6TH ANNUAL

HONORS SYMPOSIUM

STANDING IN HIGH PLACES

SATURDAY, MARCH 25, 2017

Presented by the UIW Honors Program
Why the Tower on the Cover?

Vladimir Tatlin’s Tower is famous primarily because it was never actually built. Dedicated as the Monument to the Third International (1919) during post-revolutionary Russia, the required materials—glass, iron, and steel—were unavailable. Tatlin built several models, but the tower was never erected, and has since become a symbol of ambition, innovation, and curiosity—everything required for exceptional research.
The Honors Symposium is our annual forum for ambitious Honors students to present their independent studies to the Honors community. Their fascinating projects are a testament to their creativity and fortitude and become an inspiration to the younger students for their future work.

The thesis, original research or studies in the student’s major, was a previous requirement of the Honors Program. Students tied their work into the originating theme of the Honors Program, “What does it mean to be human?” This year four seniors will represent that originating program structure in their theses, tying the work to the previous Honors theme. This is likely the last year that the theme will be such an integral part of the presentations as we move on to a new structure minus the theme and the thesis requirement.

Beginning this year, the symposium is expanding to include more than just the original projects of our thesis writers. With a thesis no longer a program requirement we will see more capstone or independent projects, collaborative work with faculty researchers and reflections on personal development over the undergraduate years. All these variations are evident in this, our sixth symposium.

As before, the Honors Council will evaluate all today’s presentations at the Honors Symposium to award the “Best Poster Presentation” and the “Best Podium Presentation” at the April awards dinner. The Council will recognize the additional work required of a thesis by also selecting a” Best Thesis” winner.

One of my favorite parts of the symposium is the opportunity to see and hear from our alumni. Today’s featured alumnus, Alfred Mejia, was an integral member of the Honors Student Board for two years, and got our first group to the Guadalupe River for some fun before the start of classes back in the olden days. He also took home the big prize from the Honors Symposium as a senior back in 2015. It will be our pleasure to hear from this young man who knows what it takes to initiate and complete a thesis project.

Your presence here is deeply appreciated by today’s presenters, the Honors Council and myself. I hope you enjoy the wonderful variety of topics in today’s symposium and ask the students many questions. They have lots to share and there is always lots to learn!

Warm regards,

Jean E. Loden
Director, Honors Program
ABOUT OUR SPEAKERS

OPENING: ALFRED MEJIA (*'15 BFA, ART)

When I was a child, I had fantastic dreams of being many things: a super hero, a wizard, the first boy to live on Neptune. Although these dreams haven’t panned out (yet), as a child I was able to live them out by drawing them. I got pretty good at doodling and coloring inside the lines as a result. This creativity and desire to achieve some standard of impressiveness and accomplishment shaped my preteen and teenage years and allowed me to become the first person in my family to enroll into a full time bachelors program at a respected university.

During my years at UIW I impressed my professors with my ability to draw and paint and to write about art history; but, truthfully, I still had no idea of what I wanted to do after graduation. However, very thankfully, after the completion of a four-year research project, a few dozen conversations with my advisor, an internship at the Blue Star Contemporary Art Museum and one particularly special visit to the McNay Art Museum my freshman year, I found pieces and hints at a direction and a goal: modern art history and arts administration and curation.

I now have my eyes set on graduate programs at two schools in two cities, one in New York and one in Chicago. Although I have every finger crossed for acceptance to this fall’s term, I’ve learned not to worry as much as I did a few months ago when I first applied. I know that the creativity, capability and determination that has carried me this far will continue to do so in an unyielding manner.

To be human means to have a desire to seek, to strive and to find, and I as I seek to strive I’ll let you know what I find.

CLOSING: JULIE MILLER, TH.D.

Dr. Julie Miller has been on the faculty of the University of the Incarnate Word since 2000. She is in her third and final year as chair of the Honors Council, although she has served on the Council for a total of five years. She helped develop and now teaches the Theological Anthropology course for the Honors Program. Dr. Miller is also chair of both the Religious Studies and Cultural Studies departments.

Dr. Miller received her undergraduate degree from the University of Notre Dame and her Masters and doctoral degrees from Harvard University. Her areas of study include feminist theology and ethics, sexual theology and ethics, environmental theology and ethics, women in Christian tradition, and medieval mysticism.
# HONORS SYMPOSIUM

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*Denotes thesis presentation*
COLLEGE OF HUMANITIES ARTS AND SOCIAL SCIENCES

In This Section:

- Joseph Z. Conger
HARD LESSONS: AN AIR FORCE ROTC REFLECTION

Conger, Joseph Z.; Psychology, Biology

Mentor: Thiem, Lisa S.; Lieutenant Colonel USAF, MS, MS, MA

ABSTRACT

Have you ever wondered what you should do if the woman you love breaks up with you the day you get her engagement ring? What if you get in serious trouble at boot camp one month later? What if the people appointed over you at this camp do not like you on a personal level? I answer all of these questions and more in “Hard Lessons: An Air Force ROTC Reflection.”

