INTRODUCTION

We are pleased to present a summary of some of the outstanding scholarly research and creative inquiry carried out by undergraduates at the University of St. Thomas during the 2012-13 academic year. In every case, the student researchers showcased here have worked outside of their normal course load in close collaboration with faculty mentors to produce original research that was of the students' own choosing and design. As you peruse the wide variety of projects carried out by some of our most talented students, please be sure to take particular notice of the students who have been profiled in expanded format – students who were chosen by their department chairs for special recognition owing to the truly exceptional quality of their work.

Many projects presented in this book have been supported by student grant programs administered by our Grants and Research Office. These programs, which award research grants to undergraduate students through a highly competitive review process, provide funding during Spring Semester (Collaborative Inquiry Grants) and the summer (Young Scholars Grants and Community-Based Research Grants) to support students who wish to work closely and for a sustained period with a St. Thomas faculty member. In addition, many of these students received free housing during the summer, giving them an opportunity to carry out their advanced research and be part of a vibrant community of young investigators. Finally, many of the students portrayed here have received travel grants that have allowed them to present their research at academic and professional conferences around the world, affording them a unique opportunity to share their insights and interact with leading scholars in their field.

The close partnership between our students and faculty that produced the research highlighted here is a hallmark of the undergraduate experience at the University of St. Thomas. These students gain a deeper understanding of the research process in their fields, and our faculty gain a better sense as to how students approach complex issues. Both students and faculty alike report that these collaborations are among the most rewarding experiences they have at St. Thomas, and together, these young researchers and their mentors create an intellectually rich and exciting environment on campus that makes St. Thomas stand out among our peers.

Congratulations to these young scholars for their excellent work!

Sincerely,

Susan J. Huber, Ed.D.         David F. Steele, Ph.D.
Executive Vice President         Director, Grants & Research Office
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In the midst the Civil Rights Movement, quilters from Gee’s Bend, Alabama created the Freedom Quilting Bee to market their work and engage with political issues relevant to African American women. The beautiful quilts created by the women of Gee’s Bend, Alabama are recognized throughout the world. The quilts, with their bright colors and bold, abstract patterns, have been featured in major art exhibitions and on postage stamps. Reproductions of the quilts are sold all over the world, and there are many books on the artists and their work. My research will contribute to the scholarship on the quilters of Gee’s Bend by focusing on an early period of their history and the development of the Freedom Quilting Bee, a movement which is often ignored in the scholarship and museum exhibitions.

"My favorite part of conducting research was being able to travel to Gee’s Bend, Alabama and meet some of these inspirational women in person.”

Amanda Lesnikowski

ART HISTORY

The Freedom Quilting Bee in the 1960s and today: the quilters of Gee’s Bend as artists, merchants, and activists

I was awarded a curatorial internship at the Whitney Museum of American Art in New York City. I will be working on the Andy Warhol Film Project in collaboration with the Museum of Modern Art. We will be working towards the publication of a catalogue raisonné dedicated to Warhol and his original films.

YEAR
Graduated May 2013

MAJOR(S)
Art History

FACULTY MENTOR
Dr. Heather Shirey

PLANS AFTER GRADUATION?

“Graduated May 2013
Art History
Dr. Heather Shirey

PLANS AFTER GRADUATION?

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Collaborative Inquiry 2013

“Knowing that my research could ultimately contribute to the formation of more efficient drugs has made this experience incredibly rewarding.”

Kristin Braden
BIOCHEMISTRY

Charge density and stereochemistry affect the interaction of G5 PAMAM dendrimer with glycosaminoglycans

Cell-penetrating compounds, such as polyamidoamine (PAMAM) dendrimer, are often attached to drugs to induce cellular uptake. We hypothesize that electrostatic interaction occurs between the positively charged primary amines of PAMAM and negatively charged glycosaminoglycans (GAGs) found on all cell surfaces to different extents. The interactions between generation 5 PAMAM dendrimer and four GAGs have been studied using isothermal titration calorimetry (ITC), dynamic light scattering (DLS), and gel electrophoresis. ITC experiments revealed the binding thermodynamics. DLS was used to confirm complex aggregation. Competitive displacement of DNA cargo from PAMAM by the individual GAGs was studied using gel electrophoresis. It has been determined that PAMAM-GAG affinity is dependent upon GAG charge density and stereochemistry. GAGs can disrupt PAMAM-DNA complexes, which has implications at the cell surface.

YOUNG SCHOLARS GRANT

YEAR
Senior

MAJOR(S)
Biochemistry and Spanish

FACULTY MENTOR
Dr. Lisa Prevette

PLANS AFTER GRADUATION?
I plan on attending osteopathic medical school.

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
As a result of my research experience, I’ve developed the ability to critically examine and understand complicated and unexpected results. This can translate into the ability to thoroughly evaluate a patient’s symptoms to make a diagnosis and develop a proper treatment plan in my future career as a physician.

"Knowing that my research could ultimately contribute to the formation of more efficient drugs has made this experience incredibly rewarding.”
“Thanks to my research experience, I now understand how to go about properly designing and conducting a unique research project.”

