

HONORS RESEARCH SYMPOSIUM POSTER PRESENTATION ABSTRACTS



COLLEGE HALL

Honors College
Office of the Dean
Honors Advising
Carolyn A. Barros Reading Room
Honors Academy

Department of Military Science

Recruiting
Administration
Hall of Honor - Sponsored by the Corps of Cadets Alumni Chapter

APRIL 22, 2022

UNIVERSITY OF TEXAS AT ARLINGTON

MORNING SESSION

11:00AM – 12:30PM

CARLEY ANDREW, PSYCHOLOGY

Gender Bias and Creative Idea Evaluation

Faculty Mentor: Dr. Logan Watts

Gender bias in evaluating creative ideas can partially be explained by role incongruity theory; a perceived mismatch of gender roles and stereotypes is connected with an individual's sex. Idea evaluation is the process of cognitive appraisal and is a vital aspect of the creative process. Previous literature links higher perceived levels of creativity to males. The present study utilized a mixed-subjects design with a sample of 261 undergraduates. The study found that male-generated ideas had fewer pros and cons and similar evaluations of novelty, usefulness, and creativity compared to females. The main effect was found between idea source gender and the numbers of pros and cons. A two-way interaction was not found between idea source gender and the experiment's utilization of a gender stereotype threat. Despite stereotype threat failure, subtle gender bias still appeared in the more critical evaluation of ideas from female sources.

MAYUR BHAKTA, BIOMEDICAL ENGINEERING

Simulated Blood Glucose Meter Design for Educational Simulation in Healthcare

Faculty Mentor: Dr. Cheng-Jen Chuong

A commonly performed point-of-care test is the measurement of a patient's blood glucose, a process currently practiced in healthcare simulation with minimal realism at UTA's Smart Hospital. Training of healthcare professionals involves essential skill development and mastery which cannot be done effectively with low-fidelity props. A device was developed with consideration of the types of scenarios run at the facility and coded to be prototyped with Arduino. The device's circuit setup and function were simulated using Tinkercad to assess the desired output values in the three glucose ranges: hypoglycemic, normal, and hyperglycemic. Successful generation of random glucose readings in these ranges was achieved. The SolidWorks model of its external housing resembles glucose meters on the market with the ability to insert and remove test strips. The blueprint design is open for further modification and optimization to improve functionality and eventual production of a physical prototype.

KARA CHIDESTER, NURSING

The Effects of Transcutaneous Electrical Nerve Stimulation Applied Using Different Parameters and Site Placements on Range of Motion and Patient Perceptions in Chronic Low Back Pain Patients

Faculty Mentor: Dr. Cindy Trowbridge

Chronic low back pain is linked to mobility restrictions, limitations in daily activities, opioid dependence, and high healthcare costs; therefore, nonpharmacological treatments for pain has never been greater. A common nonpharmacological treatment is transcutaneous electrical nerve stimulation (TENS), which is an over-the-counter device used to alter a patient's pain perception. The purpose of this study was to investigate the difference between meridian TENS placement (m-TENS) and pain site TENS placement (ps-TENS) on the subjective assessment of global pain intensity and spinal flexion and extension range of motion (ROM) in chronic low back pain patients. Ten participants completed ten 30-min TENS treatments over the course of 2 weeks. There was no significant improvement in trunk ROM within or between groups. Pain reduced $36.7 \pm 18.0\%$ in m-TENS group ($p=0.003$) and $28.3 \pm 24.0\%$ in ps-TENS ($p=0.36$). Therefore, both applications can lead to a decrease in pain, but meridian placement seems to provide more relief.

REGINALD CONLEY, BIOMEDICAL ENGINEERING

Dual Automated Colorimetric Detection of E. coli and S. aureus using a Modified Lateral Flow Assay Featuring Copper Sulfide Functionalized Iron Oxide Nanoparticles

Faculty Mentors: Dr. Kytai Nguyen and Dr. Khosrow Behbehani

Nosocomial infections are one of the biggest issues facing hospitals today; they prolong hospital stays, worsen patient outcomes, and decrease patient satisfaction. Standard detection using cell culturing can take days. The object of this research is to develop a biosensor using the lateral flow assay platform that can accurately detect the bacteria *E. coli* and *S. aureus*, two causes of nosocomial infection, simultaneously in 15 minutes. To do this, carboxylated iron oxide nanoparticles will be capped with copper sulfide allowing for the nanoparticles to bind to both gram-positive and gram-negative bacteria without the use of antibodies. The lateral flow assay will be optimized to allow for dual detection using multiple immobilized antibody test lines. Testing will be conducted to determine feasibility, optimal line placement, and antibody concentration. The expected lower limit of detection will be 10^3 to 10^4 CFU/mL. Automation of the results will be done using MATLAB.

GILES FITZWILLIAMS, BIOMEDICAL ENGINEERING

Fabrication of a Microfluidic system to Generate Microcarrier Beads for Cell Culture

Faculty Mentor: Dr. Yi Hong

Current microfluidic systems and procedures used to produce microfluidic systems can range up to thousands of dollars. The objective of this project is to create a cost-effective four inlet microfluidic system that can produce uniform microcarrier beads ranging from 100 μm to 1000 μm in diameter. To create this device research was done on sodium alginate and gelatin, bead components, properties, and their interactions with one another within a microfluidic system. The device was fabricated using a 3D printed acrylonitrile butadiene styrene (ABS) plastic design mold and encasing the mold in a polydimethylsiloxane (PDMS). After cleaning the device with acetone, Harvard syringe pumps were used to inject sodium alginate, gelatin, and oil and varying flow rates to produce microcarrier beads. The expected findings of this experiment are the production of uniform beads that decrease in diameter as the oil flow rate increases.

CHASIDAH FRIED, INTERDISCIPLINARY STUDIES

All Languages Matter: Can Handheld Technology Benefit Endangered Languages?

Faculty Mentors: Dr. Laurel Stvan and Dr. Barbra Berthold

The goal of this paper is to continue a previous study entitled, "The Endangered Saami Languages: From Causation to Restoration" which was completed in 2021 regarding the loss and continued endangerment of Saami Languages through trauma and forced assimilation. This current work will focus on Saami Language revitalization using self-accessed stand-alone mobile phone applications and the benefit of creating a Saami-centric Language learning application as none exists as of this writing. This paper will include technical schematics to implement the ideas discussed in this work. These schematics were created by a team of students from the College of Science and Technology at Temple University, based on a discussion with Mr. Leomar Duran who influenced his team to create an application for language learning and revitalization. Their willingness to assist with this project speaks to the viability of the concept.

MATEO GALVEZ, CIVIL ENGINEERING

Guaranteeing the Code Accepted Target Collapse Mechanism of a Steel Structure

Faculty Mentor: Dr. Antonio Balderrama

Standard structural design practice calls for designing to almost every possible load scenario including high winds, strong earthquakes, and large magnitude live loads; however, it is impractical and expensive to design for 100% of scenarios. The best engineers can do for these extreme cases is design the failure mechanism to behave a specific and safe way so there is no sudden structural failure. I designed the failure mechanism for the 5-story apartment building that my group and I designed. To do this, I first had to determine the size of the replaceable "fuse" and analyze the structure based on the design strength of that member. This is not something that can be achieved using software, and a design short of this analysis is neither complete nor accurate. I determined that several critical structural members were under designed because they were only designed via software outputs while neglecting further analysis.

