposed females. Progeny were counted at the egg, larval, and pupal stages. The results of the male exposure were similar to those for female exposure, in that as toluene exposure increased, observed fecundity and offspring survivability decreased. Our data indicates that toluene causes changes in reproductive capacity and, regardless of parental exposure, there were detrimental effects on offspring development. In the future, we will examine the development of F2 generation without further exposure to toluene, to determine a correlation between toluene

exposure and long term development. Also, future experiments will focus on the cellular and genetic mechanisms of action by which development is disrupted in the offspring of exposed adults.

## Characterizing The Cytotoxicity Of A Methionine Aminopeptidase Inhibitor On Cancerous And Non-Cancerous Mammalian Cells

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### Abstract

Tuberculosis (TB), a disease that primarily affects the lungs, is caused by the bacterium *Mycobacterium tuberculosis* (Mtb). An increase in multi-drug resistant (MDR) strains of TB necessitates development of novel therapies. Our collaborators at Texas Southern University identified novel bacterial methionine aminopeptidase (MtMetAP1) inhibitors, resulting in decreased viability of Mtb. Studies support the existence of an ortholog of MtMetAP1 in *Homo sapiens*; the cytotoxicity of MetAP1 inhibitors in mammalian cells remains undetermined. We hypothesize that the novel MtMetAP1 inhibitor, UST-001, will cause low levels of cytotoxicity in cancerous and primary lung cell lines. Cytotoxicity of varying concentrations of UST-001 was tested in H1299 human lung carcinoma cells. Cell viability was measured using flow cytometry via MUSE Cell Count and Viability Kit and Trypan Blue Assays. H1299 cell viability was over 60% at 750µM UST-001, the highest concentration

tested. Data indicates that concentrations of UST-001 below 100µM induced little cell death, which may be attributed to the cancerous cell line's higher mitotic rates and increased DNA repair pathways. We are currently testing cytotoxicity of UST-001 on Mlg-2908, a non-cancerous murine lung fibroblast cell line. We hypothesize that Mlg-2908 cells, having fewer repair pathways and a decreased mitotic rate compared to cancer cells, will be more susceptible to UST-001. We have begun testing a positive control, Primisterin, to confirm that cell lines exposed to UST-001 will have minimal viability. Our ultimate goal is characterizing toxicity of UST-001 in mammalian systems, with hopes of identifying a new class of therapeutics for TB infections.

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## Thermal Stress And Antioxidant Activity In Sea Anemones, *Exaiptasia Pallida*

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### Abstract

Symbiotic relationships between marine invertebrates and unicellular algae provides the foundation of the coral reef ecosystem that supports about a fourth of all marine life. The disruption of this relationship results in the phenomenon known as coral "bleaching". The sea anemone, *Exaiptasia pallida*, expels algal symbionts during bleaching, enabling it to serve as a model organism of coral. Stress factors can

increase free radical production, like reactive oxygen species (ROS), which may give rise to bleaching events. Oxygen-free radicals are closely managed through endogenous systems, like antioxidants such as superoxide dismutase (SOD). A major contributor to coral bleaching and mass bleaching events is the ongoing ocean warming along with other biotic factors that have compromised the homeostasis of many reefs. We hypothesized that as temperatures increase, the levels of SOD activity in the sea anemone will increase over time. Once *E. pallida* acclimated in the stock tanks, they were placed into one of three identical tanks, maintained at temperatures of 22° (control), 24°, and 29°. We sampled 5 anemones from each tank at two-week intervals for 8 weeks and conducted protein analyses and enzyme kinetics assays for SOD. *E. pallida* reared at temperatures of 24° and 29° showed an increase in SOD activity from week 6 to week 8 compared to the control tank at 22°. Our data showed that elevated water temperatures caused a stress response that increased metabolic activity quantified by an increase in antioxidant activity in the sea anemone. Additional replicates of the experiment are in progress.

## Applying Oxford Nanopore Sequencing Technologies To Identify Sars-Cov-2 Variants Of Concern In Belize

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### Abstract

Belize has a high volume of undiagnosed febrile illness cases due to lack of

diagnostic testing capacity. In January 2020, the team at the National School of Tropical Medicine began a surveillance study on Acute Febrile Illness (AFI) in Belize in partnership with the Centers for Disease Control and Prevention (CDC) and the Belize Ministry of Health and Wellness (MOHW) to collect data on acute febrile illnesses. Study participants are enrolled at 11 MOHW healthcare facilities throughout all six districts of Belize. Patients enrolled in the study provide a blood sample, serum sample, and a nasopharyngeal (NP) swab sample, and/or a stool sample, symptom dependent. All sample types were collected for pathogen specific testing, including a vector-borne panel on PCR, a respiratory panel, and a gastrointestinal panel for testing on a BioFire FilmArray Torch machine. With the onset of the COVID-19 pandemic, and the frequency of new variant discovery, NP swab media were also extracted for COVID-19 sequencing. Samples with a CT value of less than 25 on qPCR were considered positive matches and could be used for further downstream sequencing to determine the COVID-19 variants circulating in Belize. In 2022 to date, 3619 patients were identified with AFI. Of the 3619 patients, 741 had a SARS-CoV-2 PCR test or BioFire test done at Central Medical Laboratory in Belize and had a positive SARS-CoV-2 result. We extracted NP swabs and tested them on qPCR for SARS-CoV-2 on the E-Sarbeco gene. We only used samples that had a CT value of less than 25, indicating we could sequence them using our revised NEBNext ARTIC SARS-CoV-2 Companion Kit Protocol for Oxford Nanopore Technologies. Of the various COVID-19 variants circulating in the world, preliminary results indicated we found the parent strain, Epsilon, Alpha, Delta, and 16 from other subclades. As the Covid-19 pandemic continues to evolve, the frequency and accuracy of testing must escalate to combat the increase in variants.

## Detection And Analysis Of The Ku70-Bhrf1 Protein-Protein Interaction

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### Abstract

The Epstein-Barr virus is highly prevalent and affects 90% of the human population. Typically, those infected with the virus are asymptomatic or present with infectious mononucleosis. However, a persistent infection has the capability to increase a person's risk of developing cancer, particularly nasopharyngeal carcinoma and Burkitt's lymphoma. While host cells try to defeat the infection by activating apoptosis, the virus counteracts their action by employing BHRF1, an anti-apoptotic protein. BHRF1 shares BH domains with BCL2 and BAX, while BCL2 and BAX both interact with Ku70 at the nucleus and cytoplasm, respectively. A previous study identified lysines 539 and 542, located on the C terminus of Ku70, as critical regulators of BAX-Mediated Apoptosis. Furthermore, creating mutations that mimicked acetylation showed to disrupt the binding between BAX and Ku70. Since Ku70 interactions with apoptotic proteins are influenced by acetylation, we also hypothesize that the same may be true for the Ku70-BHRF1 protein-protein interaction. A mutagenesis study was conducted to test possible interacting sites in the interaction and determine how Ku70 acetylation may influence their binding. Bimolecular fluorescence complementation was used to validate the protein-protein interaction. Based on our results, the fluorescence emitted by the K539X, K539Q, and K542Q mutations were statistically, significantly higher than the BHRF1-Ku70 construct. We plan to investigate how acetylation influences the binding of Ku to other proteins involved in DNA repair (XLF and XRCC4) and telomeres (TRF1 and TRF2). Insights into BHRF1-Ku70 interactions may provide therapeutic avenues to

prevent Epstein-Barr related malignancies.

## Metagenomics Analysis Of Viral Families Carried By *Aedes* Mosquitos In Houston

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### Abstract

Mosquitos are important known vectors of important viral diseases, including Zika, West Nile and Yellow Fever among many others. Although their role in transmitting these diseases is well established, little is known about the true diversity of viruses that are carried by these insect vectors. Traditional methods for culturing and identification have been employed to answer this question, but these can be cumbersome and inefficient. Our research employs the use of metagenomic analysis, which analyzes the complete nucleic acid content present in a sample, to characterize all viruses carried by mosquitos in the Houston area. To build our library of viral sequences, we used DNA and RNA extraction techniques to sequence mosquito samples. We developed a computational workflow to analyze all sequence data and identify viral sequences present. Our first successful experiment included data from female and male *Aedes aegypti* mosquitos. We were able to build a small initial library of viral sequences along with unknown sequences. A total of 51 unique viruses for females and 40 for males were obtained. Our results demonstrate that this approach is effective for detecting viruses from environmental samples.

# Pro-Inflammatory Cytokine Regulation Via Adrenergic Catecholamines In Melanoma Growth And Metastasis

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## Abstract

There have been an increasing by number of studies that demonstrate stress's prominent role in cancer growth and metastasis at a molecular level. When stress activates the sympathetic nervous system, it induces the secretion of catecholamines, such as norepinephrine (NE), in the tumor microenvironment (TME), resulting in the stimulation of tumor associated macrophages (TAMs) and secretion of pro-inflammatory cytokines that aid tumor growth and increases metastasis. To study this mechanism in melanoma, a co-culture system of melanoma cells and macrophages was exposed to NE in a cytokine array blot assay. In response to NE exposure, several cytokines known to contribute to human melanoma tumor growth were found to be regulated including, angiopoietin-2, GRO- $\alpha$ , IL-11, and MIF. To quantify these cytokines and validate our results, ELISA assays were performed MIF. There is a significant increase of MIF concentration in the melanoma/macrophage co-culture exposed to NE as compared to the co-culture without NE exposure ( $P < .001$ ). These results are consistent with our blot assays that stress (NE) in the TME increases MIF and possibly other pro-growth cytokines. We continue to see evidence demonstrating at a molecular level how stress is implicated as having a major role in tumor development.

# SECTION 2

# Chemistry

## Study And Synthesis Of Gold Nanoparticles And Nanorods For Photothermal Therapy

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### Abstract

In recent years, photothermal therapy (PTT) has been investigated for the treatment of various cancers. Gold nanoparticles (AuNPs) play an important role in PTT due to their biocompatibility and ability to absorb visible light radiation, thus making them an appropriate photothermal agent. In addition to nanoparticles, gold nanorods (AuNRs) were synthesized, since they show similar properties and absorb light in the near-infrared region (NIR). The AuNPs and AuNRs were synthesized under different reaction conditions, using the Turkevich method. Their size, morphology, and size distributions were characterized via dynamic light scattering (DLS), ultraviolet-visible (UV-Vis) spectroscopy, and transmission electron microscopy (TEM). AuNPs and AuNRs were both irradiated with a 532 nm green laser and an 808 nm NIR laser to test their change in temperature as a photothermal agent.

## Serum Lipoprotein Profiling Via Density Gradient Ultracentrifugal Separation

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### Abstract

Accurately and precisely measuring and quantifying lipoprotein subclasses is necessary for the early detection of the beginning stage of cardiovascular disease (CVD). Clinical methods incorporate labor and time intensive immunochromatographic techniques to quantify lipoprotein subclasses, and several methods use a derivative calculation to estimate lipoprotein fractions indirectly. During recent years, many methods incorporating different analytical methods have been used for screening CVD by characterizing the populations of lipoprotein subclasses but have shown difficulties in achieving the precision required for distinguishing individuals with and without CVD. Our methodology will allow us to individually separate the lipoprotein fractions by density and preparative isolate them for further characterizations through size measurements in dynamic light scattering and chromatographic techniques. There are a multitude of applications downstream that can be utilized once the individual classes are separated by density. This technique is efficient, reproducible, facile, and rapid. Therefore, there is still a need to develop a high precision method for profiling a patient's serum that can be applied to clinical studies. In this research, density gradient ultra-centrifugation is used and the major factors that influence the precision of measurement of the lipoprotein density profile are identified and improved hence allowing high precision and reducing errors in the lipoprotein density profiles. During this research, a variety

of experiments were performed on the factors involved in the ultracentrifugation phase and the fluorescent labeling and imaging phase to optimize the resolution and precision of the measurements by enhancement of these factors, resulting in high precision density lipoprotein profiles. Using this method, patients at risk of cardiovascular disease will be more accurately classified, thereby, allowing early detection and better prevention of CVD.