Zach Henseler

Effects of various incubation conditions on g-wire self-assembly

“Bottom-up” methods of nanoscale construction, which utilize particular molecules’ ability to self-associate into higher order structures, have grown dramatically in importance as more possible uses have been formulated. Guanine-rich oligonucleotides (GROs) have proven to be prime candidates for this type of nanoconstruction, due to the self-association properties of the guanine nucleotide into a planar arrangement known as a “G-quartet”. Particular sequences can assemble into higher-ordered structures known as G-wires. A GROs ability to self-assemble into a G-wire supramolecular structure depends highly on incubation conditions. Utilizing characterization methods such as PAGE, CD spectropolarimetry and AFM, we aim to uncover in what manner these variables alter self-assembly. Our results show loop length, concentration of coordinating cation, and presence of Mg2+ all drastically affect self-assembly of GROs into higher-ordered structures.

YEAR
Graduated May 2013

MAJOR(S)
Biochemistry

FACULTY MENTOR
Dr. Thomas Marsh

PLANS AFTER GRADUATION?
I will attend graduate school for biochemistry, molecular and cellular biology at Cornell University.

FAVORITE PART OF CONDUCTING RESEARCH?
Getting to work under professional faculty who not only have an astounding amount of expertise in the field, but who are also extremely devoted to their research and are eager to provide individual assistance to their advisees.
Soil samples have been extracted from different areas in the Twin Cities to test for any heavy metals in the soils and to see if there is any correlation between amounts of heavy metals found in the soil samples and socioeconomic standing of the area.

Testing soil samples for contaminants of heavy metals such as magnesium, arsenic and lead-based on varying socioeconomic locations

Soil samples have been extracted from different areas in the Twin Cities to test for any heavy metals in the soils and to see if there is any correlation between amounts of heavy metals found in the soil samples and socioeconomic standing of the area.

“I have enjoyed the hands-on component of conducting scientific research.”

Hiwot Ayehu

BIOLOGY

YEAR
Senior

MAJOR(S)
Biology

FACULTY MENTOR
Dr. Dalma Martinović-Weigelt

PLANS AFTER GRADUATION?
I will continue to work on various research projects along with working in the medical setting to broaden my experiences in order to apply to medical school.

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
Two key parts of conducting research are being able to learn by following protocols and not being afraid to ask questions.
The focus of our research is in understanding the role of shallow lakes in global carbon cycling. We plan to measure methane and carbon dioxide content and emissions from shallow lakes in an attempt to identify their function as a carbon source or sink to the atmosphere within a given year. We would like to determine whether carbon emissions differ between shallow lakes in alternative states, turbid and clear. A clear shallow lake is dominated by submerged plants, and turbid lakes are dominated by suspended algae. Through analyzing water sample nutrient and gas content, we hope to better understand these shallow lakes’ role in global carbon cycling. With this information, we could potentially manage shallow lakes in a way that allows them to function as carbon sinks, taking carbon out of the atmosphere. This type of management could be used as a tool to help control greenhouse gas levels in the atmosphere.
Society must work towards establishing a more sustainable future. Many environmental thresholds have already been exceeded. Severe effects of biodiversity loss, the threshold farthest surpassed, are not commonly acknowledged in the public sphere. Our project aims to communicate the importance of biodiversity to ecosystem functions and global health. To achieve this, we will develop local outreach efforts in neighborhoods around St. Paul. Increasing community involvement will foster a societal shift towards a sustainable future. We plan to use phytoremediation, the process of extracting contaminants from soil by planting and harvesting wildflowers, to catalyze this cultural shift. Plots of varying wildflower species are aesthetically pleasing and may inspire locals to participate in their own sustainability efforts. We will donate bouquets of uncontaminated control flowers to the Episcopal Homes Community to enhance the moods of the seniors, subsequently increasing positive social interactions and episodic memory tasks.

“I feel I am constantly learning how to be creative, especially with experimental design, but also throughout the course of the whole project since field research is usually unpredictable.”

Elizabeth Chambers

BIOLOGY

The Helpful Flowers Project: combining phytoremediation research and community service

Society must work towards establishing a more sustainable future. Many environmental thresholds have already been exceeded. Severe effects of biodiversity loss, the threshold farthest surpassed, are not commonly acknowledged in the public sphere. Our project aims to communicate the importance of biodiversity to ecosystem functions and global health. To achieve this, we will develop local outreach efforts in neighborhoods around St. Paul. Increasing community involvement will foster a societal shift towards a sustainable future. We plan to use phytoremediation, the process of extracting contaminants from soil by planting and harvesting wildflowers, to catalyze this cultural shift. Plots of varying wildflower species are aesthetically pleasing and may inspire locals to participate in their own sustainability efforts. We will donate bouquets of uncontaminated control flowers to the Episcopal Homes Community to enhance the moods of the seniors, subsequently increasing positive social interactions and episodic memory tasks.