VANESSA GUEVARA, NURSING

*Association of Infant Mortality Rates and Healthcare Resources
in Urban and Rural Counties Across the United States*

Faculty Mentor: Dr. Jessica G. Smith

Infant mortality rate, an indicator of community health, was 5.6 deaths per 1,000 live births in the United States in 2019. The purpose of this study was to understand rural-urban relationships between healthcare resources and infant mortality at the county-level. The design was secondary, cross-sectional, descriptive, comparative, and correlational. There were 471 urban and 15 rural counties with infant mortality data. Average infant mortality rate was higher in rural ($M=8.99$, $SD=1.59$) compared to urban ($M=6.19$, $SD=1.74$) counties. There was a statistically significant difference for infant mortality, total hospitals, hospitals with NICUs, and OBGYNs in rural compared to urban counties. There was a positive, statistically significant correlation between rate of APRNs per 1,000 and infant mortality per 1,000 in urban and rural counties, indicating that more APRNs were present on average in counties with higher infant mortality. Further research is needed to determine other factors explaining the rural-urban infant mortality disparity.

ANNA LAURA HARMJANZ, POLITICAL SCIENCE

Proposal for UTA-Downtown Arlington Bike Network

Faculty Mentor: Dr. Ariadna Reyes-Sanchez

Bicycling offers great benefits for cities including sustainable, efficient, and affordable transportation, improved health and wellness, and creating vibrant communities. Universities offer a good starting point for young adults to form sustainable transportation habits. This study explores how the University of Texas at Arlington's community perceives existing bike infrastructure, services, and amenities on campus and off-campus to create a well-connected and safe bike network. An online survey was used to collect feedback from students and employees on commuting patterns, cycling experience and barriers, perceived safety on various bike facilities, and suggestions. The research findings indicate the top barriers in cycling include unsafe driver behavior, disconnected bike lanes, and lack of secure bike parking. Perceived safety increased among respondents with the addition of buffers and separation from cars. Most respondents show interest in traveling to Downtown Arlington destinations by bike and would bike more frequently if desired bike facilities were implemented.

MELISSA HORTON, LINGUISTICS

An Analysis of Suicide Coercion

Faculty Mentor: Dr. Laurel Stvan

This paper aims to define and understand the linguistic mechanisms behind incidents of suicide coercion. This is accomplished through case studies where there are sufficient records of the incidents that can give insight into the language the perpetrators used. Using well-established research on coercion in a general sense, this paper adjusts those ideas to specifically describe suicide coercion. To do this, quotes from each incident were broken down using speech-act theory to study the effect of the words on the listener. After identifying common linguistic and semantic elements present in suicide coercion, those ideas are applied to the current problems surrounding this issue in the legal field. This paper takes a unique approach by focusing not on the intent of the perpetrator, but rather the effects created by the perpetrator. This approach yields novel strategies for prosecuting suicide coercion, and legislating laws that target suicide coercion.

NICKOLAS HUYNH, PSYCHOLOGY

Variables Affecting Decision Making

Faculty Mentor: Dr. Daniel Levine

The Asian Disease Problem or ADP is a hypothetical situation with a framing bias created by Tversky and Kahneman. By utilizing the ADP, we want to see whether certain personality traits (numeracy, need for cognition, and need for cognitive closure) affect participant base decision making. This decision may be based on information that is presented to them or information that has been "mentally filled in" by implications. We used an online survey to gather our data through Amazon MTurk. The survey consisted of demographic questions, personality scales, and the decision tasks that were divided into 6 conditions with 1 condition for each participant. We found significant results for participants who scored high in numeracy and making risky decisions in the positive frame. Contrary to the original ADP, we believe it may be due to the onset of the COVID pandemic, whereas the original ADP was purely a hypothetical situation.

JASMINE HYDER, COMPUTER SCIENCE

A Proposed Approach for Testing an Educational VR Simulation for End-of-Life Care

Faculty Mentor: Dr. Shawn Gieser

In an attempt to improve the quality of end-of-life care knowledge among nursing students, a virtual reality (VR) simulation is in development that presents scenarios nurses may face. It must be tested to ensure it proves functional for end users and achieves the goal of heightening palliative care experience. A test plan is presented here which identifies three general testing areas: experience testing, accessibility testing, and VR interaction testing. Use cases are generated based on high-level objectives provided by experts in the field. The test plan also serves as usability testing for students transitioning to VR. This test plan expects to determine similarities between non-VR testing and VR testing with the key differences being the subjectivity of simulations and the complexity of creating a test plan. Educational VR simulations require an expensive, long, and highly robust test plan to be successful in predicting positive learning outcomes.

RITHIK KAPOOR, COMPUTER SCIENCE

Creating and Comparing Lightweight Seated Posture Classification

Models Using Machine Learning and Computer Vision

Faculty Mentor: Dr. Shawn Norman Gieser

The pandemic has led to an increase in the number of people teleworking. The amount of time people spend in front of the computer elevates the risk of them developing bad posture habits that, in the long run, can result in health issues. Therefore, it is important to develop methods to monitor and correct the posture of people who are adjusting to this new lifestyle of teleworking. Although there are many posture correction apps on Google play store, almost all of them involve using some kind of expensive tracker that is placed on the body and none appear to use machine learning and computer vision. The aim of this research is to create several machine learning models that can detect good or bad seated posture and compare the performances of these models across various metrics to find the best model for this purpose.

MATTHEW KOITHAN, MECHANICAL ENGINEERING

Vibro-Acoustic Analysis of a Fan Blade

Faculty Mentor: Dr. Yawen Wang

A frequent problem with rotating machinery is vibration. Vibration in a rotating part is usually caused by unequal mass distribution. A sound or acoustic wave is created by a pattern or disturbances traveling through a medium. Vibration and Acoustics can be dealt with individually; however if they share a common source both could be solve simultaneously. The purpose of this project is to correlate the fan noise to the rotor imbalance. The unbalanced mass can be removed by aligning the center of gravity (CG) with the axis of rotation which eliminates any coupled moments. The vibration is measured using accelerometers and the noise is measured with microphones. Siemens TestLab hardware and software are used to analyze the signals before and after the balancing of the fan. The vibration and noise level of the fan is expected to decrease after the rotor is balanced.

BRITNEY LE, BIOLOGY

Effects of Miniaturization on the Brain Case of Gymnophthalmoidea (Squamata)

Faculty Mentor: Dr. Walter Schargel

The concept of miniaturization states that as we go down the phylogenetic tree, species begin to become smaller in body size due to environmental pressures, especially within the Gymnophthalmoidea squamata. We question how the brain case morphology between different lizard species in the Gymnophthalmoidea squamata compares to one another when considering the differences in their body size. The brain cases of five lizard species were isolated using a 3D segmentation computer program, then reconstructed using an illustrator computer software and compared. The lizards studied includes one species from the Alopoglossidae family (Alopoglossus embera), one species from the Teiidae family (Dracaena guanensis), and three species from the Gymnophthalmidae family (Loxopholis hexalepis, Bachia pyburni, and Oreosaurus luctuosus). In general, every species' brain case shape differs, but will also have structures that are very close in resemblance, except for some variation in the structure size and shape.