## Study And Synthesis Of Gold Nanoparticles For Photothermal Therapy

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### Abstract

Gold nanoparticles (AuNPs) have become versatile in a variety of fields due to their unique physical properties. One application being their use as a photothermal agent in Photothermal Therapy (PTT) since AuNPs are biocompatible and are able to target specific cancerous sites. In this study, AuNPs were synthesized using a modified Turkevich method, from the work of El-Sayed, to produce spherical AuNPs with a diameter ranging from 40-60 nm. Three different reducing agents were used to synthesize AuNPs and were later compared and characterized through the use of Dynamic Light Scattering (DLS), Ultraviolet-Visible spectroscopy (UV-Vis), Transmission Electron Microscopy (TEM). The AuNPs were synthesized with HPLC water with a pH lower than 7 with several modifications of the Turkevich Method and some samples proved to be successful.

## Synthesis And Characterization Of Gold Nanorods For Photothermal Therapy

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### Abstract

The physical properties of gold nanorods (AuNRs) have an extensive range of biomedical applications, one of interest is AuNR as a photothermal contrast agent in plasmonic photothermal therapy (PPTT). PPTT is a form of cancer treatment which uses photon energy to release heat on the membrane of cancerous cells. This is possible due to the ability of AuNRs to absorb laser light from visible and near-infrared regions. The AuNRs were synthesized with a seed-mediated method based on the procedure developed by Sau and Murphy, with some alterations. In this study, we aim to compare the resulting gold nanorods and characterize their surface plasmon resonance peak, size, and size distribution using ultraviolet-visible spectroscopy (UV-Vis), dynamic light scattering (DLS), and transmission electron microscopy (TEM).

## Oxidation Effects On Lipoproteins Measured By Dynamic Light Scattering

**Gustavo Agreda**

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### Abstract

Cardiovascular disease remains the leading cause of mortality in the United States. High concentrations of low-density lipoproteins have been linked to a higher risk of cardiovascular disease. Medical research characterizes the buildup of oxidized low-density lipoprotein as a leading cause of plaque formation also known as Atherosclerosis. Our research involves oxidation of lipoprotein subunits known as high-density Lipoprotein (HDL), very low-density lipoprotein (VLDL), and low-density lipoprotein (LDL) under two oxidative mechanisms: peroxidation by NO<sub>3</sub>- free radical and peroxidation by H<sub>2</sub>O<sub>2</sub>. A comparison between oxidized lipoproteins and unoxidized lipoproteins is done to observe any differences between the counterparts. We investigate these differences through dynamic light scattering (DLS). We report size distributions to examine conformational changes between oxidized and unoxidized lipoproteins. Dynamic light Scattering allows for a robust way to observe potential links between ROS and particle size through oxidation properties of a lipoprotein. The changes in particle size may establish a tool to connect lipoprotein oxidation to increased cardiovascular disease as we hypothesize that these structural changes that occur under our oxidation mechanisms may also occur in vivo.

## Construction Of Protein And Substrate Variants For tRNA Splicing Endonuclease

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### Abstract

Pontocerebellar hypoplasia (PCH) is a group of rare neurodegenerative disorders that affect the development of the pons and cerebellum, forms of this disorder are linked to mutations in human tRNA splicing endonuclease (TSEN). TSEN catalyzes the splicing of introns in tRNA and acts as an endonuclease for a subset of mRNA transcripts. Both yeast and human TSEN proteins are a tetramer composed of two catalytic subunits, SEN2 and SEN34, as well as two structural subunits, SEN15 and SEN54. We are making specific mutations in the yeast TSEN to assess the effects of these mutations on the catalytic activity and functions of TSEN. Mutations will also be made in tRNA substrates to study the factors that influence the enzyme kinetics of TSEN since initial enzyme kinetics results indicate differences between tRNA substrates. By creating mutations in both the yeast TSEN subunits and tRNA substrates, our research aims to further insight into the function of TSEN by fully defining its substrate preferences with the ultimate goal of understanding the role of TSEN in patients with PCH.

## Anion-Exchange HPLC Of Lipoproteins

### Cameron Cardozo

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### Abstract

Lipoprotein metabolism disorders are key catalysts to the appearance of CVD (cardiovascular disease), the leading cause of death in America. In response to this, there is considerable interest in the discovery of new methods that can analyze lipoprotein complexes to prevent CVD. We are using anion-exchange High Performance Liquid Chromatography (AEX-HPLC) developed by Yuji Hirowatari in 2003 to analyze lipoproteins (HDL, LDL, VLDL, and chylomicrons). Hirowatari continues to expand upon this technology however, no other research has proposed any modification to further improve AEX-HPLC. Our novel approach uses a lipid-specific fluorescent probe, NBD C6-ceramide, in conjunction with AEX-HPLC to further elucidate the human serum profile with methodology that is facile and efficient. We perform various experiments to sufficiently support our methodology's value for further HPLC-based lipoprotein profiling. We achieve this by generating a highly selective and sensitive fluorescent serum separation that is potentially quantitative. We expect this fluorescent anion-exchange methodology to contribute to the diagnosis, treatment, and prevention of CVD.

# SECTION 3

## Computer Science

## Stark: A Lightweight Point-Of-Sale System

### Kevin Diaz

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### Abstract

Point-of-sale (POS) systems are software for registering sales transactions, this is typically done in retail companies, for instance, a supermarket at check-out. Additionally, they also keep inventory information. One drawback with POS for small business, is their price. The goal of this project is to design, implement and deploy an economical and lightweight POS for a real small business, specifically, a cell phone repair shop. I will adopt software engineering concepts and practices throughout the lifecycle of the project. Some of the functionality includes, managing inventory of parts for repairs, as well as cellphones, overall tracking of cellphone services such as plan payments, and international recharges transactions. In addition, it will register information such as, personnel working hours, repairs, sales, and phone-plan/service payments, activations for new users, and international recharges. The initial version of Stark will be a standalone front-end application, with connection to a stand-alone database system for storing data and information. A future version will allow connectivity to a cloud-base store system such as AWS for managing and storing data. Stark also entails importing existing inventory, sales and personnel information. An additional feature of Stark is the possibility of analyzing the transactional data for better understanding clients buying and usage patterns as well as inventory flows, so that in the future, the system can be used for marketing, promotional, and productivity purposes.

## Implementing A Platformer Game

### Fernando Quintero

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### Abstract

Gaming is a growing industry in all society. This project aims at developing a platformer style game, similar to the popular classic 2D platformers of the early 90's. Among the features, it will include physics-based movements, multiple levels along with multiple goals on each one. Players will control the characters to move in a 2D space in x-y directions. The stages will allow the player to develop skills relevant to a platformer style game. Playing difficulty will increase as the player progresses. In addition, collectible items will be used to unlock special areas or events and a health system will be used to determine restarting a level if a certain threshold has been reached. I will be investigating core computer science concepts that make gaming possible such as memory allocation, multi-threading programming, and object-oriented programming in C#, specifically using the Unity game design engine.

## Pathforward: Exploring Object-Oriented Programming And Multi-Threading Through Game Design

### Carter Taniguchi

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### Abstract

PathFoward is intended to be a top-down, two-dimensional action game. The task will be to go to make it to the end of the level, fighting enemies along the way to do so. The player will only be given a melee attack to use against these enemies. The player will also only have six health points. Some enemies will do more damage when they hit so the effective amount may be lower depending on what they are fighting. There will be a scoring system for each enemy the player defeats and whether they make it to the end. The game is intended to be difficult to complete but possible. The player will control one character when moving between locations. An important goal of this project is to investigate object-oriented programming concepts and the way in which the operating system handles multiple threads for enabling a smooth game experience.

## Image Inventory Detector And Analyzer

### Carlos Alonso

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### Abstract

In logistics warehouses, managing and organizing objects is essential to identifying objects and finding their physical location. In a facility with large number of stored items and constant inventory movement (i.e. items are removed and new ones added), the possibility of misplacing objects is high. Some of the main effects of this problem are: a) time waste trying to find items, and b) monetary cost, when items are not placed in their expected location, and c) mixing small and big items. This project seeks to create an image recognition system, that will identify the approximate size of the items and request a set of boxes that maximizes the space they require, leading to more efficient inventory management and better packaging usage. The main technologies to be use are DeepLens, an Amazon AWS image and video recognition tool along with Raspberry Pi, which is small computing device for making the application more mobile. Among the research areas in this project are: machine learning for image recognition and Internet of Things IoT.

## StudyBot: Enhancing and Automating Study Sessions with Discord Bots.

### Andreas Lupascu

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### Abstract

Discord is an instant messaging and communication platform that enables users to communicate, chat, and share resources. The platform provides bots, which are AI-driven tools for automating tasks. This project aims at implementing a discord bot with features for improving the quality of life of the user, among the main goals is to help the user to study or as a task reminder, or more specifically as an “accountability bot.” It will play music in voice channels, embed TikTok videos, and generate random memes based on different categories. An important functionality is the scheduling of long study sessions mixed with breaks, which will be organized based on “a study breakdown calculator” that maximizes study time interleaved with enough breaks. A typical scenario is a study session enriched with some “study music” randomly generated or based on the user’s created playlist. When the user leaves the channel during their study session, the bot will generate some memes to congratulate the user.

# SECTION 4

## Education

## Role Of School-Based Counseling Access And Interventions On Elementary Student Behavior And Academic Wellbeing

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### Abstract

Peruo et al. (2011) found that 13-20% of students in America have a mental, emotional, or behavioral experience per year. As early as 2003, mental health effects on youth were becoming evident. As such, President's New Freedom Commission on Mental Health made mental health for young children a priority (DHHS, 2013). It made it clear that there was an overwhelming need for mental health care for children and adolescents. One solution is an expansion of school health programs. Unfortunately, the educational system has failed to provide unequivocal access to this much-needed service for students who fall in a minority group, low socio-economic group, or primary residence in a rural community. Young people today are constantly influenced by their surroundings, both physically and virtually. With the rise of social platforms and readily accessible information comes the potential for the increase of school bullying, cyberbullying, and anxiety in elementary school-age students. These influences are increasingly impacting their ability to cope academically and socially in a structured classroom setting.

The purpose of this presentation is to explore the responsibility that educational systems have to ensure that all students receive an educational experience that allows them to reach their fullest potential that isn't dependent on race, socio-economic background, or geographics and the role that counseling interventions can have on improving behavior in terms of reduction in classroom misconduct and office referrals; as well as student academic wellbeing in the form of increased

classroom engagement, academic performance, and reduced absenteeism.