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The development of chemicals advances at a rapid rate. Subsequently, they are often not tested or regulated based on environmental impacts. Pharmaceuticals are designed for specific uses in humans or livestock, but may have unintended effects on other organisms exposed environmentally. Ibuprofen is meant to inhibit cyclooxygenase (COX), a protein responsible for the production of prostaglandins which cause pain and inflammation in humans. In fish, prostaglandins are hormones and pheromones important for the regulation of gonadal steroidogenesis, ovulation, and initiation/synchronization of male reproductive behaviors. This study examined effects of IB exposure on reproductive behaviors, the prostaglandin synthesis pathway, ovarian prostaglandin concentrations, and COX enzyme activity. Findings suggest that IB affects the prostaglandin synthesis pathway and impairs performance of male sexual behavior.
Evergreens must deal with excess light energy that would normally be used to drive photosynthesis. In evolutionary response to this dilemma, evergreen species have adapted a number of ways to protect and acclimate to excess light stress that has the potential to damage cells. One of the ways that evergreens acclimate to winter conditions and light stress is via a reorganization of the photosynthetic proteins from a summer form (which is efficient in harvesting light to drive photosynthesis) to a winter form (which is efficient in dissipating absorbed light safely). Once warm temperatures return evergreens will recover and re-acclimate from winter stress. Our goal is to determine which photosynthetic proteins are being regulated at different points in an eight-day recovery from winter stress and how it correlates with increases in photochemical efficiency during the recovery between two different species of evergreen.

**An investigation of protein reorganization during recovery of eastern white pine (Pinus strobus) and white spruce (Picea glauca) from cold temperature stress**

Cold winter temperatures adversely affect photosynthesis. Evergreens must deal with excess light energy that would normally be used to drive photosynthesis. In evolutionary response to this dilemma, evergreen species have adapted a number of ways to protect and acclimate to excess light stress that has the potential to damage cells. One of the ways that evergreens acclimate to winter conditions and light stress is via a reorganization of the photosynthetic proteins from a summer form (which is efficient in harvesting light to drive photosynthesis) to a winter form (which is efficient in dissipating absorbed light safely). Once warm temperatures return evergreens will recover and re-acclimate from winter stress. Our goal is to determine which photosynthetic proteins are being regulated at different points in an eight-day recovery from winter stress and how it correlates with increases in photochemical efficiency during the recovery between two different species of evergreen.

“**My favorite part of researching has been forming relationships with faculty as well as with my fellow researchers.**”

**Ryan Merry**

**BIOLOGY**

**YEAR**
Junior

**MAJOR(S)**
Biology and Environmental Science

**FACULTY MENTOR**
Dr. Amy Verhoeven

**PLANS AFTER GRADUATION?**
I plan on going to grad school to get my Ph. D. in plant biology or a related crop science. I would like to get into genetic engineering of crop plants in an effort to create better crops for a growing population as well as crops that are more eco-friendly in terms of fertilizer need.

**WHAT HAVE YOU LEARNED AS A RESEARCHER AT UST?**
I have learned the value of biology and research as a whole, and have a better idea of the effort and energy put into research by scientists.
Light harvesting protein complexes (LHCII) play a crucial role in photosynthesis by moving between the two major plant photosystems to help regulate the balance of light absorption by chlorophyll. These state transitions are light-dependent and are controlled by phosphorylation of LHCII. Research indicated that this light regulation occurs differently in gymnosperms compared to angiosperms. Angiosperm pumpkin (*Cucurbita pepo L.*) and gymnosperm eastern white pine (*Pinus strobus L.*) displayed LHCII phosphorylation in low light levels and consequent dephosphorylation at high light. In contrast white spruce (*Picea glauca [Moench] Voss*) retained consistent LHCII phosphorylation during high light. The reduction-oxidation (redox) status of the chloroplast stroma was examined to determine the regulation process of LHCII phosphorylation. Results suggest species-specific differences in light regulation of state transitions that alter the balance of light absorption during photosynthesis.
Lanthanide ions have unique fluorescent properties that can be used in a variety of applications such as bioimaging, lighting, binding tags for studying proteins, and luminescent tags for cell imaging. In order for this group of ions to be useful in these applications, they need to interact with organic ligands. Lanthanide ion’s electrons are not easily excited, so therefore receive an excited electron from an organic ligand that can relax back to its ground state to produce light. The organic ligand not only has to be able to donate excited electrons, but it must also be able to shield the lanthanide ions from solvent and water molecules. This shielding allows uninhibited interaction between the ligand and ion for optimal electron transfer. This research project focuses on synthesizing an organic ligand that will be a good electron donor while stabilizing the lanthanide ion. By modifying a synthetic route based on the work of Dash et al., we hope to synthesize, isolate, and test the ligand’s capabilities in interacting with Lanthanide ions to produce a luminescence.
We present geometric and electronic structures of a model fluoroquinolone (FQ), an antibiotic molecule, computed at the Hartree-Fock and configuration-interaction singles (CIS) levels of ab initio MO theory. Using the electronic structure code GAMESS, we have located the lowest-energy neutral (N-) and zwitterionic (Z-) FQ tautomers, for both ground and excited orbital electronic configurations. Most of the low-lying CIS singlet and triplet excited states are classified as \( \pi \) to \( \pi^* \), but several \( \pi \) to \( \sigma^* \) excited singlet states are presented. Aqueous solvation effects have been studied using both full quantum waters of hydration complexes with FQ and effective fragment potential (EFP) water molecules hydrating the N-FQ and Z-FQ molecules. Up to 65 EFP waters have been included in these studies. In the gas phase, N-FQ is the stable tautomer, but in the aqueous phase Z-FQ is the more stable tautomer. Structures of low energy solvated excited state transitions were studied, and interpreted.