The purpose of this study is to provide a comprehensive reflection of my four-year journey through AFROTC; however, I focus on field training -- the four-week AFROTC equivalent of basic training. Because leadership and people go hand-in-hand, I will be discussing the lessons I have learned through the people I have met. I will provide a backstory for each person, as well as a description of what they taught me.

Finally, I will give the top five lessons I have learned: accept dislike, acknowledge weakness, make mistakes, be silent, and adopt the ultimate leadership style. What is the ultimate leadership style? It is putting people first by being warm and expressing genuine interest in who they are, what they want to be, and where they want to go.
DREEBEN SCHOOL OF EDUCATION

In This Section:

- Crystal Frost
AWARD-WINNING CHILDREN’S LITERATURE: A COMPREHENSIVE LIST OF PATTERNED BOOKS FOR THE ELEMENTARY CLASSROOM

Frost, Crystal; Interdisciplinary Studies    Mentor: Grote-Garcia, Stephanie, Ph.D.

ABSTRACT

Previously, Grote-Garcia and Frost (2015) investigated the applications of using patterned text for close reading. Two hundred and thirteen children's books that had won awards between 2010 and 2015 were examined for potential text patterns identified by Zipprich, Grace, and Grote-Garcia (2009). The current project is a further continuation of a literature review to include research connected to pattern books, close reading, and reading comprehension as well as a connection to the 2008 to 2015 UIW Honors Program theme of “What does it mean to be human?”
ILA FAYE SCHOOL OF NURSING AND HEALTH PROFESSIONS

In This Section:

- Carolyn Busch-Mendez
- Anyssa Guajardo
NURSING STUDENTS’ KNOWLEDGE AND ATTITUDES TOWARDS OLDER ADULTS: A DESCRIPTIVE, CROSS-SECTIONAL STUDY ACROSS A FIVE-SEMESTER CURRICULUM

Busch-Mendez, Carolyn; Nursing  Mentor: Rauschhuber, Maureen; Ph.D., RNC

THESIS ABSTRACT

The aim of this study is to further understand baccalaureate nursing students’ attitudes and knowledge of geriatric care, while analyzing the effect of certain demographic variables of the students being surveyed on these different constructs. This study would analyze correlation between progression in the program and changes in knowledge and attitudes concerning gerontological care.

Generally in healthcare, there is a negative view towards older adult care and many older clients experience ageism, which removes their independence and dignity. Nursing students must be prepared to care for the elderly with classroom exposure, in practice, and with the appropriate perception of their patients. Therefore, consideration of attitude, knowledge in theory, and their application in the clinical setting can further improve the quality of elderly care. This research study could also be useful in the nursing program curriculum, to ensure that there is proper emphasis on the aging population.

This study would employ a descriptive, cross sectional design. The sample would be recruited from a 5-semester baccalaureate nursing program at a Hispanic-serving, private university in the southern United States. Three questionnaires would be distributed by the researcher. The three questionnaires distributed would be: a general demographic survey, the Kogan Attitudes Toward Old People Scale, developed by Kogan, and the Facts on Aging quiz, developed by Breytspraak. The Statistical Package for the Social Sciences would perform all statistical analysis for this study.

Due to the structure of the nursing program, I was not able to distribute the surveys or develop my project further than my proposal. Although I was unable to currently undertake this project, I plan to expand on it further in the future. This research topic is very personal to me, but also addresses a problem in the health care system that cannot be ignored by incoming health care personnel, especially nurses that have such one-on-one time with their patients. Looking forward, I will carry the skills that I have developed during the research process with my mentor and use the information in my own career.
SIMULATION IMPROVES STUDENT CONFIDENCE ON HIGH-RISK, LOW-FREQUENCY SKILL SCENARIOS

Guajardo, Anyssa; Rehabilitative Science  
Mentor: Fisher, Reid; Ph.D.

ABSTRACT

The purpose of this study was to explore simulations as an effective way to increase athletic training students' confidence levels in high risk, low frequency events.