## Role Of Frequency In Emergency Department Patient Visits On Costs And Quality Of Care

**Areli Stewart**

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### Abstract

This evidence-based mixed methods study explores whether the frequency of emergency department patient visits plays a role in patient quality of care and costs. The frequency of emergency department patient visits is defined as more than four emergency room visits a year by an individual. Quality of care is defined as the domains of effectiveness, efficiency, equity, patient-centeredness, safety, and timeliness when providing patient care. The research also studies healthcare costs incurred in provider delivery of service, insurance payments, and patient out-of-pocket costs. Study significance is that it establishes reason(s) for frequent emergency department visits, effects on costs and quality of care, and the importance of creating protocols that allow patient identification and resources needed for their continuous plan of care post-discharge. A reduction in the number of recurrent visits would allow for resource reallocation to adequately support a broader patient population more efficiently. Participants will be adults over the age of 18 who frequently visit the emergency room. My Symposium presentation discusses existing empirical literature reviewed on this research topic which shows that the main issue of increased costs and spending in hospital visits is due to high out-of-pocket spending and unpaid medical bills (Dobkin et al., 2018) but that (a) socioeconomic factors, (b) access to primary care, and (c) lack of patient education are the main source for the high-cost emergency room frequent visits, which in turn

play a negative role in providers and nurses' feelings towards the patient and that this results in decreased quality of care.

## The Role Of Gender Inequality On Access, Participation, And Successful Higher Education Outcomes Among Women In Ethiopia

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### Abstract

In this mixed-methods approach with a convergent questionnaire variant design study, the role of gender inequality on access, participation, and successful higher education outcomes among women in Ethiopia is examined. The study seeks to answer the central question of whether gender inequality plays any role in the access, participation, and successful higher education outcomes for women in Ethiopia. In this study, gender inequality is the independent variable, and the following dependent variables will be explored: (a) higher education access, defined as the opportunity to attend postsecondary education institutions in Ethiopia; (b) higher education participation, defined as the ability to engage and persist in higher education learning in Ethiopia; and (c) higher education outcomes, defined as successfully graduating from a postsecondary education institution with relevant skills required to attain successful professional employment. A mixed methods approach with convergent questionnaire variant design will be utilized. The sample size of 40 will include two groups: Group #1 will consist of Ethiopian born and raised women currently residing in-country, while Group #2 will be Ethiopian born and raised women currently residing in diaspora/overseas but who have attended at least one year of postsecondary higher education. For this symposium presentation,

I will discuss the results of my review of existing empirical literature to highlight what is already known on this topic, in terms of research results and implications relating to the role of gender inequality on the access, participation, and successful higher education outcomes for women in Ethiopia and globally.

## Role Of Teacher Attitude On Digital Citizenship Skills And Digital Footprint Awareness In The Academic Outcomes Of Middle School Students

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### Abstract

For students to fully understand the long-lasting consequences of responsible or irresponsible digital citizenship in the world of online learning, teachers and students need to formally engage with digital citizenship lessons as they become more dependent on technology daily. Teacher attitudes on importance of digital citizenship plays a role on middle school students' digital citizenship. This mixed method convergent design study aims to understand the role of teacher unique attitudes concerning digital footprint awareness and digital citizenship skill training on middle school student academic outcomes in a large, multicultural Texas school district. This study is critical because students need to understand the long-lasting consequences of their responsible or irresponsible digital citizenship actions in the online learning environment and social media world today.

## Phenomenological Study On Parental Role In Special Education Advocacy And Support For Early Childhood Learning Needs Of Elementary Students

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### Abstract

In this phenomenological study on a parental role in special education advocacy and support for early childhood learning needs of elementary students, I will explore the perceptions of parents on whether they have adequate know-how and resources to advocate and support the early childhood educational needs of their Pre-K to 2nd-grade elementary students that receive special education services. The study seeks to answer the central question of whether parents perceive they are adequately informed and equipped to: (a) advocate and (b) support their early childhood elementary child's special education needs. The study explores how parents perceive their role concerning IDEA and the IEP process in special education advocacy for school-based interactions, at home, supplies/resources, motivation, attendance, and behavior for their elementary student's learning needs. This qualitative study will be conducted with parents of elementary students receiving special education services. The sample size will include approximately 25 parents in one district. The data for this study will be collected through a Qualtrics Demographic survey and a one-time in-depth interview with each participant. At least forty-three percent of empirical research conducted in a public-school setting reveals that parents' understanding of the Individuals with Disabilities Education Act (IDEA) and the Individual Education Plan (IEP) process is essential for home

support to better support their children's homework, virtual at-home learning, and anti-summer-brain-drain learning needs. It also highlights that parent perceptions of teacher and administrator collaboration play a valuable role in the quality of communication parents receive from these stakeholders concerning their child's educational needs.

**Keywords:** *Individuals with Disabilities Education Act, the Individual Education Plan process, special education, advocacy, collaboration, and know-how*

## Sexual Assaults On College Campuses

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### Abstract

Sexual assaults on college campuses continue to pose a greater threat to a large percentage of students than non-college students (Cooper & Dranger, 2018).

This study examines the role of sexual assault prevention and intervention program type on campus sexual assault rates or incidence of sexual assaults at a Texas Tier I university.

The purpose of this quantitative study will be to explore through the ex post facto design the role of sexual assault prevention and intervention program types, reporting pathways, media scrutiny, loss of federal funding, campus safety measures and policies, and student behaviors (independent variables) on campus sexual assault rates (dependent variable) at a Texas Tier I university by comparing archival data before and after the 2019 state of Texas institution of more strict prevention and reporting requirements that resulted in hyper-extensive prevention programs

and reporting, to determine whether any difference exists in the campus sexual assault reported rates for the Clery Act of 1990 and the Campus Save Act of 2013 postsecondary institution requirements. Sexual assault prevention and intervention programs will be generally defined as programming to minimize or eliminate sexual assaults on college campuses through sexual assault education; dialogue on stereotypical sexual gender roles; behaviors; the role they play in sexual assaults; and application of dating safety measures (Kress et al., 2006).

**Keywords:** *sexual assault prevention*

## **Role Of Self-Advocacy In Educational Outcomes And Wellbeing Of Doctoral Students Who Receive Cancer Diagnosis During Degree Program Enrollment**

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### **Abstract**

Presentation addresses rising age of doctoral students and correlated increased risk of cancer diagnosis while completing their studies. Doctor of Education programs attract a student demographic at higher risk of cancer incidence. This presentation focuses on celebrating diversity to address social justice inequities of this healthcare related issue. It is well documented that increases in the incidence of cancer correlate to increasing age. As cancer treatment advances, cancer is transforming into a chronic disease rather than a death sentence. These two factors combined

with the increasing number of students entering doctoral programs above the age of 30 means that there will be more incidences of doctoral students engaging in their doctoral studies while receiving cancer treatment. Due to the emergent nature of this problem, students must self-advocate and institutions must intentionally create a supportive environment that extends beyond the interpersonal to incorporate structural and systemic awareness and engagement with this critical area of student need. Using a convergent fully integrated design mixed-methods study, I will examine how a cancer diagnosis during doctoral degree program enrollment, in terms of the role played by a student's self-advocacy in the subsequent peer support as well as in class and out of class support, relate to a doctoral student's wellbeing and their associated educational outcomes. Using posttraumatic growth theory and the student wellbeing model, this study seeks to examine the relationships between student personality factors, environment factors, and posttraumatic growth and wellbeing.

## **The Role Of Executive Leadership Philosophy On Multinational Corporation Type And Rate Of Gender Lens Investment And Community Outcome Experience**

**Mary Morley**

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### **Abstract**

Gender lens investing (GLI) supports gender equality, advancement, women-owned

businesses, and women's products and services. Multinational corporations' chief executives and investors have increased interest in GLI; however, funding remains low, and women are underrepresented in business. Lack of inclusion perpetuates social injustice for entrepreneurs and fails to resolve gender-biased unsustainable societal socio-economic structures. Executives can develop diversity, equity, and inclusion cultures to support gender equality within corporations and motivate engagement. In this mixed methods study, I will use a survey to measure the chief executive's servant and ethical leadership to explore leadership philosophies. I will discuss insights on the necessary servant and ethical leadership skills and their related impact; and whether chief executives are transformed due to exposure, support, and promotion of GLI. Discussion includes how GLI participation affects organizations, invested-in organizations, and executives to trace leadership's commitment to developing shared-value business models connecting companies with GLI projects. This understanding is foundational for leadership development that can serve by sensitizing business leaders on their position-power's impact on forming a sustainable corporate environment. In addition, it inspires transformational work today while sustaining work that needs to continue tomorrow in societally stabilizing ways. Further, I cover entrepreneurial challenges to ensure GLI is fully equipped to advance inclusion, honor participation, and equality. Challenging economic environments need leaders willing to develop knowledge of social justice implications touching entrepreneurs to respond ethically and create systematic change for globally cohesive sustainability.

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**Keywords:** *gender lens investing, leadership philosophy, servant leadership, ethical leadership, chief executive, invested-in organization, empowerment*

## Mixed-Method Study On Role Of Ethical Leadership Development In Sustainable Engagement And Academic Achievement Of Private High School Students

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### Abstract

This mixed-methods study examined the role of ethical leadership development in the sustainable engagement and academic achievement of private high school students in the eleventh and twelfth grades. A specific lens was applied to discover any differences in the study population due to marginalization. Existing research points to an advantage that is enjoyed overall in students from non-marginalized backgrounds. However, there is little research on the potential influence of ethical leadership development on students from marginalized backgrounds. The study surveyed students using the SPACS-Q instrument to measure sustainability engagement and leverage school-provided archive data for student achievement and demographic information. These results were compared against qualitative interviews with educators from each subject school. The converged analysis of the findings is discussed below in Chapter IV. The social change model for leadership development (SCM) forms the theoretical framework that guides the study, along with a researcher-derived conceptual framework derived from the SCM.

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**Keywords:** *ethical leadership, sustainability engagement, marginalized student performance, social change model for leadership development*

## Stem Self-Efficacy On Secondary Science Teacher Cultural Responsiveness And Outcome Expectancy To Students From Marginalized Backgrounds

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### Abstract

STEM education is a trending area of focus globally, demanding qualified mathematicians, technologists, engineers, and scientists from diverse settings (Bell, 2016; Sondergeld et al., 2016). Enriching this demand requires addressing the academic achievement gaps among marginalized student groups in K-12 environments (Jones et al., 2018). Currently there are lower trends in STEM participation from historically marginalized student groups i.e., girls, students of colors, English learners, and lower socioeconomic families. This negative trend not only negatively impacts the social versatility of the students, but it also limits diverse perspectives in STEM fields (Betancur et al., 2018; Stipanovic & Woo, 2017). Perhaps, acknowledgment of high teacher self-efficacy and high culturally relevant curriculum and instruction can serve as a conductor for positive STEM education for all students (Capraro et al., 2014). The purpose of this mixed-methods study addresses whether secondary science teachers' level of STEM self-efficacy has any role on a teachers' level of cultural responsiveness and/or outcome expectancy beliefs regarding students from marginalized backgrounds. The study measures a teacher's level of STEM self-efficacy, cultural responsiveness, and expectancy. A convenience sampling technique will be used to capture secondary Science teachers attending a professional development district workshop, who

service students in science academic areas, and volunteer to participate. This study is significant because it seeks to determine how an education system facilitates the involvement and interest of students from marginalized backgrounds in STEM subjects, by identifying whether and/or how teachers use culturally responsive instructional practices to enrich student learning.