“The professors are also great, pushing their students to achieve, but not pushing so hard that they become discouraged.”

Cole Johnson

CHEMISTRY

Computational and mechanistic analysis of solvated fluoroquinolone

We present geometric and electronic structures of a model fluoroquinolone (FQ), an antibiotic molecule, computed at the Hartree-Fock and configuration-interaction singles (CIS) levels of ab initio MO theory. Using the electronic structure code GAMESS, we have located the lowest-energy neutral (N-) and zwitterionic (Z-) FQ tautomers, for both ground and excited orbital electronic configurations. Most of the low-lying CIS singlet and triplet excited states are classified as \( \pi \) to \( \pi^* \), but several \( \pi \) to \( \sigma^* \) excited singlet states are presented. Aqueous solvation effects have been studied using both full quantum waters of hydration complexes with FQ and effective fragment potential (EFP) water molecules hydrating the N-FQ and Z-FQ molecules. Up to 65 EFP waters have been included in these studies. In the gas phase, N-FQ is the stable tautomer, but in the aqueous phase Z-FQ is the more stable tautomer. Structures of low energy solvated excited state transitions were studied, and interpreted.

YEAR
Graduated May 2013

MAJOR(S)
Chemistry

FACULTY MENTOR
Dr. Joseph Brom

PLANS AFTER GRADUATION?
I will be pursuing a Ph. D. in theoretical chemistry

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
As a result of being required to present our research periodically to the chemistry department, I have learned how to express my ideas to others in a clear concise way.
Collaborative Inquiry 2013

CHEMISTRY DEPT.

CHEMISTRY

Rebecca Kummer

Synthesis of a novel antibacterial compound

Bacteria resistant to frequently used antibiotics are common, even in the hospital setting. Therefore, there is a pressing need to develop new antibacterial compounds derived from molecules of different chemical classes. Molecular Topology (MT) is a mathematical system that is dedicated to just that purpose. This computer program is able to correlate chemical structures to biological properties. Using this system, it is possible to predict the chemical structures of compounds that are not analogous to currently used, biologically active compounds, particularly those compounds which have a high probability of being effective antibiotics. The synthesis of a compound predicted by MT to have high antibacterial activity, along with various derivatives of the target compound, is the goal of this research project. The majority of the synthesis has been completed, and research this summer will be dedicated to carrying out the final step of the synthesis, making the derivates of the target molecule, and testing these molecules for antibacterial activity.

“I never thought I would say this, but my favorite part of conducting research has resulted from the major setbacks I have encountered. At the time, problems with my synthetic route to reach the target molecule were frustrating. Looking back, however, I enjoyed the critical thinking required to solve these problems.”

YEAR
Senior

MAJOR(S)
Biochemistry

FACULTY MENTOR
Dr. J. Thomas Ippoliti

PLANS AFTER GRADUATION?
After graduation, I plan on attending medical school. After medical school, I plan on specializing, possibly as a pediatrician.

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
Research has taught me much more than just chemistry. I have learned how to take responsibility for the work I carry out as the sole researcher on my project. I have learned to be independent and confident in the work I do. Most important, research has taught me to be persistent.

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Surface-enhanced Raman spectroscopy (SERS) is an analytical chemistry technique with a lot of potential. Its ability to measure concentrations of molecules in minute quantities makes it very useful to chemists. However, this technique has been mired by a few limitations. The limitation of cost will be addressed by the synthesis of an entirely new molecule that replaces the expensive one recommended in literature. Then, the issues of excessive time consumption and imprecision will be addressed in tandem, by the introduction of a standard into the synthesized molecule. This standard will serve to focus the SERS instrument, and avoid the need for precise preparation for the experiment. With the limitations addressed, this version of the SERS method will be able to be applied to the analysis of a whole new class of molecules. This project is innovative in addressing the limits of SERS and making the method more accessible and useful to analytical chemists.
Antibiotics are being identified as environmental contaminants because of their extensive use in human medicine and agriculture, which has led to frequent detection of these compounds in the environment. The potential for antibiotics to select for resistant organisms can result in increased antibiotic resistance levels detected in the environment, threatening human health due to decreases in their efficacy in treating disease. The goal of this study is to identify and quantify significant sources of antibiotic resistance in surface waters and determine whether antibiotic resistance is impacting our drinking water.