Medical doctors, nurses, and paramedics regularly use simulation to safely expose students to high risk, low frequency events. The result is an increased self-confidence in performing the skills necessary to successfully manage the event. In athletic training, however, no research assesses the effective impact or psychological utility of simulation as a tool in student preparation.

IRB approval was granted through the Ila Faye Miller School of Nursing and Health Professions' Simulation Center. Testing was conducted once a semester for three semesters. Simulation is part of the program’s approach to ensuring preparedness, so each student takes part in the simulation regardless of willingness to have their data included in the study. Lead faculty provided an informed consent, ensuring that the students understood that they could elect whether or not they wanted their data included. Three days prior to the event, faculty provided students with pre-event preparatory materials directed towards foundational knowledge necessary to manage an emergency scenario. The day of the event students arrived in pre-assigned groups and were asked to complete self-evaluations of confidence for various competencies involved in the scenario. Each participant was assigned a specific role to play. Faculty assessed students on their reactions to the events that then transpired. Debriefing after the conclusion allowed faculty and students to discuss collectively the end result and ways of improving a final outcome. The same confidence evaluation was given after the simulation to compare the students' level of confidence for each competency. Data were analyzed using a paired sample t-test.
SCHOOL OF MATHEMATICS, SCIENCE, AND ENGINEERING

In This Section:

- Alan Amaya
- Kelli Bass
- Paul Huron
- Gabriela Ortiz
- Nyssa Saenz
- Kayla Treviño
- Emerald Walsh
ANALYZING THE PROTEIN-PROTEIN INTERACTION NETWORK OF TNF-ALPHA

Amaya, Alan; Mathematics  Mentor: Kinsley, Debra; Ph.D.

ABSTRACT

Type 2 diabetes is one of the leading causes of death in America. This type of diabetes is caused by insulin resistance which disables your body’s ability to properly regulate your blood sugar levels. Having high blood sugar levels causes inflammation within the body, which eventually leads to organ failure. TNF-alpha, also known as tumor necrosis factor alpha, is a specific cell signaling protein involved in inflammation and insulin resistance inside the body.

In this project, we analyze the protein-protein interaction (PPI) network of TNF-alpha by using graph theory in order to understand more about inflammatory pathways found in the development of type 2 diabetes.
ABSTRACT

The purpose of this study is to (1) determine which risk factors are associated with increased fasting blood glucose (BG) and glycemic response to a high carbohydrate meal, and (2) to determine if the number of risk factors present is associated with an increased fasting BG and glycemic response. I hypothesize that the risk factors, BMI and activity level, will correlate with BG levels, and that as the quantity of risk factors increases, so will a participant’s fasting BG, indicating a poor glucose response.

According to the Center for Disease Control, 9.3% of the United States population has diabetes (2014)\(^1\). This statistic is quite alarming, especially when considering the numerous complications associated with the disease. Much emphasis has been placed on the prevention and treatment of type 2 diabetes, primarily because this is the only form of the disease that is moderately preventable. The foundation of this effort has been disease prevention and identifying risk factors, which include race/ethnicity, family history, high BMI, diet, and physical inactivity. Although identifying risk factors is vital to disease prevention, there is little research on the role these risk factors play in glucose response prior to diagnosis of type 2 diabetes. For instance, can there be a high fasting BG and indications of a poor glucose response in individuals who have risk factors for type 2 diabetes but do not have the condition? This research study attempts to bridge this gap.

Twenty healthy adults (age 20-33) were asked to fill out a questionnaire which included family history of diabetes, ethnicity, and activity level. In addition, height, weight, and waist circumference were measured to determine physiological risk factors. Following this, participants’ fasting BG levels were determined. They then consumed a high carbohydrate breakfast (60gm carbohydrate). Blood glucose measurements were repeated at 15, 30, 60, 90, and 120 minute intervals. This information was used to determine each participant’s type and number of risk factors, fasting BG and the spike in BG (peak minus baseline).

THE SYNERGISTIC EFFECT OF METFORMIN, ASCORBIC ACID, AND PYRIDOXAMINE IN THE GLYCATION OF BOVINE SERUM ALBUMIN (BSA)

Ortiz, Gabriela; Biochemistry  Mentors: Franklin, Cynthia MS, Coker, Adeola O.; Ph.D.

ABSTRACT

The purpose of the study is to evaluate the effects of varying concentrations and combinations of metformin, ascorbic acid, and pyridoxamine on the glycation of albumin. From this evaluation, the effect of these compounds on inhibiting the aggregation and cross-linking of albumin that may occur with glycation can be determined.