**Keywords:** *STEM, marginalized, culturally responsive, expectancy, self-efficacy*

## Gifted And Talented Education Programs

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### Abstract

The lack of inclusive diversity within gifted and talented education programs, which is a persistently clear problem since their inauguration in 1962. Existing data shows there are more girls than boys identified as gifted and talented, yet a disparaging difference continues where girls identified for English as a second language services are rarely girls identified or retained in gifted and talented programs throughout their grade school enrollment. To explore why this is, my qualitative phenomenological study examines perceptions of public-school teachers regarding whether their instructional practices play any role in promoting successful gifted and talented program engagement of otherwise eligible fourth grade girls receiving English as a second language services. Of specific interest is whether teacher cognitive, environmental, and behavioral instructional practices factors play any role in how gifted and talented identification and service is provided to eligible English as a second language fourth grade girls. Through interviews with ten gifted and talented certified fourth grade English as a second language teachers

at four elementary school sites in suburban southeast Texas., this study will inform evidence-based professional development initiatives designed to address the specific instructional needs of teachers, to support successful engagement and retention of eligible English as a second language girls within gifted and talented programs. Data analysis of significant statements and emergent themes will generate textual and structural descriptors that inform study findings, implications for practice, and recommendations for future research. My current presentation will focus on insights and implications generated from existing empirical literature on this topic

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**Keywords:** *Teacher instructional practices, English language learners (ELLs), teachers' perceptions, gifted and talented program, girl students*

## Role Of High Stakes Accountability Standardized Testing On Public School Educator Wellbeing During A Global Pandemic

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### Abstract

Research Topic: Role of High Stakes Accountability Standardized Testing on Public School Educator Wellbeing During a Global Pandemic

Population: Middle school reading and language arts, and math teachers in urban middle schools in southeast Texas

Method: Qualitative Method - Phenomenological

Application of results or findings

## Extreme Poverty

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### Abstract

Extreme poverty affects children in multifaceted ways from their early years and has multidimensional lifelong residual effects that often lock them in cyclical generational under-resourced and marginalized communities. The purpose of my mixed methods explanatory sequential design study is to understand what role extreme poverty backgrounds play on the academic performance and social skills of children in a rural area of the central region of Angola, in southern Africa. Using a quasi-experiment ex post facto design for my quantitative strand, I will survey 50 eligible consenting participants; and, then using a phenomenological case study design for my qualitative strand, I will complete in-depth follow-up interviews individually with 12 elementary teachers that work in area schools whose communities are affected by extreme poverty, after purposively selecting these 12 teachers from my quantitative strand's survey completers. The valuable insights and new knowledge generated by engaging with this study's target participants will inform (a) actionable implications for practice, (b) valuable insights for social justice development policy makers and initiative planners, and (c) constructive recommendations for future research on the role extreme poverty backgrounds play in academic outcomes and social skills of children. Since this multi-year study is still in-progress, my current focus for this UST Student Research Symposium presentation is on my existing research on the theoretical implications, current state of being and related challenges, gaps in service, best practices that have already shown promising results, and the implications for practice discussed in existing empirical literature that I have reviewed on this topic.

# SECTION 5

## Engineering

### Advanced Rail Energy Storage (Mechanical Energy Storage)

#### Joshua Middleton

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#### Abstract

Our Mechanical Energy Storage Research Project will use ideas from the Rail Energy Storage concept to calculate the amount of power put into and out of the system. Our research question for this Rail Energy Storage will be how does change in the incline of the hill affect the areal energy density, efficiency, and cost? This project will require a track, track cart, gear set, generator, voltage, and current probes, and a stepper motor. The track and cart will simulate a rail cart moving up and down a hill, gaining potential and kinetic energy. Conservation of energy states that energy cannot be created or destroyed, it can only move from one type to another. The potential energy gained from moving up the hill will be stored in the mass of the cart for a given amount of time. When the power is needed the rail cart will be released down the hill, gaining kinetic energy. The kinetic energy will be used to run the generator, therefore, producing a power output. A pulley will be used in our system to pull and release the cart up and down the hill. A Rail Energy Storage system is currently located in Nevada and is constructed on a hill that covers twenty acres of land. The reason for this mechanical energy storage system is to act as a battery to supply power and electricity to another system. The idea behind this type of energy storage stems from the fact that the sun is not always shining, and the wind is not always blowing for solar-powered systems and wind turbines. This system can produce and store energy whenever it is needed. The excess energy stored can be used for a natural disaster or storm surge when there is no power to be produced. Benefits to mechanical energy storage consist of excess energy storage, a longer lifespan, and efficiency. The downside, however, is the amount of land and space needed for this system to operate. That is why we will

calculate the energy density, efficiency, and cost based on the angle of elevation; to evaluate if the system can operate on a smaller piece of land.

## **GAIR (Guided Autonomous Information Robot)**

### **Christopher Alducin**

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### **Abstract**

Having to find out where everything on campus can be difficult – different departments, buildings, study spots, and even essential student resources. GAIR (Guided Autonomous Information Robot), to be designed and developed by the Physics and Engineering department in collaboration with the Engineering clubs, will look to facilitate that need and even do more! GAIR will be traversing across the Academic and Crooker Mall. Through assembling a 1:7 detecting robot conceptual model, we were able to gather essential data, wiring, and coding resources to assist us in the 1:1 prototype model of GAIR we are working on. The prototype will be complimented with an iPad to be the main user interface via a custom app/website we created to display all the prior discussed information. In addition, the app will include popular food and entertainment locations near campus to stronger build a sense of community near campus and increase school morale. GAIR will allow the university and engineering department to show-off our student's creativity and capabilities through real-world robot development.

# SECTION 6

## English

## It's All About The Benjamins, Baby: Dialectical Opposition Between Moneylending & Usury In Shakespeare's *The Merchant Of Venice*

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### Abstract

The complexities of Shakespeare are myriad. An attempt to pin down his work into a single meaning is fraught with peril, and this is surely one of his many intentions. Any meaningful exegesis derived from the text often contains embedded assertions to the very opposite. This dialectical opposition, that is the balanced tension of opposing social forces and their attendant implications presented in Shakespeare, becomes especially true when considering one of his most problematic plays: *The Merchant of Venice* (Merchant). One must be careful when emphasizing any aspect of Shakespeare for fear of subsuming other veins of inquiry, yet it is the contention of this paper that the tension engendered from a dialectical opposition between Christianity and Judaism serves to highlight an even larger social tension. Antonio and Shylock's antipathy arises from their mutual pursuit of economic gain via contradictory means, which in turn underscores the necessary antimony between moneylending without interest and usury. Religion, therefore, is used as a diversionary tactic despite its apparent centrality to the text. Following from this, a close reading of Merchant provides ample evidence of the dialectical opposition between Antonio and Shylock.

## The Female Psyche Reflected In Women's Literature

**Ana Paola Hernandez Rabago**

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### Abstract

Women have been exposed to violence and subjugation from male figures since the beginning of civilization. Men who commit acts of violence against women range from utter strangers to relatives and romantic partners. There is no unerring nor specific profile to identify these male perpetrators other than that they have all resolved to inflict physical, sexual, and/or psychological or emotional abuse against the women they encounter and often know and love. Consequently, women have developed gender-marked traits to communicate in methods that go unnoticed by men. As women have adopted forms of communication that make them less threatening and more agreeable to men, they have also acquired the skill of communicating with one another by means of a language composed of gender-marked characteristics that include both verbal and nonverbal modes of transmission. These gender-marked traits are illustrated throughout women's literary works, providing insight into the women's condition in the world and their psyche. Alas, despite efforts to resist oppression and silencing, there is a continual pattern of women's accomplishments and experiences being overlooked and disregarded—literary works composed by women are no exception. The development of gender-marked communication created by women as a result of sexual politics will be reviewed through the analysis of four short stories: Kate Chopin's *The Story of an Hour*, Zora Neale Hurston's *Sweat*, Sandra Cisneros's *Woman Hollering Creek*, and Manju Kapur's *Chocolate*. Moreover, an analysis of society will be executed to deconstruct patriarchal systems that contribute to the prevalence and recurrence of violence against women.

## ***Macbeth: The Historical Account Contrasted With Shakespeare's Play***

**Cody Groff**

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### **Abstract**

William Shakespeare's *Macbeth* is a tragedy based on the historical account of Macbeth King of Scots. Shakespeare's play portrays the Scottish king as a villain, a usurper who is hellbent on seizing the throne. However, in reality, Macbeth's account is much more convoluted. Based on historical records, Macbeth King of Scots was justly named King of Scotland and was usurped by King Duncan. Macbeth's downfall eventually led to a war between England and Scotland. It is likely that Shakespeare wrote Macbeth's character to be a villain because he did not want to upset his monarch, King James I. James I was a descendent of Banquo the Scottish Thane and was a compatriot of Macbeth King of Scots. In other words, Shakespeare did not want to present the king's ancestor's in a negative light. In essence, Shakespeare writes a revisionist history to please his monarch, King James I. In this context, we see that Shakespeare set up a dichotomy between the Catholic Church as represented by Scotland and the Church of England established by Henry VIII. In this sense, the supernatural or witch-like behavior seems to be aligned with Catholicism. In contrast, Macbeth's enemies - specifically Macduff - represent the new Church of England led by Elizabeth I and her successor King James I. My study is concerned with Shakespeare's motivations for writing his play at the time that he wrote it - the political and religious consequences inherent in the tragedy of *Macbeth* in 1606.

## **More Than Skin Deep: The Mode Of Racial 'Othering' Within Shakespeare**

**Haley Baker**

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### **Abstract**

Taking into consideration the relevant social context of Elizabethan and Jacobean Britain—such as what racialized group presence one could expect and attitudes toward the integration of Islam or Judaism—this presentation will seek to make an informed study of the early modern ideal of faith informing the budding concept of race and its appearance within the work of William Shakespeare, illuminating the role of Christianity in the deliberate 'othering' of non-Christian characters through racial and religious stereotypes.

## **The Naivety Of The Working Class In George Orwell's *Animal Farm***

**Keizy Young**

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### **Abstract**

*Animal Farm* by George Orwell presents many interesting topics. The topic I found to be the most important and worth writing about would be the divide of social class and its effects on a community and the exploitation of the naivety of the working class. Some important central questions I'd like to address would be how the

working class continues to be naive and exploited. I intend to do this by connecting Plato's *Allegory of the Cave* and the Marxist theory. The strongest symbol of this theme is the use of the character Boxer. He is the prime example of how being naive and trusting is exploited by bigger systems in place. Boxer is a representation of the working class and I intend to expand on several elements of his treatment and mentality to showcase my research on this topic.

Another central question I'd like to address is the noted quote, "All animals are equal but some animals are more equal than others" I'd like to dissect this quote and connect it to how there can be a divide between people in certain social classes. The divide between social classes in *Animal Farm* is important and I intend to expand on how it's a reflection of modern society and its effects on current communities.

These topics are important to research and understand because they have a direct effect on everyone. My goal is to explain why these topics are relevant and how George Orwell showcased the effects and outcomes of such topics. I hope to provide a better understanding of the lower class and their usage of ignorance as well as how that is often easily exploited. They also aren't topics I commonly see addressed in *Animal Farm* that should be more readily talked about. George Orwell was able to write a novella that is still relevant and will continue to be relevant in so many different aspects. These themes I've chosen to pursue I think are themes that are commonly overlooked or not as heavily researched in his novella *Animal Farm*.