CINDY LEDAT, INTERDISCIPLINARY STUDIES

Mental Health in Historically Black Communities: The Role of Local Non-profits

Faculty Mentors: Dr. Ericka Roland and Dr. Darlene Hunter

This study examined the role that local non-profit organizations play in bridging the gap to mental healthcare services in historically Black communities. With a focus on the Oak Cliff neighborhood of Dallas, Texas, semi-structured interviews were gathered from participants working for local non-profit organizations, specifically those that connect the community to mental health services. Utilizing a phenomenological approach to qualitative analysis, the key themes that emerged were those of combatting shame, building trust, and engaging with community stakeholders. Additionally, there were themes of helplessness in the face of systemic barriers as well as empathy towards a participant's cultural community. Though there were significant limitations to this study, the results suggest that current organizations advocating for mental health in Oak Cliff stress the importance of consistent and multi-faceted strategic approaches. It also suggests significant limitations on the impact of such organizations without active support and participation from community stakeholders.

ALEXIS LUECKENHOFF, COMPUTER SCIENCE

Testing for Transfer of Learning in Educational Palliative Care VR Simulation

Faculty Mentor: Dr. Shawn Gieser

Because palliative care scenarios for nursing students are difficult to simulate, a virtual reality (VR) simulation including four unique end-of-life scenarios is developed to provide more experience before graduating and completing tasks in the field. Such applications have a wide range of possible inputs, making them difficult to test. However, testing is essential to ensure that a product meets its original requirements, in addition to achieving its intended purpose of transfer of learning. Thus, a testing strategy is proposed to assess validity and fidelity of the simulation using both objective and subjective means. The performance of both nursing students and experts will be compared in various contexts. Additionally, questionnaires and group discussion will be used to evaluate how closely the simulation resembles the real-world task. The proposed test plan not only contributes to the deficit of end-of-life care in nursing, but to the testing of educational VR systems as a whole.

MELISSA MACIAS, PHILOSOPHY

Just Like Us: Identifying the Moral Relevance that Animals Have to Humans

Faculty Mentor: Dr. Keith Burgess-Jackson

Most humans tend to use non-human animals as a means to an end. This means that, often, they are not valued and only treated as mere things. To better analyze why humans treat non-human animals in such a way that we would never treat each other, we must evaluate the moral principle that we base our treatment of each other. Peter Singer's Principle of Equal Consideration of Interests claims that our moral obligations towards beings is grounded in the interests that they have. In other words, we ought to give equal moral importance to relevantly similar interests. Singer also helps promote the notion of Speciesism. This states that humans favor their species above any other. Singer claims that, one day, humans will look back at their treatment of animals in disgust just like we do now towards racism and sexism.

KABIN MAGAR, INFORMATION SYSTEMS

Expanding the Interoperability of Disparate Healthcare Record Systems, Despite Personal Privacy Issues

Faculty Mentor: William Venable

There has been a push to implement the tenets of the Management Information Systems (MIS) by the American Recovery and Reinvestment Act (ARRA) of 2009, the Federal Communications Commission (FCC) Broadband Plan, and the Patient Protection and Affordable Care Act and the Reconciliation Act of 2010 (HIPPA), which have led to continued growth in the use of the electronic healthcare record (EHR). The adoption of innovative technologies in the digitization of health records, use of telehealth solutions, and global problems, such as the pandemic, have presented MIS professional with "big data" concerns that effect source systems, marketing, strategic development, and data integration opportunities, both internally and externally. This paper addresses these concerns as healthcare moves forward as a major component of the domestic economy. We discuss not only privacy and data security, also interoperability and data management that provide the patient with transparency and usability of their personal health records.

DHRUVA MALIK, COMPUTER SCIENCE

*Building an Application to Monitor Back Posture in Real-Time
and Provide Live Support from Health Professionals*

Faculty Mentor: Dr. Shawn Norman Gieser

Everyone has experienced backpain due to bad posture. Incorrect posture seems to grow with time and can become a chronic source of pain and bodily problems. We are aware of the impacts of bad posture, yet we do not make a conscious effort to change these bad habits. With increased stress and decreased awareness, our posture can easily deteriorate. Aasan uses a combination of machine learning algorithms and computer vision techniques to understand and predict the coordinates of joints in the human body, Aasan can analyze the posture of a person, giving them recommendations to improve it. Aasan also provides users feedback from chiropractors and industry health professionals. Thus, this project brings together a number of features that can help anyone, at any age, to make big or small corrections in their posture and help them to live a healthier and pain-free life.

LISA MEY, BIOLOGY

Synthesis of Silver Pyrazolate Complexes

Faculty Mentor: Dr. Rasika Dias

Given antiviral resistance to traditional antiviral drugs and the risk this poses to global health, metal nanoparticles offer a special opportunity to develop a unique antimicrobial therapy, and specifically of significance to this research, silver and copper nanoparticles. However, the cost of silver is not conducive to economic practicalities. By taking advantage of pyrazolate ligands, we can expose a much greater surface area of the antimicrobial silver agent, which will reduce the amount of silver required and thus mitigate the prohibitive costs. To further explore silver- and copper-supported pyrazolate complexes, they were prepared and isolated using standard Schlenk techniques. Extremely bulky 1-adamantyl substituted pyrazolates were used, and the copper and silver complexes were fully characterized with NMR spectroscopy and X-ray diffraction. Although this project was not able to study its antimicrobial effectiveness, it provides the opportunity to investigate this in the future with the synthesized pyrazolate complexes.

APARNA NARAYANAN, INFORMATION SYSTEMS

*Understanding Vulnerabilities Posed by Information Technology Systems
of Firms using Fixed Effect Panel Ordinary Least Squares*

Faculty Mentor: Dr. Ruochen Liao

The information technology infrastructure of firms plays an essential role in their operation. With this, many cybersecurity risks arise at an organizational level. This project seeks to understand if the age and size of a firm are related to this risk factor. The study utilizes a dataset containing records of 13,075 companies across the period of 2014-2020, extracted from the directory of records of autonomous system numbers from CyberGreen. This research hypothesizes that age and size (the number of services a firm operates) affect the risk score. By running a fixed effect panel of ordinary least squares on python, it was found that for a unit increase in standardized age, the risk score increased by 5319.5, and for an increase in size, the risk score increased by 0.0293. Overall, results show that the age and size of a firm are correlated to the firm's risk factor.

MIKAELA NEUBAUER, B.S. PUBLIC HEALTH

Social Media as a Tool for Education and Awareness of Mental Health

Faculty Mentor: Dr. Brandie Green

With the growing levels of awareness and discussion of mental health on social media, online social platforms provide a unique and powerful opportunity to reach people. Are social media campaigns effective avenues and tools for circulating educational mental health content and advertising mental health resources? This project uses content analysis to determine the efficacy of a social media campaign regarding mental health. The campaign was designed based off research on the target audience and other previously successful social media campaigns and run for the therapy platform Atlas Health Group Inc. This study found that women ages 21-32 are mostly likely to use YouTube and Facebook, with Snapchat, TikTok, and Instagram being close seconds. Positive messages engage more effectively for longer, while the strength and credibility of an argument with the proximity of connection online heavily affect message reception. Overall, consistent posting is effective, the quality of posts is more important.