Protein glycation describes a series of chemical reactions in which a sugar reacts with an amino acid to produce reactive end products. This process is the primary mechanism that leads to several health complications that occur in a diabetic state, including retinopathy, neuropathy, and atherosclerotic disease. Serum albumin is vulnerable to protein glycation, which can result in adverse health effects due to the multitude of systems that it affects. The anti-glycation effects of metformin, ascorbic acid (vitamin C), and pyridoxamine (vitamin B6) have been observed in past literature, but it has not been determined whether a combination of these agents can produce a synergistic effect on glycation of serum albumin.

To determine the relative concentrations that have a significant effect on glycation, a design of experiments method, which provides simultaneous testing so that interactions can be identified, was used. All samples were created with the following: bovine serum albumin (BSA) buffered to physiological pH (7.4), glycating agent, and different concentrations of vitamin C and metformin in a central composite design. Anti-glycation activity was determined through measurement of UV absorbance and intrinsic fluorescence. Extrinsic fluorescence scans were also obtained by adding 7.5 μM bis-ANS and exciting at 400 nm, with emission monitored from 425-600 nm to determine if a conformational change occurred in the samples and if the compounds were able to inhibit the conformational change. Size-exclusion chromatography was used to determine extent of aggregation in the samples. The results were assessed to determine the extent of synergistic effects between pyridoxamine, metformin, and ascorbic acid levels on protein glycation.
ANTIBACTERIAL EFFICACY OF BASIL, CORIANDER, AND MELALEUCA OIL ON STAPHYLOCOCCUS AUREUS, PSEUDOMONAS AERUGINOSA, AND STREPTOCOCCUS PYOGENES

Saenz, Nyssa; Biology

Mentor: Vallor, Ana; Ph.D.

THESIS ABSTRACT

Due to the significant increase in microbial resistance to traditional medical therapies (i.e., antibiotics), research has explored sources of alternative and new natural sources of antimicrobials, in this case, essential oils. Essential oils are comprised of volatile liquids distilled from plants that have been proposed to have a variety of biological attributes including antiseptic, anti-inflammatory, anti-bacterial, and anti-fungal properties. This study seeks to address the microbial sensitivity of a selected panel of normal flora and pathogenic bacteria to pure grade commercial preparations of basil, coriander and melaleuca essential oils. It is predicted that when tested separately or combined against Staphylococcus aureus, Pseudomonas aeruginosa, and Streptococcus pyogenes, melaleuca, basil, and coriander essential oils will demonstrate a degree of inhibition of growth of these microorganisms, and therefore, one or more will be proposed for further study as an alternative treatment in microbial infections. Investigators utilized standard Kirby-Bauer methodology to demonstrate the presence of antimicrobial properties by the essential oils as compared to standard antibacterial drugs.
A PRELIMINARY STUDY ON THE SOIL BACTERIA DIVERSITY IN THE INCARNATE WORD AND HEADWATERS AREA

Treviño, Kayla; Biology

Mentor: Starkey, David; Ph.D.

THESIS ABSTRACT

Land-use can significantly affect the diversity of soil bacteria in an area due to changes in environmental factors, such as soil moisture and pH. This study acted as a species inventory to note the taxa in two sites, one on the campus of the University of the Incarnate Word and the other in the Headwaters Sanctuary; the relative abundance of each taxa was not evaluated, since the main focus was to see the major players in each site.

Bacteria from the first and fourth centimeter of each soil sample was isolated, and the morphological features of distinct colonies were noted before performing quantitative PCR. The taxa are in the process of being identified using sequencing and GenBank. Soil pH, temperature, moisture, and amounts of nitrogen and phosphorous were measured for each site.

It was hypothesized that the natural setting of the Headwaters Sanctuary would encourage a higher level of diversity than a cultivated environment, such as a community garden on campus, due to an increase in organic matter along with a possible lack of acidification, which can occur from the addition of nitrogen.

Future studies can focus on identifying the taxa on other sites as well as the fluctuations of taxa as the seasons change. Such studies, along with this one, can help us further understand how the change in environmental factors impact the level of bacteria diversity and communities, which play an important role in decomposition, nitrogen fixation, and chemical reduction.
SYNTHESIS OF POTENTIAL ACETYLCHOLINESTERASE INHIBITORS FOR THE EFFECTIVE TREATMENT OF DEMENTIA

Walsh, Emerald; Biochemistry  Mentor: Davis, Julian; Ph.D., Sikazwe, Donald; Ph.D.