## My Other Half

### Michael Valdez

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### Abstract

My senior thesis, titled *My Other Half*, is series of short memoirs about my twin and me. It includes work from previous semesters and newly written memoirs. I've written about specific moments in my life that are important to me, and that shed light on my relationship with my twin brother, Gabriel, and our relationships with the people around us. I've written about two nights out with friends (and Gabriel): the first is a piece I wrote during a previous summer semester that deals with our eventful evening at a Chinese restaurant; the second is a new memoir about a game of hide and seek at a park with the same group. Although some of my writing for my thesis involves experiences with friends, others are simply about us two. And a few are about thoughts and feelings I had that were related to Gabriel in some way, such as in "Coffee Quest." In that piece I wrote about my experience traveling to a coffeeshop that was half a mile away from the university by wheelchair. Although most of the writing within my thesis focuses on lighter, happier experiences, the memoirs that I've written this semester have primarily focused on memories with Gabriel and my family that are heavier—arguments, crushed dreams, and one-on-one conversations.

## Obsessive Fixation In “My Antonia” And “The Great Gatsby”

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### Abstract

Modern Literature has a strong tendency to emphasize the fractured ideas and sentiments of the self, in the many forms that it takes. As a running theme in the great novels of the 20th century, F. Scott Fitzgerald’s *The Great Gatsby* and Willa Cather’s *My Antonia* there is a common thread that connects them in their emphasis, fixation, and fascination with the past. The characters in their respective works find out the hard way that living stuck in the past makes for a miserable experience, and at times it may even lead to a catastrophe that leads to a character’s undoing and the destruction of what they hold most dear. In the disintegration and fragmentation of the self as expressed by their characters, Cather and Fitzgerald capture the anxiety driven obsession to a nostalgia that infected the imagination of the early 20th century modern man to a time of innocence and charm, a time before the Great War(s), and the brutality that Modernity brought with it. In this thesis, I will analyze how the authors themselves found that obsession of the past to be dangerous, and self-destructive. I will argue that it is in their expression of the view of the past and the conditions that their characters suffer in their novels that we find the beckoning or call to move forward, and to let the past stay in the past, regardless of how wonderful and idealized it may seem (as seen in Gatsby’s and Jim’s view of the past). Modern Literature has a strong tendency to emphasize the fractured ideas and sentiments of the self, in the many forms that it takes. As a running theme in the great novels of the 20th century, F. Scott Fitzgerald’s *The Great Gatsby* and Willa Cather’s *My Antonia* there is a common thread that connects them in their emphasis, fixation, and fascination with the past. The characters in their respective works find out the hard way that living stuck in the past makes for a miserable

experience, and at times it may even lead to a catastrophe that leads to a character’s undoing and the destruction of what they hold most dear. In the disintegration and fragmentation of the self as expressed by their characters, Cather and Fitzgerald capture the anxiety driven obsession to a nostalgia that infected the imagination of the early 20th century modern man to a time of innocence and charm, a time before the Great War(s), and the brutality that Modernity brought with it. In this thesis, I will analyze how the authors themselves found that obsession of the past to be dangerous, and self-destructive; it is in their expression of the view of the past and the conditions that their characters suffer in their novels that we find the beckoning or call to move forward, and to let the past stay in the past, regardless of how wonderful and idealized it may seem (as seen in Gatsby’s and Jim’s view of the past).

# SECTION 7

## History

### Tracing Giotto's Renaissance In Late Byzantine Art

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#### Abstract

Giotto's Arena Chapel frescoes in Padua have long been considered a primary example of a new rebirth in Western painting. Even Giorgio Vasari himself praised Giotto as the one who had rescued the method of painting which had long been lost. However, many of Giotto's revolutionary painting aesthetics can be found in the work of often unknown and disregarded Late Byzantine artists that predate him. The Palaeologan Renaissance brought about and sponsored artists that were breaking with traditional aesthetics. A closer look at the frescoes of the Church of the Holy Mother of God Periblepta in Ohrid, North Macedonia, testifies to these new forms of experimentation. The workshop of Michael Astrapas and Eutychios, artists from Thessaloniki, were commissioned with the interior painting of the church. These artists were, before Giotto, adding volume and bulkiness to their figures, sketching chiseled-like folds, creating marble-like figures, and experimenting with different compositions. They were abandoning frontality and presenting figures from different angles. They were concerned with perspective, and most significantly, they were infusing their figures with lively emotions through gestures, poses, and facial expressions. The naturalism and realism that these artists were presenting in the Balkans are in line with what Giotto was trying to create in the Arena Chapel a few years later.

## Remembering The Ladies: A Snapshot Of Revolutionary Women In America And Russia And Their Legacy

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### Abstract

The American and Russian Revolutions were remembered for their profound impact in how other nations would rise against their oppressors. The American patriots rallied behind the ideals of life, liberty, and the pursuit of happiness; the Russian working-class bolsheviks stood and cried for bread, unity, and the fall of the bourgeoisie. Both revolutions had their familiar heroes remembered, but the faces of the women who had sacrificed so much and were the foundation for change have often been overlooked. With the rising popularity of women's studies, new perspectives have been explored to show the impact and importance of the other half of the population, and how the two countries have more in common than believed. The earliest commentaries by Elizabeth Ellet from the mid-1800s offer insight of women working hard, wealthy and poor, to give whatever support they could for the Continental Army and oppose the British. Later commentaries by Ray Raphael, Cokie Roberts, and Carol Berkin would expand on these and include stories of women defending their homes and sneaking into the military for the hope of a free America. Meanwhile, letters, notes, and stories from some of the Russian Revolution's mothers became material used by Barbara Engel and Barbara Evans Clements to show how the world held its breath on International Women's Day, 1917; women left their jobs, en masse, marched to the corrupt Tsar's palace, demanded their brothers, sons, and husbands return from the First World War, and be given the bread they have worked for.

## Desert Mothers: Female Anchorite & Monastic Tradition In The Early Christian World

**Harpreet Kaur**

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### Abstract

The desert as a physical space has captivated writers throughout human history, from Herodotus to twentieth century explorers such as Lawrence of Arabia and Gertrude Bell. The Christian faith spread rapidly in the early centuries and provided a new sense of identity not only for people of all backgrounds but to women also who hereto had lacked full autonomy on their physical and spiritual life. The desert offers “no cheap and easy access to divine majesty” yet humanity has been attracted to it for millennia. This intrigue is noteworthy as the desert is capricious, brutal, indifferent to human whims and desires yet many a religious epiphanies have been born out of the tales that took place on its sandy dunes. The Desert Mothers were a fascinating group of women in late antiquity who ventured out into the harshness of that climate, secluded themselves from the comforts of urban-life and led an ascetic and virginal lifestyle. These women, often hailing from wealthy families, were aware of the risks but nevertheless accepted the consequences in the pursuit of their unwavering faith. What was the motivation for these women to lead an anchorite lifestyle? Female house ascetics were a common feature in the early monastic Christian world, and we know of these women through primary paleographic sources. Women lived as monks in non-coenobitic, desert environments and left an indelible mark on the continuation of the Christian faith. Essentially, the Desert Mothers “embodied the new focus on eternity and individual salvation in its most extreme form, shaping their whole lives so that they could taste the bliss of eternity now.”<sup>1</sup>

<sup>1</sup>Riddle, M. John. *History of the Middle Ages: 300-1500*. Lanham, MA: ROUTLEDGE, 2018, 42.

## How Could Art Therapy Be A Resource To Treat Trauma Caused In Childhood?

**Zamara Hernandez**

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### Abstract

This research examines trauma induced in one's childhood and the process of art therapy to heal that trauma through the versatility of art and psychology. This research aims to understand art therapy methods and how the results are measured to verify their effectiveness. After analyzing research, case studies, and an interview in academic journal articles, I have found that art therapy techniques are very closely related to the practice of psychology. The results of art therapy can be measured in both qualitative and quantitative data. Theories such as Personal Construct Psychology (PCP) are utilized in art therapy to access repressed memories by activating the brain's hemispheres. Unconventional, creative approaches like clay throwing, using sand, and smearing paint with one's hands can bring emotional relief because of their kinesthetic aspects. These practices have been shown to help patients alleviate their shame by clarifying that the cause of the trauma, like sexual abuse, was not their fault. As a result, art therapy can be a valuable resource to treat trauma in children and adults because it increases their self-esteem, self-worth, sense of control, reduces the prevalence of depression and anxiety, and provides them a way to express themselves.

# SECTION 7

## Honors

## A Culture Of Leisure

**Renée M. Babin, Michael Banks, Laila Barkoudeh, Mikaylah C.C. Condic, Alex N. Croes, Nicolas L. D'Amelio, Daniela B. Flores, Niamh C. Gerdes, Cody J. Groff, Jessica A. Loya, Michaella A. Maniscalco, Lauren E. Mullan, Patrick T. Vaughan**

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### Abstract

Colloquially, “leisure” refers to rest or recreation through disengaging the mind and pursuing immediate satisfaction. This leisure is understood as valuable for the sake of an external goal, like resting to be more productive when returning to work. Thomistic philosopher Josef Pieper offers a different definition in his book *Leisure: The Basis of Culture* that describes it as an attitude of contemplation and celebration which allows humans to flourish. Leisure is an activity done for its own sake; leisure begins in wonder and issues in a fuller participation in reality. According to Pieper, education is meant to be leisurely. In fact, our word “school” derives from the Greek word for leisure: “schola.” However, in modern American society education has become focused on obtaining marketable skills and maximizing productivity, rather than contemplation of the world and the beauty of reality. People do not typically understand how to “do” leisure, or why leisure is good for its own sake. We tend instead to live for our work and to seek mindless entertainment as a respite from work. The attitude of non-leisure affects all disciplines and areas of life. To remedy these problems, we must re-develop an understanding of education that creates a culture of true leisure, as well as consider a proper philosophy of “gift” as a communicable antidote to this inverted shadow of leisure.

# SECTION 8

## International Studies And Modern Languages

## Economic Globalization: A Global Opportunity Or A Problem For Developing Countries?

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### Abstract

The world is more connected or globalized today than ever before. Are economic opportunities equitable to all countries, and is economic globalization truly a global progression or a tool used to exploit lesser developed countries? I seek to discuss and find answers to the pressing question of economic globalization and its effects on the developing world. I selected case studies from developing countries within a specific GDP bracket and analyzed the influence of economic globalization upon these countries. Though the results were inconclusive as to whether economic globalization was completely bad or good, much evidence points to economic globalization as an unfavorable influence on developing countries.

## The Industrialization Of Giants

**David Colf**

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### Abstract

This essay shall examine the similarities and differences in the industrialization process and the impact on human life and the environment of three distinct countries, China, India and the United Kingdom. What were the key similarities and differences in the industrialization process of China, India and the United Kingdom as well as the positives and negatives of each model regarding their impact on the people living there? As well as the ways to potentially mitigate pollution going forwards. The paper shall review a variety of historical sources and current sources in an attempt to discern both hard to quantify things such as environmental damage and damage to human health, something particularly difficult in the case of the United Kingdom as this case is much older, but shall also attempt to gather sources with hard numbers to reach more quantifiable conclusions as well as the end result of this model of industrialization. It appears that the United Kingdom's model of industrialization has so far proven the most successful in terms of peak power, current HDI and environmental aspects. However, it must be said that it does have a large head start on the other two countries. China and India both seem to have their strengths and weaknesses in terms of raw industrialization, pollution and HDI however it appears that China has taken the edge and is definitively in the lead in two of the three things mentioned above.

## **Pork To Politics: Ideology, Pork Barrel Politics, And Clientelism In Brazil**

**Leila Lucia Al-Eisa**

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### **Abstract**

Corruption and Brazil are two words that happen to be very well acquainted with one another. There are quite a few reasons that Brazil has always been seen as the country with a lot of promise and one of the next up-and-coming countries that never quite makes it. It is important to identify and analyze the types of corruption exploited in Brazil to possibly develop a way to remediate each one for the country to prosper. As most are already aware, pork-barrel politics and clientelism have an enormous role in Brazilian politics and economics. However, we are about to explore this angle of corruption, from how it stems from the Constitution to breaking down the theory and looking into the practices that were meant to push governance.