JENNIFER NGUYEN, BIOLOGY

Population Estimates of the Urban Turtle Community in French Lake

Faculty Mentor: Dr. Corey Roelke

An infectious turtle disease called bunyavirus was emerging, and the Texas Parks and Wildlife Department decided to monitor turtle populations. This study focused on the population of four turtle species: *Apalone spinifera* (spiny softshell), *Chelydra serpentina* (common snapping turtle), *Pseudemys* spp. (river cooter), and *Trachemys scripta* (pond slider) at French Lake, in Fort Worth, Texas. The turtles were captured, tagged, and recorded over a course of ten trapping periods in three years. The population data for each species was analyzed through the statistical program MARK. For *Apalone spinifera*, *Chelydra serpentina*, and *Pseudemys* spp., the population estimate was 20,000, 11,000, and 5,000 respectively with no upper and lower bounds due to low capture rates. For *Trachemys scripta*, the population estimate was 278,375, with upper and lower bounds of 321,452 and 249,099, respectively. The population estimates are essential in evaluating the overall lake health and keeping the ecological food web in check.

SUDHIR PANDIT, BIOMEDICAL ENGINEERING

Computational Modeling of Post-Surgical Hypertrophic Heart

Faculty Mentors: Dr. Jun Liao and Dr. Khosrow Behbehani

Hypertrophic cardiomyopathy (HCM) is a clinically prevalent disease in people around the world, with potential outcomes ranging from sudden cardiac arrest and/or heart failure to the normal life expectancy of the patients. HCM is a condition where the interventricular septal wall becomes abnormally larger, making it difficult for the heart to pump blood from the left ventricle. It has been shown that having a 3D model decreases the time to perform a Myectomy and increases the chances of success. To further understand the anatomy of the Heart and blood flow pattern post-surgery, I used ScanIP software to create 3D models of how a hypertrophic heart might look after surgery. These models can be used to study blood flow pattern and establish an optimum amount of tissue in the interventricular septum needed to be removed during myectomy.

NICK RANA, COMPUTER SCIENCE

Insurance Fraud Detection

Faculty Mentor: Dr. Christopher McMurrough

In the modern world, insurance is a major service provided to consumers that offers some relief concerning their valuable assets. With so many valuable objects on the market, insurance claims are at an all-time peak; and with this comes attention, both wanted and unwanted. Insurance Fraud Detection is a sophisticated web application integrated with various modules that help insurance agents determine whether a claim by a client is fraudulent or not. Insurance agents can utilize this application to web scrape the internet for clues of the item in question to determine if it is still in the possession of the original owner. The application then evaluates the evidence of the case and compares the features with the clues found via the internet to solidify the search and help the agent decide if the claim is fraudulent.

MEGAN RODRIGUEZ, ANTHROPOLOGY

The Woman Behind the Glass: Representation of Women and Gender in Museum Exhibits

Faculty Mentor: Dr. Joci Caldwell Ryan

This thesis investigates and analyzes the ways in which Texas museums represent women and gender in prehistoric human exhibits and how this relates to the manner in which modern women view their own past. This study aims to assess human evolution exhibits and their depictions of gender in prehistoric populations, especially images and portrayals of social groups and gender roles. This was done through in-person assessment of the ways humans were depicted in exhibits by means of photographing the exhibits and observing the physical appearance and activity of the humans depicted. The study found that Texas museums present prehistoric humans with unequal numbers of men and women and with significant gender role division. This inequality in representation indicates an inaccurate portrayal of prehistoric humans as adhering to the same gender ideology and gender roles of modern Western society.

REBECCA ROTEN, PSYCHOLOGY

Academic Stress and Extracurriculars: An Examination of In-group Identification, Participation Motivation, and Stress in College

Faculty Mentor: Dr. Jared Kenworthy

Academic stress is a common feature of college life, but excessive stress can have negative effects on academic outcomes, health, and general well-being. The purpose of this study was to investigate the relationships between academic stress and factors of extracurricular participation, including in-group identification, participation time, and participation motivation. It was hypothesized that higher in-group identification and internal motivation would relate to lower academic stress. A sample of undergraduate college students ($n = 296$) completed a survey consisting of an academic stress scale and a series of questions about their extracurricular participation. Academic stress was not associated with any of the factors of participation; however, in-group identification was positively correlated with both internal and external motives, and participation motivation differed between activity types. These findings suggest that students experience similar levels of academic stress regardless of involvement.

ERIN SCHILLINGS, BIOLOGY

Measuring Texas Horned Lizard Population by Capture-Mark-Recapture Technique

Faculty Mentor: Dr. Corey Roelke

The Texas horned lizard, *Phrynosoma cornutum*, is classified as a threatened species. They are known by the horns on their head and as the state reptile of Texas. This flat-bodied and fierce-looking lizard is important to our ecosystem by limiting the ant population, but is falling prey to larger predators, such as coyotes and rattlesnakes. To further conserve the species and study the population size, a team of researchers went to west Texas to capture and mark lizards with electronic Passive Integrated Transponder (PIT) tags. They had an encounter number of 164 from 2010-2021. The data consisted of GPS coordinates, sex, gravid, Snout-Vent Length, total length, weight, temperature, and route data. The data was run through the Mark program to show the estimated population size and promote steps to preserve the diversity of the species. The findings show that the species has diminished in size and will need further support.

BHOWMIK SUJEY SOORI, ECONOMICS

What Dictates Carbon Dioxide Emissions Worldwide?

Faculty Mentor: Dr. Christopher Candreva

The factors that lead to carbon dioxide emissions worldwide has been a popular topic for the last 30 years; however, a relatively underexplored topic is the relationship between carbon dioxide emissions and economic growth. This paper attempts to identify what type of relationship exists between carbon dioxide emissions, economic development, and energy consumption. Multiple econometric models including Ordinary Least Squares (OLS), fixed effects, and a random effects model were estimated for a panel data set of roughly 100 countries from 1960 through 2016. The results of the models show that there is a strong correlation between real GDP per capita and annual carbon dioxide emissions. These econometric models also show that the relationship between economic growth and carbon dioxide emissions is diversified due to the difference in regions and the diverse sources of energy that is used in each region.

CHRISTIAN TINDULA, MECHANICAL ENGINEERING

Pellet Distribution and Mixing for a Pellet 3D Printer

Faculty Mentor: Dr. Paul Davidson

UTA's LAMMA Lab has created a pellet 3D printer by attaching a Massive Dimension Pellet Extruder head to the end of a Kuka 6 degree of freedom robotic arm. The printer must have constant access to two pellet reservoirs and be able to print a two-material structure or a mixture of the materials. A batching system was created that distributes pellets using a lead screw conveyor to an enclosed metering plate. When the weight of the pellets distributed to the plate is equal to the specified weight of the batch, the conveyor stops, and the enclosure shifts moving the entire batch into the pellet extruder head. A mixed patch is created by alternating small pulses of the lead screws of the materials desired in the mixture. The mixed batch is not uniform but will allow for a granulate batch blender to be added below the batching system.

RAKESH YADAV, MECHANICAL ENGINEERING*Mars Rover-Proof of Life Module*

Faculty Mentor: Dr. Raul Fernandez

The existence of extraterrestrial life has always been a fascinating topic for human beings, and the discovery of water on Mars reignited the debate over whether life on the planet is possible. This project describes the methods of proving life from a soil sample. Biuret and Sudan IV reagents are used for protein and lipid tests, which are the essentials of life. The presence of protein and lipid is indicated by the purple and orange-red stains; however, after testing the soil with reagents, it was discovered that the color change might be challenging to distinguish in the muddy solution. Therefore, it was decided that the soil solution should be decanted for 5-10 minutes to see a noticeable color change. Further testing is needed to determine if this will help in the distinguishment of colors.