Our current study suggests that wastewater treatment plant effluents potentially harbor resistance genes and are an important path for antibiotic resistance to reach surface waters. To determine whether surface waters that can be a source for drinking water are impacted, the levels of antibiotic resistance genes to four main classes of drugs used in both human medicine and agriculture: fluoroquinolones, tetracyclines, macrolides, and sulfonamides, will be quantified using quantitative polymerase chain reaction.
An azaborine is a molecule that contains at least one boron-nitrogen bond. A dipole moment is caused by this bond, which changes the electronic properties of these molecules compared to their all-carbon counterparts. As a result, they have great potential to be used in organic light-emitting diodes or photovoltaic cells. My research focuses on the synthesis of azaborines within polycyclic aromatic hydrocarbon analogs. Precursors to these molecules are often dialkynes, which contain two triple bonds. My goal is to find new synthetic routes utilizing these dialkynes more efficiently. Specifically, I am interested in creating cyclic boranes and vinyl halides for use in azaborine synthesis and a variety of coupling reactions.

Dialkynes in azaborine synthesis

An azaborine is a molecule that contains at least one boron-nitrogen bond. A dipole moment is caused by this bond, which changes the electronic properties of these molecules compared to their all-carbon counterparts. As a result, they have great potential to be used in organic light-emitting diodes or photovoltaic cells. My research focuses on the synthesis of azaborines within polycyclic aromatic hydrocarbon analogs. Precursors to these molecules are often dialkynes, which contain two triple bonds. My goal is to find new synthetic routes utilizing these dialkynes more efficiently. Specifically, I am interested in creating cyclic boranes and vinyl halides for use in azaborine synthesis and a variety of coupling reactions.

Christina Rozeske

Chemistry

“Research has shown me that chemistry, like life, does not always go as planned, but that something can be learned from every experiment.”

“I hope to go on to medical school and pursue a career in forensic pathology.

The thrill of the chase for the desired molecules is what makes research so challenging and fun!”
Using anomaly-based network intrusion detection for mobile devices

Computers have become integral to our lives, and the mobile market is just taking off. Unfortunately, attempts to exploit this trend (i.e. malware, viruses) are increasing at an alarming rate. The use of non user-managed attack mitigation has been limited to defenses such as firewalls, but further protection is becoming necessary. To this end, Network-based Intrusion Detection (NID) schemes offer two advantages. NID systems can detect new attacks, and NID enabled network servers can filter data before it reaches users. However, use of NID schemes is limited in practice due to their computational overhead. Recent research has introduced light-weight implementations for efficiency. Our main goals are to adapt the new implementation for use with mobile devices, which lack the power to perform extensive network defense. We will use a custom system and program an interface to allow testing, as well as reprogramming the kernel to give robust control over the mobile device, then measure the performance and suggest future research.
“In the end, when the robot flawlessly executes a series of commands and accomplishes a task that took several weeks to figure out how to do, it makes all the hard work worth it!”

Mitchell Hoffmann

ELECTRICAL ENGINEERING

Multi-floor mapping and navigation with uncertainty

This project is centered around using the Turtlebot, consisting of an iRobot Create base, a Microsoft Kinect for XBox 360, and an ASUS netbook running Ubuntu Linux and a program framework called the Robot Operating System (ROS), to autonomously map out buildings with a series of two-dimensional maps and to use those maps to navigate a building using the elevator system and act as a tour guide for people. I will be writing programs in languages such as C++, Python, and bash to allow for the functionality of the tour and use of the elevator system. We will also build an arm for the Turtlebot to increase its autonomy in navigating the elevators. The arm will need to interface with the rest of the ROS programs smoothly and keep the physical design of the robot functional.

YEAR
Junior

MAJOR(S)
Electrical Engineering

FACULTY MENTOR
Dr. Christopher Greene, Dr. James Ellingson, and Dr. Kundan Nepal

PLANS AFTER GRADUATION?
I plan to get a job in the field of Electrical Engineering, Computer Engineering, or Computer Science.

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
Through participating in several conferences, including an IEEE Twin Cities Area Student Paper Contest, in which we won first place, I have learned how to present our work in a way that makes it interesting even to people that can’t comprehend all the inner workings of the robot and the programs.
The purpose of this study is to examine the experiences non-native speakers of English, specifically International students, have when writing in English across disciplines at the university level. International students are a growing percentage of students who use the Center for Writing; having testimonials from students serves as an invaluable resource to describe reading and writing challenges. Through interviews, this study gives International students a voice to express their educational challenges and achievements.

The strategy of inquiry is a narrative approach with the hope that students will share what I have deemed at this stage of the research as their "Literacy Narrative.” I anticipate struggles that ESL students face to include: learning academic English, writing in certain disciplines, reading scholarly texts, understanding assignments, communicating effectively with professors through emails and other written forms, adapting to American rhetoric, and developing pragmatic competence. I am using analytic induction to analyze the interviews to uncover meaningful patterns and themes expressed by students.
Both global food demand and environmental impacts from agricultural intensification are rapidly increasing. Urban agriculture can help meet growing demands without degrading natural systems. However, research in urban agriculture is needed to identify best growing practices. Moreover, urban agriculture research can bring greater awareness to food issues.