## **Amazon, Rubber, And The Violence Of The Peruvian Amazon Company Against The Ocaina Huitoto**

**Maria Alejandra Aguirre Lamus**

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### **Abstract**

Little research has been done on the key factors that promoted the holocaust in the Amazon Forest in the early 1900s. The overall image that emerges from the literature and scholarly sources is vague. Few works have provided a deep understanding of the topic. This paper provides a complete analysis of how the extractive policies in Latin America promoted the atrocities committed upon the natives. The research focuses on a particular case: the rubber extraction in the Peruvian-Colombian region in the hands of Julio Cesar Arana. This study recovers legal documents from the Colombian government legitimizing the expropriation of indigenous land and denying any safeguard to such groups, along with a report by the British Council, Roger Casement, denouncing the abuses suffered by the natives in the rubber plantations of La Chorrera y El Encanto. This study implies government responsibility for the lack of a legal framework for safeguarding natives and their property; and the negative effects of extractive economies on the livelihood of indigenous communities. This project then contributes to a broader literature and can be applied to similar cases.

## Culture, Democracy, And Social Order In Latin America

**Melissa Hernandez**

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### Abstract

This study aims to understand the relationship between the pre-existing conditions of Latin American culture and the effectiveness of democratic institutions of the region. This relationship is to ultimately discover if democracy can establish social order within the region. The development of this research is through case studies targeting Latin American democracies with crucial social issues and analyzing the effectiveness of democratic governance. The significance of this study is that it informs the understanding of the compatibility of culture with democratic government, and it informs what policies ought to be implemented to establish social order.

## The Impact Of The Islamic Culture On Political-Institutional Design

**Niamh Cosette Gerdes**

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### Abstract

This paper studies the impact of the culture of Islam on political-institutional design to understand how countries with an Islamic majority shape the design of their country's political institutions. Culture, religion, and history influence and shape political-institutional design worldwide, and Islamic majority countries are no exception. How the Islamic religion, in theory, crafts institutions is assessed by analyzing plurality, hierarchy, and equality in Islam? I study Islamic countries through the case studies of Tunisia, Saudi Arabia, and Indonesia. These countries were chosen because they all followed different political paths historically yet are all Islamic and are used to assess the reality of how Islam affects political-institutional design as opposed to the theoretical literature.

## The Effects Of Oil Refineries On Mortality Rates

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### Abstract

As our society becomes increasingly industrialized, we need to remember that there are people who will experience the collateral damage of the rapid industrialization of countries. Specifically, the growth in oil refineries brings about the harshest consequences to the life expectancy rates. Through different case studies in regions worldwide that produce oil, the increasingly high rates of pollution in developing and developed countries adversely affect the population. This study explores life expectancy rates and similar studies that help to understand further the environmental conditions and policy recommendations that must be taken to minimize long-term population problems.

## Economic Epiphytes: The Impact Of Foreign Ngos On Government Development In East Africa

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### Abstract

This paper studies the effect or lack thereof of big foreign aid NGOs in East Africa and their impact on their host governments' abilities to provide public services. I examine government spending levels, different human development indicators, GDP, and the level of NGO presence in Malawi, Mozambique, Zimbabwe, and Kenya. The finding suggests a general lack of significant development levels compared to similar developing countries with different levels of NGO participation regardless of region. With NGOs becoming an ingrained part of how these nations operate, they end up supplanting possible healthy expansion of government services instead, drain resources from what might otherwise be comparatively robust public sectors.

## What Defines A Terrorist Group?

### Santiago Colorado

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### Abstract

The research is motivated by the current conditions characteristic of the lack of a generally accepted definition of terrorism. What defines a terrorist group? I propose to answer the question by following a theoretical framework that encompasses motivation, tactics, and implementation of terrorism to formulate a definition. I test the theoretical framework by evaluating three different case studies, Al Qaeda, ISIS, and the FARC. The results of the research point to the framework being correct due to the identified commonalities between the groups.

The three groups developed in nations with similar conditions of conflict and social unrest and utilized terrorism to coerce a population and challenge the social, political, and economic norms.

## Beyond The Desert Mirage: Exploring The Duplicitous Nature Of The Kafala System

### Sheza Hamdy

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### Abstract

The kafala labor migration system is currently employed across the Middle East and Gulf Cooperation Council and designed to supply a consistent stream of labor that is both temporary and economical. As Middle Eastern nations have increased their presence in the international market, various reports have revealed the depth of human rights abuses committed under the flawed structure of kafala. The policy and legal framework in place, particularly for the case of the migrant domestic worker, is deficient in government regulation and transparency and has morphed into a modern system of debt-bondage labor that violates the rights and dignities granted to the human individual by the United Nations Human Rights Charter and International Labor Organization. The United Arab Emirates, Qatar, and Lebanon are the three case studies used to demonstrate the inadequate policies that contribute to the oppressive and inhumane labor conditions for the domestic worker. Practices such as the withholding of wages, seizure of legal documentation, and the lack of compliance with international labor regulations have resulted in mass individual violations of basic human and labor rights. As a result of international pressure, nations have employed labor reforms but the plight of the domestic worker has remained largely unchanged and continues to be grievously unaddressed in recent literature.

## **Military Coups And Survival Of Democracy In Africa**

### **Tchissola Silva**

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### **Abstract**

In 2021, more than three countries in West Africa have transitioned from democratically elected governments to military regimes after coup d'états. The unconstitutional government changes marked the beginning of the decade in countries such as Mali, Guinea, and Niger, all part of the same region, and had similar reasons to transition to military regimes. This research questions whether military coups diminish the prosperity of democracy in Africa. I analyze how military leaders use the high level of corruption in the continent, terrorism, and tribalism as reasons to take down democratic governments, suspend constitutions, and keep power for a long period, claiming that is the best for the countries.

# **SECTION 9**

## **Mathematics**

## Code Development For Flow Simulation

### Christopher Ian Lama

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### Abstract

This research is about modelling a flow simulation of a 1D Poiseuille model using Python code. The Poiseuille 1D model is based on Poiseuille's law, which is an equation that describes how blood flow rate is related to different factors such as length and radius of the artery, viscosity of the blood. Many heart diseases arise from the lack of proper blood circulation: from atherosclerosis and strokes to malfunctions in organs. Understanding how the blood flow is impacted by pressure, viscosity, length, and diameter of the artery is essential to treating and preventing these diseases. To understand blood flow, renown physician Jean Marie Poiseuille derived Poiseuille's law which describes how the rate of the flow of blood  $Q$  changes as viscosity  $\eta$ , change in pressure  $\Delta P$ , radius  $R$ , and length of the artery  $L$ :  $Q = \frac{\pi \Delta P R^4}{8 \eta L}$ . In this research, Python code is developed to visualize the simulation of a 1D Poiseuille model that helps us visualize how each of these variables alters the flow of blood.

## A Look At Zero-Divisor Graphs Using Zero-Forcing And Power Domination

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### Abstract

A zero-divisor graph is a graph of a ring whose vertices are zero-divisors, and two elements are connected by an edge if their product is zero. In this paper, zero-forcing and power domination will be used to analyze the structure and behavior of zero divisor graphs of the integers modulo  $n$ .

## Using Primary Sources To Teach Factoring

### Maxwell Voltz

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### Abstract

A primary source project is a lesson that helps teach math through a different lens than we are used to: history. Using Euler's *Recherches sur les racines imaginaires des équations* (*Investigation on the Imaginary Roots of Equations* in English) from 1749 as a foundation, the goal is to create a primary source project that can be used in the classroom to teach factoring.

# SECTION 10

## Nursing

### Role Of Simulation Learning In Lifelong Nursing Career Development And Professional Resiliency Of Practicing Nurses

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#### **Abstract**

In this evidence-based mixed methods study is to explore the role simulation learning plays in a practicing nurse's lifelong career development and sense of professional resilience. Simulation learning is defined as a scenario run by trained faculty to approximate a real-life clinical setting of practice to offer students an opportunity to master different patient care and disease process techniques. Lifelong frontline nursing career development is mandated through certification training, workplace onsite training, and advanced degree continuous competency education nurtured through ongoing simulation learning, which starts in pre-nursing training preparation and continues throughout their career lifespan in these mandated professional development workshops to meet annual competency-maintenance requirements. Professional resiliency is defined as positive responses to stress management and increased adaptability of frontline nurses. Practicing nurse is, (a) Registered Nurses, (b) Advanced Practice Registered Nurses, (c) Licensed Vocational Nurses, and (d) Licensed Practical Nurses. My research studies the crucial role simulation learning plays to generate evidence-based insights on how it informs frontline nurse career development and professional resiliency, especially during COVID-19 global pandemic because in the current nursing acute shortage, critical issues of retention are best addressed through evidence-based effective continuing education customized to address areas of pressing need or concern for nurses. My central research question is: What is the role of simulation learning

in the (a) lifelong nursing career development and (b) professional resiliency of practicing nurses? My symposium presentation discusses what is already known on this topic, in terms of implications for practice and recommendations on best strategies.

## Exploring Community-Dwelling Older Adults' Participation In Exercise To Prevent Falls Before And During Covid-19 Pandemic

**Maribel Marquez-Bhojani, DNP, MSHSA, RN, NPD-BC**

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### Abstract

**Objectives:** This exploratory study seeks to understand community-dwelling older adults' behaviors and participation in exercise activities to prevent falls during the COVID-19 pandemic in the Southern United States.

**Methods:** Using Bandura's Theory of Self-efficacy, this exploratory study uses a structured interview to explore older adults' understanding of fall risks, prevention strategies, and adherence to exercise regimens before and during the COVID-19 pandemic in the southern United States. UST Institutional Review Board approved this study. Thirty participants were successfully recruited in January-February 2021, in an urban adult primary care clinic. Descriptive statistics and content analysis were used to analyze the interview data.

**Results:** The study showed that one in five or 20% of the participants fell in 2019 and four (13%) in 2020. Of those who fell, four (13%) in 2019 and three (10%) in 2020, respectively, fell at home. Only 19 (63%) participated in exercise regimens

during 2020 compared to 26 (87%) in 2019.

**Conclusions:** The number of falls was lower in 2020 versus in 2019. Seven (24%) subjects did not participate in any community exercise program in 2020 compared to 2019. Both were attributed to decreased activity in general and, more specifically, community activity due to fear of COVID-19. All healthcare providers must engage and partner with patients and their caregivers to consistently provide education that focuses on and endorses fall risk assessment, fall prevention strategies, and participation in exercise programs to mitigate falls at home and in the community.