AFTERNOON SESSION

2:00PM – 3:30PM

CHRISTINE HEKMAT ABASI, COMMUNICATION STUDIES

The Science Behind Stuttering: Reducing Stigma and Public Misconceptions

Faculty Mentor: Dr. Molly Wiant Cummins

Persistent Developmental Stuttering (PDS) affects about 1% of the world's adult population across all cultures and social classes. Stigma, especially around stuttering, can be perpetrated in many ways. There has been and continues to be a strong connection between stuttering in mainstream media and negative characteristics such as lack of intelligence, nervousness, or lack of social skills. This study investigates the source of negative social stigma and possible methods to reduce negative stigma. Participants joined in an empirically based survey meant to analyze thoughts and beliefs on stuttering and the origin of those beliefs. This survey determines if interpersonal contact and education effectively reduce negative stigma regarding stuttering. Finding an effective way to reduce negative stigma around stuttering can be used in other areas of healthcare and increase the quality of life for people who stutter.

RESHA ADHIKARI, COMPUTER SCIENCE

Increasing Efficiency of UR5 Robot

Faculty Mentor: Dr. Christopher McMurrough

Even though the UR5 robot was developed for industrial purposes, it has not been efficient enough to replace human workers in warehouses and factories. The main theme of this project is to increase the efficiency of the robot by detecting the QR code and using the code as a source to pick up envelopes. Once the robot can detect the QR code placed on the envelope and is able to scan it, the robot will move towards it, use suction to pick up the envelope and move it to another location as desired. This technique is simple and more effective than detecting an envelope itself on a moving conveyor and has higher efficiency. With this technology, there is an increased possibility of the UR5 robot one day replacing human workers in the industry.

NEAZ ALMIR, TISSUE BIOMEDICAL ENGINEERING

Biomechanical Properties of Porcine Neonatal Epidermis from Forelimbs and Hindlimbs

Faculty Mentor: Dr. Jun Liao

In adult humans, it is common to replace damaged tissues and epidermal tissues of smooth muscles on internal organs with porcine xenografts during a surgical procedure. However, there is little research on the usage of neonatal porcine tissues because of the difficulty in performing mechanical testing and obtaining samples from neonatal pigs due to the delicate property of the tissues. By performing mechanical testing on tissues obtained from stillborn pigs, we can calculate the amount of stress and strain these tissues undergo and how these tissues can be used to replace epidermal tissues in limbs of human infants. Using a Uniaxial Machine, measurements of stress relaxation, creep, and pull to failure will be calculated for various porcine tissues in the longitudinal and circumferential directions. The data will be analyzed to determine the average maximum stresses and strains these tissues can undergo for various tensile loadings before the tissues fail.

AAYUSH BHATTARAI, PHYSICS

Study of Neutrino Background for the Low-mass Dark Matter Search in Future Neutrino Experiments

Faculty Mentor: Dr. Jaehoon Yu

With high-intensity neutrino beams and large mass detectors, neutrino physics has entered the high precision measurement era. Accelerator experiments that use high-intensity proton beams impinging on a fixed target could produce dark matter with relativistic energies, along with neutrinos. DUNE, one of the most extensive neutrino experiments under construction, has similar prospects of looking for low-mass dark matter (LDM) produced in the proton interactions with the target. With the possibility of charge-neutral LDM production in the target, numerous neutrinos will be generated alongside it, which will be the primary background to the LDM signal. To understand these neutrino backgrounds, we studied two “modified DUNE” frameworks: Neutral Rich Horn Focusing (NRHF) System and Targetless DUNE. These systems help us reduce background neutrinos in search of LDM signals. These configurations also enhance the signal-to-background ratio by several orders of magnitude.

JUAN CAMILO BURITICÁ YATE, AEROSPACE ENGINEERING

A Design Study on the Impact of Stability and Control on Vehicle Geometry and Performance for Traditional Hypersonic Vehicles versus Control Configured Hypersonic Vehicles (CCV)

Faculty Mentor: Dr. Bernd Chudoba

Hypersonic vehicles have been in development for over 60 years, yet a control-configure-vehicle has yet to be designed to understand the possible improvements over statically stable configurations. This paper studies the effect of stability and control on aircraft geometry and performance by comparing traditional vehicles versus control configured vehicles (CCV) that operate in subsonic and supersonic speeds and extrapolating this analysis to predict these effects on hypersonic vehicles. Data related to geometry, aerodynamic, performance and stability from various vehicles was collected and used to find trends by comparing aircraft design parameters to stability criteria. The results showed that by decreasing the degree of inherent static stability, the vehicles tend to become smaller and lighter but require more control power and advanced control systems to compensate. Based on these results, CCV design considerations applied to hypersonic vehicles are discussed.

WILL CHEN, MATHEMATICS

Hazard Rate Estimation Based on Censored Data and Measurement Error

Faculty Mentor: Dr. Shan Sun-Mitchell

Motivated from lung cancer study data, we consider a model $X = Z + E$, where X is an observable variable and Z is a hidden variable contaminated in X with a measurement error E . Such a model can also apply to studies in microfluorimetry, electrophoresis, biostatistics, and other fields, where the measurements Z cannot be observed directly. The main objective of this project is to estimate the hazard rate of the unobservable survival time Z in a lung cancer study. Assuming the additive measurement error E has a known distribution, we combine deconvolution kernel density estimation and inverse-probability-of-censoring weighting methods to formulate a nonparametric hazard rate estimator based on random right-censored observations of X , when the distribution of X is unknown. Simulation studies show that the estimator performs well when sample sizes are relatively large.

ISABEL DAVALOS, PUBLIC HEALTH

Aloha Market @ UTA

Faculty Mentor: Dr. Erin Carlson

Mental health across college campuses is a topic that has been increasingly researched over the past couple of years. There are several things that can affect a person's mental health and are encompassed in the social determinants of health. These include economic status or social and community context. This project focused on social and community context to improve the mental health and wellbeing of those on campus. This was done by creating the Aloha Market, where community members shared their passions with others and mental health organizations educated visitors. A survey was administered to visitors to review their experience. The results are expected to show that this event will improve their mental health by increasing their awareness of health resources and by building a sense of community for them. Research should continue to be conducted on this topic to cultivate a society with much aloha (peace, love, and compassion).

IDARAROSA EKONG, BIOLOGY

Generating A Sparse Fluorescent Reporter for A Phagocytic Cell in C. elegans to Characterize Compartmentalized Cell Elimination

Faculty Mentor: Dr. Piya Ghose

Programmed cell death is very important for animal development. Our lab discovered a new form of cell death called Compartmentalized Cell Elimination (CCE) in the nematode *C. elegans*. Here three segments of a complex epithelial cell called the tail-spike cell (TSC), that shapes the animal's tail, die differently. After a cell dies, its remains are taken up by a phagocyte (cell-eating cells) through a process called phagocytosis. We wish to image phagocytosis of the TSC as it dies, we have a fluorescent reporter for the phagocyte. However, in the current version of this marker expression is very broad, other cells are obscuring our view to see what we are interested in. The experimental strategy includes gene promoter dissection, PCR fusion of promoter fragments to GFP, microinjections, and microscopy/imaging techniques. We will use new phagocytic reporter to look at phagocytosis in wild-type embryos through time-lapse imaging.