Here I propose an urban agriculture project that combines research, campus engagement, education, and community service. I will be looking at yields based on fertilizer and water use. Each plot will be assigned to a different amount of fertilizer and some plots will be covered with mulch to replace watering. I will then follow these instructions and measure vegetable production. I will then use these data in a statistical analysis to identify factors that most influence yield in this setting. There are important complementary components to this project. I will engage the campus by inviting different groups on campus to participate in garden activities. The project has educational benefits because it is the basis of student work in the Environmental Science capstone course. Finally, the project will provide a community service because vegetables will be donated to food shelves.
Current research states that green initiatives within organizations have many benefits including increased satisfaction throughout the organization. The primary objective of this study was to investigate whether overall veteran satisfaction increases due to information about the Strategic Sustainability Performance Plan. The secondary inquiry within this study was to determine whether presenting information about money saved or environmental impact reductions differentially increases veteran satisfaction. A series of three brief questionnaires pertaining to sustainability and overall satisfaction were mailed to a random sample of Veterans (N = 300). The first type of questionnaire had a paragraph describing the money saved due to the Strategic Sustainability Performance Plan. The second questionnaire described the reduced carbon footprint due to the Strategic Sustainability Performance Plan. The third questionnaire served as a control. Our data found that Veterans were highly satisfied with services, and awareness of green initiatives and money savings did not significantly increase Veteran satisfaction.
“Research experience is incredibly valuable to the learning process because it requires going through every step of a real scientific process.”

Nick Hermann

GEOLOGY

Exploring the geochemistry of Minnesota lakes

Spring Lake, Upper Prior Lake (UPL), and Lower Prior Lake comprise a connected three-lake system in Scott County, Minn. Spring Lake is a hypereutrophic lake characterized by high nutrient levels relative to its size. As a result, Spring Lake suffers from large algal blooms and deepwater anoxia during the summer, causing ecological and geochemical changes, including decreased diatom diversity, increased oxygen stress on organisms, phosphate release from sediments, and more intense and widespread anoxic conditions during stratification periods. I used x-ray fluorescence, loss-on-ignition, and sediment microscopy to collect ecological and geochemical data from a sediment core from UPL. Preliminary results indicate calcium concentration increases 500% from the beginning of the record, while iron concentration drops 300%. I interpret this to mean UPL has increased in depth and area over the course of this record. Biological productivity has increased since the start of the record, likely as a result of deepening of the lake and increased nutrient input. Diatom species sensitive to phosphate have become dominant in the lake. Millimeter-thick laminations of calcite-rich sediments persist through at least 25% of the core. Further analysis of these laminations is needed to explore the nature of seasonal or other periodic sedimentation in UPL.
It is well known that exercise training positively affects cognitive function. Much research focused on exercise training and cognitive function in relationship to well-exercised individuals. Little research documents the influence of acute exercise on memory of individuals. My goal was to assess the effects of acute aerobic and anaerobic exercise on cognitive function in female college students. Participants were randomly assigned to a control group, where no exercise was performed, an anaerobic group, where 100-yard sprints were performed, and an aerobic group, where exercise on a stationary bike was performed. Using ImPACT™ testing, cognitive function was tested before and immediately after exercise. The anaerobic group performed better than control group and no difference was found between aerobic and anaerobic groups. The general trend of higher scores for the aerobic and anaerobic groups suggests acute exercise improves cognitive function. Furthermore, the results suggest anaerobic exercise is more effective in enhancing reaction time and motor speed than aerobic exercise.

"I enjoyed brainstorming the different options and directions my project take alongside my advisor and then developing the right experiment to best test my hypothesis."

Ann Goding

HEALTH & HUMAN PERF.

Effect of acute aerobic and anaerobic exercise on cognitive function

It is well known that exercise training positively affects cognitive function. Much research focused on exercise training and cognitive function in relationship to well-exercised individuals. Little research documents the influence of acute exercise on memory of individuals. My goal was to assess the effects of acute aerobic and anaerobic exercise on cognitive function in female college students. Participants were randomly assigned to a control group, where no exercise was performed, an anaerobic group, where 100-yard sprints were performed, and an aerobic group, where exercise on a stationary bike was performed. Using ImPACT™ testing, cognitive function was tested before and immediately after exercise. The anaerobic group performed better than control group and no difference was found between aerobic and anaerobic groups. The general trend of higher scores for the aerobic and anaerobic groups suggests acute exercise improves cognitive function. Furthermore, the results suggest anaerobic exercise is more effective in enhancing reaction time and motor speed than aerobic exercise.

YEAR
Graduated May 2013

MAJOR(S)
Exercise Science

FACULTY MENTOR
Dr. Bridget Duoos

PLANS AFTER GRADUATION?
Physical therapy school and continuing research in the exercise science field.