## Role Of Preventative Awareness Training On The Nature, Rate, And Medical Outcomes Of Hospital Acquired Pressure Injuries Among Intensive Care Patients At Acute Care Hospitals

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### Abstract

Hospital acquired pressure injuries are serious adverse and detrimental events for patients, their families, and the healthcare system. Their annual cost to the United States is billions of dollars spent on patient treatments, which often leave patients with dire long-term consequences. My evidence-based research explores the central research question on whether preventative awareness training plays any role in hospital acquired pressure injuries (a) nature, (b) extent of occurrence, and (c) medical outcomes of intensive care patients at acute care hospitals. The study sample will be

30 full-time acute care registered nurses at participating acute care urban hospitals in southeast Texas, who will help generate insight necessary to examine the study's independent variable of hospital acquired pressure injury preventative awareness training, in terms of whether it plays any role in the (a) nature, (b) incidence rate, and (c) medical outcomes of intensive care patients which serve as the dependent variables under exploration at participating acute care hospitals in southeast Texas. A divergent global review of empirical related literature on whether hospital acquired pressure injury preventative awareness serves any role in their nature, incidence rate, and patient outcomes, revealed some valuable insights. Studies done globally show societal costs of alarming rates of hospital acquired pressure injuries. The studies' findings suggest the need for increased patient and provider awareness and education on pressure injury preventative methods. Pressure injury prevention is multifaceted and require a multidisciplinary approach from leadership to staff members to increase awareness and decrease societal burdens.

# SECTION 11

## Psychology

## Attitudes Towards Housing: Will Gen Z Save The Housing Market?

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### Abstract

Shelter is the foundation of Maslow's Hierarchy of needs. That means shelter needs must be met for the individual to self-actualize, and when that need is not met it can cause long term maladaptation. The people most affected by this are the children of working-class families, as it has been demonstrated that housing instability in early years can cause children to lag behind their peers developmentally. The paradigm of housing-as-a-commodity has created a situation whereby sufficient shelter is artificially scarce. This presents a societal problem where massive sections of the population are developmentally hindered, as an ever-smaller portion of the population has the opportunity to own property. This study then interrogates the attitudes towards homeownership of the student population of the University of St. Thomas. This will give insight into how we may respond to the issue of scarce housing while meeting the shelter needs of the individual.

## Entrepreneurial Characteristics In Relation To Academic Performance

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### Abstract

The purpose of this paper was to examine the relationship between entrepreneurial characteristics and academic performance in students at the University of St. Thomas. The partial objective of this study was also to find correlations between these entrepreneurial characteristics and gender, age, and status of employment. The results of this study are expected to indicate that participants with entrepreneurial characteristics have a strong positive correlation with academic performance.

## Virtual Learning Adaptability During The Covid-19 Pandemic

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### Abstract

In this study, perceived learning styles and virtual learning environment were measured to observe how students' learning adaptability is correlated due to the mandatory virtual learning that was brought upon almost every student during the COVID-19 pandemic. The hypothesized individual with the best learning adaptability in the mandatory virtual environment during the COVID-19 pandemic

would have a perceived learning style that is active, sensing, visual, and global in a virtual environment with low distractions. The study was performed by using an anonymous survey completed by no more than 250 participants, with 41 sample items relating to demographics, perceived learning styles, and virtual learning environment. For perceived learning styles, the scale used was a modified version of the Felder and Solomon Index Learning Style, while the scale for the virtual learning environment is original and created by the researcher. The results will be analyzed using SPSS, with the r-value hopefully being +0.70 and the p-value hopefully being 0.04 between perceived learning styles and virtual learning environments. Thus, suggesting that there will be a significant, strong, and positive correlation between participants with perceived learning styles that are active, sensing, visual, and global and in a virtual learning environment that is low on distractions. Thus, this allows us to explore how one's perceived learning style and virtual environment correlate to one's adaptability to different learning environments.

## Adult Functioning Habits In Emerging Adults And Their Guardian's Parenting Styles

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### Abstract

Emerging adulthood is a stage of development between adolescence and adulthood that Arnett added to Erikson's Developmental Theory, in which individuals "come of age" and explore their identity (Arnett, 2000). This stage tends to delay the onset of adulthood and self-sufficiency and usually leads to an extension of parenting into the emerging adult's life (Arnett, 2000). Among parenting styles, "helicopter parenting" is generally detrimental to a child's development as it is marked by

parents' developmentally inappropriate overinvolvement in their children's lives (Burke et al., 2018). Adult functioning deals with independent, interpersonal, and self-care skills expected by society when one reaches adulthood, which tends to be the legal age of 18. Emerging adulthood has brought into question the society-held criteria that one becomes self-sufficient and able to function well as a "legal adult." This study looks at the relationship between adult functioning habits, perceived parenting style, and mental health in emerging adults. After IRB approval, participants were recruited from the UST community and, after consent was obtained, were asked to fill out an anonymous self-report questionnaire containing three measures. Data collection is currently being conducted. After data collection has concluded, statistical analysis will be conducted to make correlational inferences. This includes descriptive statistics, a classic correlational test to see any associations between variables, and a unidimensional reliability test to test the reliability of the study's measures.

## Meditation And Affirmation Effects On College Students Mental Health And Academic Achievement

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### Abstract

Research on meditation and affirmation has been found to improve mental health and academic achievement (Hayes, Zinner, Wise, & Carton, 2019). However, the influence of meditation and affirmation has not been extensively examined together to understand the magnitude of its effect on mental health and academic success. Moreover, previous research has been conducted on smaller samples and

less-representative populations. In addition, specific components of mediation (e.g., grounding, types of yoga, etc.) and affirmation (i.e., written or oral positive statements) has not been explicitly explored. Therefore, the present study's goal is to understand what specific factors related to mediation and affirmations are indicative of healthy mental health and academic outcomes. In doing so, a survey will be presented to college students that will analyze their academic standing, types of meditation and/or affirmation they utilize in their daily life, stress management (measured by the Perceived Stress Scale; Cohn, 1994), and overall mental health (measured by the Psychological Well-being Scale; Ryff, 1995). The current research hypothesizes that meditation and affirmation will improve mental health and academic achievement, and when these factors are combined, it will provide an additive and positive effect on overall health and academic outcomes. Moreover, affirmation is predicted to play a larger impact on students' outcome than meditation. By understanding the effects of meditation and affirmation factors separately and together, as well as the different types of practices, we can begin to understand its magnitude on overall mental health and academic outcomes.

## Analyzing The Patient-Physician Relationship: How Medical Mistrust And Implicit Bias Affect Patient Care

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### Abstract

Medical mistrust has been linked to the gap in health care among ethnic/racial minority groups (Jaiswal, 2019) with physician ethnic/racial biases exacerbating the gap and, thereby, influencing the course of treatment for individuals seeking medical attention (Maina et al., 2018). Although there is ample research concerning

patient-levels medical mistrust and physician implicit bias independently, studies have not explored the interaction between these two variables among specific minority populations, notably within the Latinx community. The purpose of this project is to analyze the physician-patient relationship and its effects on patient care. The current research is especially valuable as medical mistrust sentiments will be gathered and examined from a predominately Latinx perspective. The present study hypothesizes that the higher the physician's implicit bias and patient's level of pre-existing medical mistrust, the lower the patient will rate their quality of care (and vice versa). Physicians will be provided the Implicit Association Test (Greenwald, 1998) that will reflect biases that have been formed/nurtured from their experiences as a doctor. Patients will be issued the Group-Based Medical Mistrust Scale (Thompson, 2004) before receiving care for ailment to assess their pre-existing medical mistrust. The outcome variable will then be measured with the Care Evaluation Scale (Miyashita, 2014) to determine how satisfied the patient was with their medical ER visit. The goal of this study is to decipher the flaws within the patient-physician relationship in order to improve this interaction and bridge the ethnic/racial gap in the healthcare system one patient-physician interaction at a time.

## Social Media And Its Influences On Self-Perception

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### Abstract

With social media as a popular means of communication, connection, and interpersonal relationship-building; the downsides of its use by young adults prevail. Both men and women feel pressure to present themselves in a fashion that is most socially acceptable. For women, the compulsion is typically relative to the

objectification of their bodies in order to validate their femininity. For men, the burden is relative to maintaining a sense of masculinity reliant on their material capital and physicality. It is important to analyze how these expectations can be propelled by social media and how these stressors can affect self-worth. A study was conducted in order to measure the relationship between self-worth, social media usage, and how social media affects the self-perception of college-aged students. In order to evaluate this concept, undergraduate students from the University of St. Thomas participated in a self-survey questionnaire. We found our anticipated results to support our hypothesis as it includes data that reinforces our assertion that those who derive their self-worth on social media response report low self-esteem.

## Minding The Gap: An Assessment Of Challenges Of International NCAA Student-Athletes

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### Abstract

The aim of this study was to enhance understanding of the unique pressures and experiences of international student-athletes (ISAs) at NCAA DI, DII, and DIII schools, with a particular focus on the impact of the COVID-19 pandemic. This study employs an empirical phenomenological approach to facilitate a deeper understanding of the commonalities and differences in the ISAs transitioning experience. Seven female and three male students representing Australia and countries within Europe, South America, and Africa from tennis, soccer, swimming, track and field, baseball, and golf. Individual recorded interviews lasted approximately 45 minutes and consisted of in-depth, open-ended questions to draw out the rich details of their experiences. Interviews were analyzed and general themes and sub-themes were identified to better understand the commonalities and

differences between these student-athletes. The overall results showed significant adjustment in training and performance upon transitioning to the U.S; effects on anxiety and motivation during COVID-19; and reliance on teammates for support. These findings will help coaches and administrators better understand the academic and athletic experience of these athletes and will also help identify gaps in support and potential interventions that Sport Psychology Consultants could address to assist in their transition. Providing the best possible support system and environment for these athletes will ultimately sustain a positive retention rate and lead to the best possible performance and life experience on and off the field.

## Ink Of Color And Cognitive Performance

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### Abstract

The purpose of this research is to determine if the ink color has an impact on cognitive performance, as measured with a general knowledge test created for the purpose of this study. When the participants take a general knowledge test. There will be three separate groups of participants. Participants will be given the general knowledge test printed in black, blue, or red ink. It is predicted that ink color will impact participants performance on the test. The importance of this study is to determine factors that can impact students' cognitive performance beyond academic ability.

## Examining The Links Between Parental Attachment And Adult Attachment Styles

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### Abstract

Phrases such as “like mother, like daughter” or “like father, like son” may indicate that attachment found in parent-child relationships may influence future relational interactions. Specific attachment interactions exchanged between a parent and child may impact intimate relationships formed in adulthood. In this study, undergraduates were asked to take a survey with questions about their attitude towards love, while also answering questions relating to the positive and negative aspects their parent(s) display with them. We hypothesized that participants who answered positively about their relationship with their parent(s), tend to possess a more positive attitude towards love, while those who experienced a dismissive attachment with their parent(s) view love negatively. The findings will reveal the link between parental attachment and adult attachment styles by determining how measuring individuals’ attitudes.

## Financial Pressures In Relation To A Sense Of Loneliness During Covid-19

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### Abstract

There is a vicious cycle affecting large sections of the population: a cycle of financial pressure and isolation. It is a brutal relationship made manifest in a positive feedback loop, where one is discouraged from societal participation. The loop has two components: isolation and financial hardship. Where one enters, the loop does not seem to matter, as the results end up the same. If they enter the loop from isolation they will end up in hardship, and if they enter the loop from hardship they will end up in isolation. The purpose of this study is to establish a relationship in college students that have been affected by the Covid-19 Pandemic, and determine the extent of the effects.

## Religiosity and Employee Engagement

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### Abstract

This study concerns itself with understanding the extent to which religiosity and

employee engagement are related, which can provide insight as to how religiosity correlates with employee engagement.