RIMISHA GHORSAINI, INFORMATION SYSTEMS

Differential Privacy and Information Security

Faculty Mentor: Professor Scott Johnson

This research is based on the current emerging technology, differential privacy. The research questions privacy issues in information systems, processing, handling, organizing, and retrieving data. The goal is to have the information and the uses of differential privacy algorithm in the data privacy processes and unfolds the application of differential privacy on various fields including the field of internet technology. This study conducted a survey of 89 University of Texas at Arlington students to understand their perception of information security. The survey revealed that participants were less attentive towards their daily activities, such as shopping, online registration, and subscriptions, which could provide one explanation for data exposure. The study also reveals respondents are open to adopting differential privacy applications. Differential privacy has a wide scope and may be very helpful in providing security to data privacy in the future.

ANALEE GONZALEZ, NURSING

The Impact of Anxiety on Birth Perception Among Postpartum Hispanic Adolescents

Faculty Mentor: Dr. Cheryl Anderson

Anxiety is a common mental health disorder in the postpartum population that may severely impact birth perception. Using a secondary analysis, this descriptive study explored the contribution of anxiety and two confounding variables, unplanned pregnancy and parity, on the Hispanic adolescents' birth perception. Results from 183 adolescents 13 -19 years of age revealed that parity and a self-rating of feeling anxious correlated with a negative birth perception. Unplanned pregnancy had no significant correlation on birth perception in this population. We suggest that certain risk factors may place adolescents at risk for experiencing a negative birth perception. Results of this study support the need for assessments of adolescent anxiety, especially among multiparous teens. High birthrates for Hispanic adolescents may suggest increased vulnerability; thus, the need for additional research within this racial-ethnic group. Continued research could help identify additional contributors to experiencing a negative birth perception among adolescents.

TOLUWANI IJASEUN, BIOMEDICAL ENGINEERING

Optimal Tissue Clearing of Whole Mount Mouse Organs

Faculty Mentor: Dr. Juhyun Lee

Various tissue clearing techniques have been created to optically clear tissue for high-resolution imaging. Due to limited penetration depth, sectioning tissue is often used for imaging and reconstruction, but these lead to aberrations, unlike whole mount organs. To better understand how to optimize clearing whole organs, four different variations of PEGASOS and BABB, organic solvent-based clearing methods, were created and tested on various mouse organs. Two of the variations were chosen to stain with antibodies and dyes to display vasculature. For quantification purposes, the shrinkage ratio of the organs was measured in ImageJ for comparison. Axially swept light-sheet microscopy was used to obtain 3D images, with and without staining. Progress photos of the tissue clearing stages were taken as well. The best results are expected to be seen with combining PEGASOS and BABB for immunohistochemistry staining, while BABB will be the best for tissue clearing alone.

JACOB INGRAM, NURSING

Exploring the Relationship Between Rural Health Disparities and Income, Mortality, Insurance and Hospital Access

Faculty Mentor: Dr. Jessica G. Smith, PhD, RN

There is limited information about how social determinants of health (SDOH) relate to mortality rates in rural and urban areas. The purpose of this study was to determine rural-urban differences in, and correlations between, county-level mortality and SDOH variables (i.e., income, number of hospitals, being with or without insurance). The design was secondary, cross-sectional, descriptive, and correlational. There were 82 urban and 172 rural Texas counties. Mean county-level mortality rate was significantly higher in rural counties (M=108, SD=36.4 per 10,000 population) compared to urban (M=90.9, SD=25.6). In rural counties, uninsured rates were higher, insured rates were lower, and median income was lower. For urban counties, there was a moderate, negative, statistically significant correlation between health insurance and mortality rates. There were not significant correlations between SDOH and mortality in the expected direction for rural counties. Future studies are needed to establish what may explain rural-urban mortality disparity.

ALEXIS JONES, EXERCISE SCIENCE

Social and Environmental Disparities in Physical Activity and Childhood Obesity among 2-5-year-old Children

Faculty Mentor: Dr. Xiangli Gu

Social and environmental factors are important determinants of physical activity (PA) and childhood obesity. The purposes of this study were to 1) explore associations of social-demographics (i.e., ethnicity, social-economic status [SES], gender), PA, sedentary behavior (SB), and BMI percentile with social/built environment and 2) explore SES disparities in environmental determinants of health. This cross-sectional study recruited 40 preschoolers (Mage=3.55 years; 75% girls; 17.5% low SES; 30% Hispanic; 10% overweight/obese). Parent-report surveys measured social-demographics, PA outcomes, and social/built environment. Results indicated higher SES children engaged in more PA and less SB than low-SES peers. SES significantly associated with PA, obesity, crime safety, inside space, stimulation variety, and fine and gross motor toys (r 's range from -0.5 to 0.57; $p < .05$). Obesity significantly associated with inside space ($r = -.54$; $p < .05$). MANCOVA analyses revealed significant SES effects on perceived neighborhood safety and inside space toward PA ($p > .05$). Culture-specific interventions are needed among underserved children.

MURTAZA ALIASGAR KHOKHAR, BIOMEDICAL ENGINEERING

Application of Convolutional Neural Network towards Image

Upscaling demonstrated via Chest X-ray dataset

Faculty Mentor: Dr. Khosrow Behbehani, Dr. Juhyun Lee

Light Field Microscopy is a 3D imaging technique that sacrifices spatial resolution to capture angular information. A neural network was developed to increase the resolution of images captured. The objective of this study is to show the application of the developed convolutional neural network towards other topics. A dataset containing chest x-ray images will be used to train, test, and analyze the neural network. The neural network will be trained by converting the images to low-resolution and using it as training data. The original high-resolution data will be used as ground truth. Peak signal to noise ratio will be used to test and analyze the data. It is expected that the system will output an image that is upscaled by a factor of two. Obtaining an upscaled image will show that the developed system can be used to upscale various images and hence can be applied towards various other fields.

WARIS KHUWAJA, BIOLOGY

Chromatin Mapping of Planktonic Crustacean Daphnia Pulex Using ATAC-seq

Faculty Mentor: Dr. Sen Xu

Assay for Transposase Accessible Chromatin with high thought-put sequencing (ATAC-seq) is a procedure used to discover the regions of chromatin in a cell that are accessible to the transcription factor. ATAC-seq has been used in many model organisms such as mice, yet in non-model organisms, the technique was not fully optimized. In this research, an adapted protocol of nucleic ATAC-seq was performed on *Daphnia pulex*, a planktonic crustacean, to optimize it and generate a chromatin map. Three major steps in performing the ATAC-seq were nucleic isolation and purification, transposition reaction, and polymerase chain reaction (PCR) amplification. The modification of the protocol will be useful for future investigation in not only the whole body but also tissue-specific studies.

NICHOLAS LAUDERMILK, BIOMEDICAL ENGINEERING

Explainable AI (XAI) Approach to Convolutional Neural Network Model Optimization

Faculty Mentor: Dr. Juhyun Lee

Advancements in artificial intelligence (AI) show promise for the technology's use in widespread biomedical applications. As these models grow more complex, understanding how they work becomes increasingly more difficult. To use these systems in the healthcare setting, it is imperative to reduce model ambiguity and increase user trust in their decision-making. Explainable AI (XAI) techniques were used to optimize the development of a super-resolution convolutional neural network (SRCNN). Image augmentation was performed on the training data, and k-fold cross validation was used to obtain more reliable metrics. Saliency maps and SHapley Additive exPlanations (SHAP) were used to show the importance of sections of the image on the model's final output. Feature visualization was used to show internal network features in a visually perceptible pattern. Using these techniques, object edges and regions were shown to have the biggest effect on the model's output, and the model outperformed interpolation by 5-10%.