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
I have developed creative and innovative thinking as well as learned communication and organization skills throughout my research process at St. Thomas.
“I’ve learned the importance of a descriptive but succinct thesis, as well as the value of using teachers and librarians as resources throughout the research process.”

Maggie Whitacre

HISTORY

When tyranny becomes acceptable: the presidencies of Abraham Lincoln and Franklin Delano Roosevelt

In my research project, I explored the presidencies of Abraham Lincoln and Franklin Delano Roosevelt, and claimed that their arguably tyrannical actions were acceptable because of the unprecedented periods of history in which they served our country. While democracy and the rights of the people are important to maintain, an internal insurrection and the worst economic crisis-to-date called for strong action from these two leaders, or so I argued in my research. Lincoln’s most controversial decision while in office was suspending the writ of habeas corpus, while FDR’s most criticized action was the manipulation of the Supreme Court. I examined both primary and secondary sources throughout my research to fully understand Lincoln and FDR’s motives, as well as the times in which they lived.

YEAR
Graduated May 2013

MAJOR(S)
History and Communication and Journalism

FACULTY MENTOR
Dr. Tom Mega

PLANS AFTER GRADUATION?
Since graduating, I have been working as a sales representative for Thomson Reuters’ legal sector. I plan on continuing to work here and starting my master’s in education, with hopes of one day teaching history.

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
I’ve learned the differences between primary and secondary sources, and the use of each of them in understanding the people and norms of various different periods in history.
This project studies the results of H. Cai for vorticity radar data and the results of Josh Wurman for velocity radar data, as related to tornado genesis. Following their ideas we consider slopes of vorticity lines derived from nested grid numerical weather data. We compute slopes of vorticity lines and try to determine a threshold slope corresponding to tornado genesis. We will do this considering a variety of initial conditions that have been archived for different storms, some tornadic and others not. The project involves programming in several different languages and the use of Linux. We modify the model code to facilitate the study. We use the initial conditions to initiate and run the numerical model. We view the data in a variety of ways including construction vortex lines in Vis5d, looking at the slopes of vorticity lines and their time series. The background for the project is some physics, multivariable calculus, differential equations, some linear algebra and programming experience.
Craniosynostosis is a medical condition of newborn infants in which the cartilaginous regions between the plates of the skull ossify prematurely, thereby fusing the skull plates, and thus do not allow the brain to grow and expand properly. While this condition is successfully treated using surgical intervention, the intracranial stresses that develop if surgery is not performed have not been quantified. Using the finite element method of mathematical modeling we wish to determine the magnitudes of intracranial stresses that develop in cases of craniosynostosis to better understand its effects on brain development. The goal of this project is to create a three-dimensional simulation that allows us to predict head shape, magnitude and location of intracranial stresses that result from a specific case of craniosynostosis.
The increase of microtechnology in engineering and medical industries is demanding improved and more affordable micromachining. However, at the micro level, heat and friction accelerate tool wear and failure. A recent development of cooling and lubrication technology for micromachining processes is the use of spray cooling. Atomization spray cooling systems have been shown to be more effective than traditional methods of cooling and lubrication for micromachining. In a two-phase atomization spray cooling system, the atomized fluid can easily access the tool-workpiece interface, removing heat by water evaporation and lubricating the region by oil droplet spreading. The success of the system is determined in a large part by the nozzle design, which determines the droplet behavior at the cutting zone. In this study, computational fluid dynamics are used to investigate nozzle design and droplet delivery to the tool.

Andressa Lunardelli

Computational fluid dynamic investigation of atomization-based cooling system sprays of eccentrical nozzles for micromachining

I thoroughly enjoyed the independence to work on a project that was my own. My professor helped and supported me, but the decisions and hard work had to come from me.”
“After spending time in Latin America, I really enjoyed this opportunity to develop a more academic, informed perspective to supplement my experiences.”

Kate Hanson

MODERN & CLASSICAL LANGUAGES

_Cien Años de Soledad: social and political history of Colombia through the lens of magical realism_

In Latin America, the magical realist genre has played a prominent role in the portrayal of social circumstances during political turmoil. The masterwork, One Hundred Years of Solitude (1967), by Gabriel García Márquez is one of the most influential novels in this genre. In order to experience and appreciate the true literary merit of this work, I read the novel in Spanish. By examining the historical context and critical reception through various secondary texts, I was able to integrate my research and literary findings into a cohesive ten-page paper in Spanish. This paper explored the influence of García Márquez’s social background and political interests on the construction of morality within this novel. This project enhanced my Spanish reading, oral, and comprehension skills while expanding my knowledge of Latin American history through one of the most influential literary works of the 20th century.

YEAR
Junior

MAJOR(S)
Spanish and Neuroscience

FACULTY MENTOR
Dr. Jane Tar

PLANS AFTER GRADUATION?
Medical school.