Currently, no study examines the relationship between religiosity and employee engagement. I anticipate 150 participants from the University of St. Thomas – Houston, to participate in the study. I will use 15 items from the CRS to measure one’s religiosity as it is defined as the “intensity, centrality, and importance or salience of religious meanings in personality” (Huber & Huber, 2012). I will use the EES’s original 14 items that measures employee engagement as it is defined as the “active, work-related positive psychological state operationalized by the intensity and direction of cognitive, emotional, and behavioral energy” (Shuck, B., Adelson, J.L., & Reio, T.G. Jr., 2017). With a predicted  $N = 150$  and predicted  $df = 148$ , the critical value will be  $r = .159$  and  $p = 0.05$ . I predict that the that the correlation coefficient between employee engagement and religiosity will surpass the critical value with a strong and positive correlation. With the anticipated significant results of the correlation coefficient analysis between employee engagement and religiosity, we can conclude with confidence that this study benefits society and/or human/scientific knowledge by being the first study to measure the association between employee engagement and religiosity.

## The Relations Between Depressive Symptoms And Religiosity

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### Abstract

Going to college can be a highly satisfying and rewarding milestone for young

adults to accomplish early on in life. It is a chance for most individuals to live separately and independently from their families, most likely for the first time. As young adults transition from being dependent on their parents to becoming more self-governing, adjusting to this new way of life can put these individuals at high risk for mental health problems, namely depression. Depression is a common yet severe mood disorder that negatively affects how individuals cope with the events and stressors of day-to-day life. As a result, many college students don’t turn to positive coping mechanisms to help manage depressive symptoms. A previous study conducted (Exline et al., 2000) found some college students felt a sense of constraint when it came to the demands of their religious beliefs and their personal need to explore potential identities within themselves. The study supports this claim by linking strong feelings of distress and disagreement with family and friends on religious issues among those college students who are experiencing depressive symptoms. While much research has investigated the relationship between depression and varying coping mechanisms, the current study will focus on the relationship between depressive symptoms and religious affiliation as a coping mechanism. The study will utilize three different scales: PHQ-8 (level of depressive symptomology), CRS-10 (level of religiosity), and The Brief RCOPE (level of religious coping), for measuring the three variables in the study.

## Effects Of The Pandemic On Campus Student Engagement

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### Abstract

Student engagement has been linked to students’ sense of belonging, which leads to better persistence, engagement, and overall mental health (Gopalan & Brady, 2019),

as well as higher academic achievement (Lei & Cui, 2018). Moreover, research has identified that campus climate (i.e., those who live on campus vs. commute; Gunuc et al., 2022), ethnicity (Bingham & Okagaki, 2012), and gender of students (Swanson et al., 2003) are important variables to consider when understanding its influence on campus engagement. [TCD1] However, there has been little research on how campus student engagement has changed since the COVID-19 Pandemic. Given the importance of engagement with overall student well-being and university retention, the present study aims to explore these avenues by understanding how certain student demographics (e.g., age, campus climate, cultural, gender, etc.) may interact with their engagement level on-campus. Additionally, the present study targets how different modalities such as event incentives (e.g., food, apparel, etc.), styles (e.g., interactive, lecture, etc.), settings (e.g., in-person, Hyflex, online.), and form of advertisement (e.g., social media, fliers, word-of-mouth, etc.) can impact student engagement. In doing so, student demographic and information about different event modalities will be collected from the student body at the University of St. Thomas, Houston, a private liberal arts university. Specifically, student engagement will be measured by using the Student Engagement Scale (Gunuc & Kuzu, 2014). By understanding factors that influence campus student engagement, the present study will allow for intuitions to promote campus student engagement and, thereby, promoting better mental health and academic outcomes for college students.

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**Keywords:** *student engagement, campus engagement, student engagement scale, post pandemic, liberal arts university, private university*

## Susceptibility To Priming Consists Of Influence, Trust, And Openness

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### Abstract

Priming is a psychological phenomenon that occurs when a stimulus creates a response from an individual due to how implicit information related to the stimulus is stored in the brain (Weingarten, 2016). Although research documents the results of priming regarding cognitive or physical responses, there is no scale that measures susceptibility or sensitivity of an individual succumbing to priming. The purpose of this study is to create a measure that captures individual characteristics related to priming effects. Creating a scale to measure priming will provide researchers with a consistent method comparing priming effects across studies and may identify additional characteristics that affect cognitive and physical responses related to priming. In this study, we outline the steps in the development of the Priming Scale (PS). We used the Impression Management Scale (IMS) developed by Bolino and Turnley (1999) to compare against the PS scale because of the conceptual overlap between both constructs. Specifically, IMS utilizes influence as a way to assess an individual's impression on others, while PS assesses how external stimuli influence an individual. The major finding from our research was that although the initial piloted PS was not valid, there is a purpose for the subscales to be further explored. Background research shows that the majority of priming studies used verbal components as primes. Subscales for priming potentially utilize words or environmental stimuli. To improve our study, we can explore different priming components like verbal versus environmental awareness and modify the PS.

## Relations Between Attitudes Toward Sex And Level Of Religiosity

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### Abstract

There have been multiple studies done on the topic of attitudes toward sex. Some studies that measured sexual attitudes have also included religiosity. However, there is a gap in the available literature due to a lack of information regarding attitudes towards various aspects of sexuality (premarital sex, sex in a committed relationship, homosexuality) and how each aspect correlates to levels of religiosity. In my research I hope to close this gap by looking specifically at how attitudes toward various aspects of sex are related to religiosity. My study will have level of religiosity as an independent variable and attitudes toward sex as a dependent variable.

## The Impact Of Social Media Usage On Socialization And Social Anxiety

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### Abstract

Seven out of ten Americans participate in social media usage, with 84% of Americans aged 18-29 subscribed to at least one social media platform (Pew's Research Center, 2021). Prevalence of social media usage has grown to shocking levels, and research has indicated a rise in depression and post-traumatic stress disorder associated with daily social media usage (Price et al., 2022; Ferguson et al., 2021). However, little research has been conducted to understand the impact of social media usage on individuals' socialization skills and social anxiety. Socialization is a fundamental process that includes the development of values, principles, and other defining social concepts (American Psychological Association, 2022), while social anxiety determines the fear individuals experience in social circumstances that can lead to possible scrutiny or unfamiliarity (National Institute of Mental Health, 2022). Therefore, there is a need for psychometric tools and resources specific to social media usage to understand the magnitude of its effect (Parent et al., 2019). The present study aims to collect data on participants' social media usage (e.g., how frequent, purpose of usage, emotional investment) and comparing it to subscales measuring socialization skills (Social Skills Questionnaire/SSQ-1; Caballo et al., 2014), social anxiety (Social Anxiety Questionnaire; Caballo et al., 2010), and methods/baseline information (Socialization Scale; Gough, 1969). By understanding the mechanisms involved in social media usage and its potential effects on socialization, the present study has large implications on identifying risk factors in order to promote healthy social media usage and overall socio-emotional outcomes.

## Trait Empathy Amongst Socioeconomic Groups

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### Abstract

Empathy is a multidimensional personality trait characterized by both the ability to understand the emotional state of others as well as vicariously experience the feelings of others. Empathy can either impede or enhance social functioning, so it's important to understand the factors that may influence it. There is evidence of a class difference in empathy related measures such as sympathy and compassion. Those of a lower social class have been shown to exhibit more compassionate responses than those of a higher social class. Although class status has been shown to be related to empathy adjacent constructs, there has yet been any research done on the influence, if any, that class has on an individual's ability to empathize. The purpose of the proposed research is to determine whether an individual's capacity for empathy is related to their socio-economic status. Specifically, if there is a difference in feelings of empathy between those of a low SES, middle SES, and high SES. Undergraduate college students were recruited from classes at a small, private university through email. Participants were asked to complete a survey in which they answered questions about their age, race, gender, family affluence, and from the Questionnaire of Cognitive and Affective Empathy (QCAE). Data was analyzed using a one-way analysis of variance (ANOVA) and correlation test. Based on the literature, it is expected that empathy will be negatively correlated with socioeconomic status.

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**Keywords:** *empathy, socioeconomic status, QCAE, family affluence*

# SECTION 12

## Theology

## Human Community And Individuality In Christ: Using The Lord's Prayer To Refute Enlightenment Ideas

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### Abstract

The Thesis of this paper is that the Enlightenment notions of the “individual” and the “community”, the “I” and the “we”, is fundamentally incompatible with the Catholic Church’s understanding of the “I” and the “We”. This is approached through the lens of St. Thomas Aquinas and his view on the human person as seeking the good. Then the ideas of “I” and the “we” as outlined by Joseph Ratzinger in his *Jesus of Nazareth* series, particularly his reflection on the *Our Father*. These two thinkers will represent the Catholic Church’s ideas of unity/community and the individual. On the other side of this argument are four Enlightenment thinkers who reduce society to either an overemphasis of the “I” or the overemphasis of the “we”. Thomas Hobbs, Georg Hegel, and Friedrich Schleiermacher all make claims about the human person that fail to truly grasp the dimensions of the interplay between the individual and the whole. Hobbes doesn’t trust the “we” dimension of humanity, Hegel reduces history to the “we” of a spirit that realizes itself over time without a concept of the individual and the role they play as individual, and Schleiermacher reduces Theology to the changing feelings and experiences of a particular time, at the cost of truth, which is to reduce the “I” and the “we” to reflect only ourselves in an eco-chamber divorced from the eternal truths of God, thus the “I” dominates Schleiermacher’s thought. Ultimately, Ratzinger and Aquinas both believe that it is the Christological component of the Catholic faith that truly allows for these two concepts to be related and yet distinct. This ends up culminating in the person of

Christ as reflected on by Ratzinger in the *Our Father*, Aquinas in his view on the human person, and the inspired word itself, the sacred scriptures.

## The Soteriological Mission Of Christ's Descent: A Survey Of The Early Church Fathers, Thomas Aquinas, And Benedict XVI

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### Abstract

With its omission from the Niceno-Constantinopolitan Creed and a deficiency of Scriptural accounts, the doctrine of Christ’s descent into hell has gradually faded into the background of many theological discussions. However, the 1992 Catechism of the Catholic Church notably states that the descent “brings the Gospel message of salvation to complete fulfillment.” Christ’s descent is, arguably, the climax of his work of salvation. With the hope of rediscovering the role and significance of Christ’s descent in his saving mission, this paper will examine three sources taken from three time periods of the Church’s theology: the witness of the early Church Fathers, the theology of descent presented by St. Thomas Aquinas, and the reflections of Pope Benedict XVI. These sources manifest a consistent proclamation of the soteriological nature of Christ’s descent, and, more specifically, Christ’s mission to preach the Gospel, suffer punishment, and save the righteous. It is evident, then, that the Church’s theological reflections across the ages attest to Christ’s descent into hell as a fundamental and essential element of his saving mission.

# True Freedom: The Recapitulation Of The Symbolic

## Salvatore Aquila

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## Abstract

Man was sold into slavery, into Death, into Sin, into incompleteness. God then became man, that all men might be drawn to Himself, into freedom. What Adam has undone has been repaired in Jesus Christ. It is for this reason that one can properly speak of Christ as the New Adam. It is because He fulfills, with human flesh, what Adam could not, right worship. The essential Gospel message is one of liberation. It is a message of freedom, a movement out of Egypt into the Promised Land, from Death into Life, from nothingness into reality. How can the essential Gospel message, the *kerygma*, be communicated to an age with a subversion of the meaning of freedom? In my research, I will treat the subject of modern liberty as metaphysically flawed, assenting to D.C. Schindler's thesis that modern liberty is a "flight from reality" and essentially diabolical (as opposed to symbolical). I will then apply this to Joseph Ratzinger's reading of the episode of the Garden of Gethsemane and reflect on this episode as an analogy of the recapitulation of the symbolic through the person of Jesus Christ.



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