KATIA LOPEZ, SOFTWARE ENGINEERING

Human Assistance for Robot Arm

Faculty Mentor: Dr. Christopher McMurrough

The problem of inefficient machinery in industries affects overall production and can cause significant errors. The Human Assistance for Robot Arm (HAFRA) project consists of a Universal Robot, specifically the UR5, an Intel RealSense depth camera, and software programs. The robot receives a position from the computer vision program, which uses the camera to detect an Aruco tag, and then suctions the envelopes from a conveyor belt and places them into a bin. The project also includes human assistance, which allows remote picking by an operator. A human is able to view an image and use the mouse cursor to select a pixel coordinate. This coordinate is converted to a real-world position and sent to the robot so it can continue picking. Human assistance increased the robot's performance and achieved a success rate of nearly 100%. Industries with product lines can use HAFRA to optimize their tasks with precision.

ANGELICA MAGNUSSEN, COMPUTER SCIENCE

Rectifying Performance Bottlenecks in a Geospatial Data Visualization Web Application: A Case Study

Faculty Mentor: Dr. Christopher McMurrough

Data-heavy analytic and visualization software are often at risk of performance degradation due to their system's inability to adequately process large or complex volumes of data in a context-specific practical period of time. Known as the Big Data Problem, its solution is to implement a custom solution for each bottleneck identified within a system's dataflow pipeline. This case study seeks to rectify bottlenecks in a Recreational Vehicle Travel Data Analysis Web Application. To achieve this, the methodology used is Bottleneck Identification, Bottleneck Categorization, Solution Engineering, Implementation, and Method Effectiveness Measurement. In this study, the primary bottlenecks identified occurred at the retrieval and map-rendering of geospatial route data. After analysis, remedial strategies — including the use of data pre-processing, a database management system (PostgreSQL), a RESTful based server (Pg_tileserv), and partial data renders — are implemented. The effectiveness of these implemented performance enhancement strategies will be measured in the near future.

RAUL-ANDRES MORALES, ARCHITECTURE

Improving Texas with Green Roof Gardens: A Review of Green Roof Garden

Systems and Design Proposal for the CAPPA Building, UTA

Faculty Mentor: Dr. Kathryn E. Holliday

Texas is home to some of the hottest summers, often reaching over 100o during the day. A few countries, like Canada and Germany, have created policies that mandated green roof garden systems for new and renovated buildings. Studies conducted by the American Society of Landscape Architects shows that green roofs can lower the temperature of a city, as a whole, anywhere between 0.2o and 1.4o F. The implementation of green roof gardens in Texas can aid in lowering heat islands, excessive rainwater run-off, and increase energy efficiency in buildings. With the research conducted, this project was a creative design proposal for the construction of a green roof garden for the College of Architecture, Planning, and Public Affairs building at the University of Texas at Arlington, in hopes of beginning a more sustainable change.

VICTORIA MUNOZ, COMMUNICATION STUDIES

The Cultural Implications of Media Portrayals of Minorities in the U.S

Faculty mentor: Dr. Karishma Chatterjee

Research suggests the media shapes the way children perceive the world. In addition, ethnic minorities are typically portrayed negatively in media. Disney Princess movies have become a widespread part of childhood experiences, as these movies often top box-office sales and generate copious merchandise sales. Disney Princess movies have the ability to produce, circulate, and exchange information, especially to kids; therefore, it is important to understand how minority and ethnic people are portrayed. Using content analysis, this study examines a sample of eight popular Disney Princess movies utilizing a codebook to assess demographics, types of interactions, and personal appearance characteristics of gender and ethnic minority characters. When a minority character appears on screen, their characteristics and interactions are counted and added into the codebook to correlate with a number (e.g., blonde=1). Study findings are expected to provide an understanding of the presence and portrayals of ethnic minorities in Disney Princess movies.

MICHELLE NGUYEN, INTERDISCIPLINARY STUDIES

Marrying Strangers: Picture Brides and Arranged Marriages in the US, 1875-1943 and 1990-Present

Faculty Mentor: Dr. Stephanie Cole and Dr. Dustin Harp

This paper examines the historical phenomenon of picture or mail-order marriages during two periods: the first period is the era of Asian exclusion at the turn of the twentieth century and the second period is the rise of online dating at the turn of the twenty-first century. This research project examines oral testimonies, government reports, and products of popular culture to suggest that women have used their own agency to make these marriages beneficial as often as the marriages have been exploitative. In the era of Chinese exclusion, marriages help to sustain Asian communities, especially in light of serious racial prejudice. While most imagine the marriage of an Asian female-white male in the second period as problematic for the women, this research, in both the first and second periods, suggests that women have pursued these marriages for the economic and social advantages that the marriages bring.

CHIDOZIE NWANKWO, EXERCISE SCIENCE

Circadian Rhythm and Anaerobic Power, How Time of Day Effects Physiological Variables Responsible for Rapid Exercise Performance

Faculty Mentor: Dr. Judy R. Wilson

In contemporary physiology, the circadian rhythm influences more than the neurotransmitters melatonin and cortisol. Monitored from hypothalamic pacemakers and suprachiasmatic nuclei (SCN), metabolic and physiological structures are under a biomolecular schedule. Likewise, peripheral tissues are coordinated through the hormonal, autonomic, and behavior stimuli that direct the metabolic processes that occur in the skeletomuscular system. The purpose of the current study was to determine how the time of day could significantly the metabolic response to an anaerobic capacity test. Subjects had weight, height, and body fat % recorded prior to the Wingate Anaerobic Test. Blood lactic acid accumulation was documented before to form a baseline and 5 minutes post protocol. Fatigue index, peak and mean power were recorded post-test. A significant difference in lactate millimole ($p < .005$) and power ($p < .005$) was observed. It was concluded that time of day could influence exercise performance and that individuals should consider the circadian cycle when optimizing performance.

SRI SUBHASH PATHURI, COMPUTER SCIENCE

Building an Application to Monitor the Back Posture in Real-Time and Provide Live Support from Health Experts

Faculty Mentor: Dr. Shawn Normal Gieser

During the pandemic, much of the working population spent a lot of their time doing sedentary desk jobs. As a result, they may have developed inadequate posture, which can cause problems such as back pain, if not corrected at an early stage. Implementation of machine learning and computer vision has allowed us to capture and analyze video input from the user's phone to remind them whenever they are not in the correct position. To further support users, a chat feature has been implemented through which the users can quickly get in touch with orthopedic experts for evaluation and feedback. With the help of strategies from kinesiology, a comprehensive analysis can be conducted to find the root cause of any abnormality of the spine. Anyone can instantly monitor their posture and make minute corrections to swiftly recover after consultation with a medical professional.