ABSTRACT

Alzheimer’s disease and other forms of dementia are a growing concern in healthcare, prompting a search for effective pharmaceutical treatments. Among other suppositions, the cholinergic hypothesis suggests this class of neurocognitive disorders to be characterized by low levels of the neurotransmitter, acetylcholine. Acetylcholinesterase, the enzyme responsible for catalyzing the breakdown of acetylcholine, has become a target for inhibition in hopes of slowing the decline of acetylcholine. Certain derivatives of isonipecotate and nipecotate may have the potential to inhibit the esterase. The purpose of this study is to synthesize a compound which might work to successfully inhibit the acetylcholinesterase, and thus limit the decomposition of acetylcholine in the brain.

The synthesis consisted of a series of reactions the ultimate goal of forming a compound that had the characteristic length and charge hypothesized to have the most effective binding capacity to the esterase and dissolution in the body. Beginning with the addition of a benzyl ring to one end of the ester, giving it the desired length, and ending with the coupling an amine to the opposite end and converting it to a salt to provide the charge.

Producing length by addition of a benzyl group proved to be a relatively simple step and was completed by N-Benzylation of Isonepicotate by benzyl chloride. Addition of the amine to the opposing end, a more imposing task, required several different reactions. Following the benzylation reaction, the product ester was purified by column chromatography, hydrolyzed in sodium hydroxide, and refluxed in a water-methanol mixture for 30 minutes. This produced a carboxylic acid from the ester, which allowed us to convert it to the acid chloride derivative. The acid chloride derivative was then coupled to the amine, 1H-benzo(d)imidazole-2-amine, which was added dropwise.

The purity of the free base produced from the set of reactions was analyzed via GC-MS (Gas Chromatography-Mass Spectroscopy). The product was converted to a salt by dissolving it in a solution of hydrochloric acid in isopropanol and placing it under cold conditions. The purity of the salt was verified by HPLC (High Performance Liquid Chromatography).
SCHOOL OF MEDIA AND DESIGN

In This Section:

- Paul Huron
- Leah Norton
DEVELOPMENT OF A SIGNAL ANALYSIS IDENTIFICATION PROGRAM FOR AIRCRAFT/DISASTER VISUALIZATION BY CONVERTING AUDIO SIGNALS USING FOURIER TRANSFORM ALGORITHMS

_Huron, Paul; Computer Information Systems_  
_Mentor: Youngblood, Philip_

**THESIS ABSTRACT**

The objective of the project is to apply Discrete Fourier Transform algorithms to the electrical representation of the sound of aircraft to identify specific aircraft makes and models.

This project will provide a new way in which society will view and utilize aural signatures for aircraft discovery and identification. With this project, the data obtained via initial experimentation can aid in the development of numerous scientific fields. This technology can be used by law enforcement agencies (CIA, FBI, NSA) for safety and security, energy companies can locate geothermal energy, and the concept itself can be utilized for natural disaster preparedness. Identifying lost or suspicious aircraft that cannot be detected using conventional technologies as well as monitoring “no fly” zones are other possibilities.

The first step in the experimental process will be to record the sound wave at the perimeter of the airstrip where aircraft will take off and land. A portable sound recorder digitizes the signal file into an MP3 file. The MP3 files will be converted to a WAV format and read into the MATLAB program. The plot function in MATLAB creates a detailed graph of the aircraft’s aural signature. Finally, an analysis of the graphs will take effect to see if each different air vehicle system contains a unique output.

During testing, each aural signature was logged in and compared to identify signal patterns within each trial. Numerous distinct patterns were noticed as they varied between certain aircraft models. As a result, each aircraft displayed a unique visual representation of the sound that was emitted and recorded during data collection. More tests were performed using Octave software. The Octave program was able to test two models of aircraft per test. Each test was able to produce a figure that showed how each aircraft’s aural signature differed in appearance, frequency, and amplitude. When collected, these figures provided valuable insight into the nature and physical functioning of each aircraft.
MEDIA DIGITAL SOURCE BRANDING PROJECT

Norton, Leah; Graphic Design  Mentor: Treviño, Maria. T.; BA, MA, MFA

ABSTRACT

My work explores the design process behind the corporate world of a digital marketing firm and modern design. My influences have been found in established companies like Apple to smaller firms like Huge. Ever since I started in the graphic design program here at Incarnate Word, I have been fascinated with how designers have to solve problems and tell stories by using design, imagery, and color.

I started working for Media Digital Source (MDS) when it was just ink on paper. With an independent study course coming up, I offered my services as a graphic designer to create the logo and branding to give a face to the new company, and help it stand out against its competitors.