JASH SHAH, INFORMATION SYSTEMS

Improving User Experience (UX) through Web Redesign

Faculty Mentor: Karen Scott

This project aims to identify major factors of consideration for redesigning a website to improve the user experience (UX). We short-listed ten websites and reviewed them with the prospect of understanding the user experience. A short survey was also conducted to better understand usability, user satisfaction and for examining the user experience. This information was compared with the top three UX popular websites to help ascertain the major differences. The process allowed us to classify factors that would assist in enhancing the user experience, but it was discovered that these could vary depending on website type and use. Additionally, there were few instances identified that could help the website owner determine when a redesign is needed. Future studies should include a larger sample size and a website impression report for each website, as that would assist in determining the major factors that matter both in user experience and website redesign.

CORRINA SULLIVAN, POLITICAL SCIENCE

United Nations Peacekeepers, The Use of Sexual Exploitation and Abuse, and Feminist Theory

Faculty Mentor: Dr. Brent Sasley

The purpose of United Nations peacekeepers is to promote peace in a country following a period of unrest and/or violence. Therefore, when peacekeepers engage in acts of sexual exploitation and abuse, questions arise as to what problems this creates. Moreover, the question of how to prevent further incidents of sexual exploitation and abuse can be explained by looking at various feminist theories and what they would have to say about how to respond to instances of sexual violence. This qualitative research study focuses on the peacekeeping force, specific examples of sexual violence, and feminist theory. Through conducting a qualitative study, this paper ultimately concludes that these acts are the result of broader, societal issues regarding sexual violence.

ANNA TARPLEY, INTERDISCIPLINARY STUDIES

Destroying Man: Philosophically Situating C. S. Lewis' The Abolition of Man

Faculty Mentor: Dr. Steven Gellman and Dr. Miriam Byrd

Lewis' central argument in *The Abolition of Man* explains the philosophical consequences of extending assumptions implicit within scientific methodologies and originally used to treat Nature to include a treatment of humans. This thesis elucidates Lewis' philosophical concept of man's "Power Over Nature" by providing the historical and philosophical context out of which it developed. Multi-disciplinary research relying on primary source documentation, secondary academic literature, biographical material, and philosophical text was used to synthesize a descriptive philosophical narrative in two parts. The first part consists in the historical basis for the shift in ideas involved in Lewis' argument as manifest in the philosopher-scientists Galen and Bacon, and the second consists in contextualizing the argument within Lewis' broader corpus. It was found that Lewis' argument, when situated within its historical-philosophical context, is understood better both as an argument and in its application to modern philosophies of science.

MICHELLE TRAN, NURSING

Gender Differences in Symptoms Perception, Physical Functioning, and Activities in Daily Living in Adults with Heart Failure: A Secondary Analysis

Faculty Mentor: Dr. Yaewon Seo

Although Heart Failure (HF) can occur in both women and men, some studies have shown that both genders do not present the same outcomes. However, there is an underrepresentation of the effect of gender on the relationship of heart failure and changes in activities of daily living. This study compared the effects of gender on dyspnea and other variables to determine differences in relationships between dyspnea and other variables. A secondary analysis of a cross-sectional descriptive study was conducted with 186 patients who were asked to perform several tests to evaluate muscle weakness and functional status (e.g., the 6-minute walk test) and to rate dyspnea, depression, and disability using reliable questionnaires. Results showed higher levels of dyspnea related with more depression in female patients and higher levels of dyspnea related with lower muscle strength in male patients. These differences indicate that interventions targeting the findings may help improve patient outcomes.

THU TRAN, BIOLOGY

Comparisons of the Reduced and Developed Pectoral Girdles Among the Gymnophthalmidea Clade

Faculty Mentor: Dr. Walter Schargel

The Gymnophthalminae family consist of over 250 lizard species. Many of these microteiids present with reduced limbs that contribute towards their snake-like appearance. Several predictions regarding limb reduction arise from genetic and environmental influence; however, there is limited literature supporting the impact of limb reduction onto the pectoral girdle. Five Gymnophthalminae species were selected, and Dristhi software was used to perform CT segmentation to view their pectoral bones. *Echinosaura horrida* presents with the most developed pectoral structure, as this is a fully developed quadruped species. Whilst *Calypotommatus leiolepis* presents with the most reduction with a thinner structure and diverges from a traditional girdle. These findings support the hypothesis of reduced limbs reducing pectoral structure as *C. leiolepis* have absent forearms. Likewise, the well-developed lizards present with a well-developed pectoral girdle. Further research should be conducted to compare pectoral reduction amongst other families to help support this hypothesis.

ELIZABETH ROSE WEERESINGHE, BIOLOGY

Immune Variation through MHC Gene Analysis of the Mourning Gecko (Lepidodactylus lugubris)

Faculty Mentor: Dr. Matthew K. Fujita

A Major histocompatibility complex (MHC) is a cell-surface molecule encoded by a large gene family in all vertebrate DNA. The MHC determines susceptibility to autoimmune diseases. These genes are highly polymorphic, meaning that in a non-endogamic population, each individual has a unique set of MHC genes and molecules. Evolution of the MHC through polymorphism ensures a population will not succumb to a new or mutated pathogen, because some individuals will develop an adequate immune response to win over the pathogen. Because of this, finding MHC genes in transcriptomes is important for finding genetic variability in the immune systems of a species. Looking at the transcriptomes of the mourning gecko (*Lepidodactylus lugubris*) will allow observation and analysis of the genetic variation in this species. Even though this particular gecko is asexual and reproduces through parthenogenesis, environmental factors may play a part in immune variation resulting in inheritance of different MHC molecules.

TORI YOUNG, NURSING

The Effect of Depression, Anxiety, and Length of Stay in Neonatal

Intensive Care upon Maternal-Infant Bonding

Faculty Mentor: Dr. Cheryl Anderson

Bonding is important to establish an early relationship and is a challenge to mothers with infants in NICU. The aim of this study was to determine if a longer length of time an infant requires NICU admission is associated with impaired maternal-infant bonding. A secondary goal explored associations and effects of maternal depression and anxiety upon bonding via the Postpartum Bonding Questionnaire (PBQ), Edinburgh Postnatal Depression Scale (EPDS), and a subscale of the EPDS for anxiety. A descriptive design was used to explore mental health and bonding among 45 NICU mothers who were at least 18 years old and could speak, read, and write English. Study results revealed that neither NICU length of stay, anxiety, nor depression significantly predicted impaired bonding. However, bonding scores significantly correlated with anxiety and depression variables; thus, despite a small sample size, mental health assessments are important in the postpartum care of mothers with NICU infants.

MILLY YU, NURSING

Are Risk Factors for Postpartum Depression Similar Between Adolescent and

Adult Mothers with Infants Admitted in the Neonatal Intensive Care Unit?

Faculty Mentor: Dr. Cheryl Anderson

Postpartum depression (PPD) is a prevalent and debilitating mental disorder, but limited research exists comparing risk factors between adolescent and adult mothers. To further research comparisons between adolescent and adult mothers, a cross-sectional design of two merged datasets was used to compare eleven recognized risk factors for PPD. The sample consisted of 82 mothers with NICU infants representing 35 adults ages 20-44 and 47 adolescents ages 13-19. Assessments via the Edinburgh Postnatal Depression Scale (EPDS) indicated significantly higher mean scores for adolescent mothers. Yet, significant risk factors including pregnancy complications, lower gestational age and infant birth weight, and cesarean birth more likely characterized adults. Marital status differentiated the groups. Findings suggest both age groups to be vulnerable to PPD, recommending routine postpartum assessments for all women. Study limitations included recruitment settings, possible differences in infant characteristics between age groups, and lack of knowledge regarding chronic depression prior to pregnancy.