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
This project taught me to work independently and maintain a balance between my extra-curricular research and normal school load.
The neurotransmitter dopamine plays an important role in developing associations between environmental cues and the rewards they predict. The use of addictive drugs mimics this reward-based form of learning, only in a much stronger way. Interestingly, males and females exhibit different behavioral responses to drug use, suggesting that they have different reward-based learning abilities. This project will investigate whether there are underlying differences in the neural dopaminergic reward pathways in males and females that could contribute to these observed behavioral differences. First, the performance of male and female rats on an odor-guided, reward-based behavioral learning task will be observed to determine how their reward-based learning abilities differ. Then, the expression of dopamine receptors in the orbitofrontal cortices of these rats will be examined to determine whether there are anatomical differences in their reward pathways that could explain the behavioral differences. The results of this experiment will help to explain the neural mechanisms of reward-based learning in males and females.

Sexually dimorphic dopaminergic reward pathways in the orbitofrontal cortices of *Rattus norvegicus*

The neurotransmitter dopamine plays an important role in developing associations between environmental cues and the rewards they predict. The use of addictive drugs mimics this reward-based form of learning, only in a much stronger way. Interestingly, males and females exhibit different behavioral responses to drug use, suggesting that they have different reward-based learning abilities. This project will investigate whether there are underlying differences in the neural dopaminergic reward pathways in males and females that could contribute to these observed behavioral differences. First, the performance of male and female rats on an odor-guided, reward-based behavioral learning task will be observed to determine how their reward-based learning abilities differ. Then, the expression of dopamine receptors in the orbitofrontal cortices of these rats will be examined to determine whether there are anatomical differences in their reward pathways that could explain the behavioral differences. The results of this experiment will help to explain the neural mechanisms of reward-based learning in males and females.

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**Elizabeth Smith**

**NEUROSCIENCE**

**YEAR**
Senior

**MAJOR(S)**
Neuroscience

**FACULTY MENTOR**
Dr. Kurt Illig

**PLANS AFTER GRADUATION?**
My plan is to go to medical school.

**FAVORITE PART OF CONDUCTING RESEARCH?**
The opportunity to pursue my own scientific interests in collaboration with an exceptional faculty mentor and team of student investigators. Research has truly been one of my best experiences at St. Thomas.

“Not only have I learned how to perform a wide variety of laboratory procedures, but I have been able to develop my own research questions and seek answers.”
This paper presents an argument stating that time exists only if rational, material beings exist. It does so in three parts: the first part logically lays out the argument as well as give brief explanations as to why the premises should be believed; the second part poses objections to one of the premises; the third part will respond to the objections. The argument of the paper is based on arguments about time presented by Aristotle, Augustine, and modern four-dimensionalists and carries with it certain assumptions made by these philosophers.
Elizabeth Annoni

Physics

Computer simulations in optics and nonlinear dynamics

My research involves writing MATLAB codes to analyze polarized light, electro-optics, and optical tweezers. In particular, I have created several codes involving matrix theory that allow the user to visualize how polarized light propagates through time-variable optical elements. These routines can be used to calibrate sensitive instruments in the optics research lab. Furthermore, I have simulated the motion of micron-sized particles trapped in an optical tweezers apparatus in order to reveal how laser intensity modifies the particles’ Brownian motion. This simulation can be used to calibrate the trap strength and will eventually allow us to quantify the swimming strengths of micro-organisms having flagella. In addition to my work with optics, I have also used MATLAB to investigate the synchronization of an array of coupled metronomes—a useful system for learning about nonlinear dynamics. My simulation shows the relative phase of the oscillators over time, given a variety of initial conditions including the metronomes’ frequencies and starting angles.
Exoplanet characterization through the analysis of observed transit curves

The transit method is one of the primary techniques used to detect and characterize extrasolar planets. If a planet’s orbit is positioned favorably so that the planet passes between its host star and the observer’s line of sight, it will block a portion of the star’s light when it crosses the face of the star, creating what is called a transit light curve. In this research, we developed a novel model that simulates the light curve that would be observed from a transiting exoplanet. We also devised a Monte Carlo style optimization routine for fitting the model to observed transits and deriving the parameters of the exoplanet system. After validating our model and fitting routine by analyzing well-characterized systems, we developed a pipeline for efficiently observing transiting exoplanets from the UST Observatory and processing the data into transit curves. We are currently working to improve our measurements and gather more transit data for further analysis.

“I have also learned about the general process of modeling a physical system and using experimental observations to compare with the model and learn more about the system.”

Sarah Millholland

YEAR
Junior

MAJOR(S)
Physics and Mathematics

FACULTY MENTOR
Dr. Gerald Ruch

PLANS AFTER GRADUATION?
I plan to pursue a Ph. D. in space physics or astrophysics.

FAVORITE PART ABOUT CONDUCTING RESEARCH?
I enjoy being able to apply my skills to novel and interesting research problems. I also like having exposure to and learning about other research topics in the field.
As arguably the most recognized symbol of democracy in the world, the United States has often unilaterally shouldered the burden to promote democracy world-wide. However, as public support for international interventions has waned in the United States, the U.S. is increasingly calling upon its allies to share the burden, including India. India is the world’s largest democracy and one of the most successful in the developing world, but historically, democracy promotion has not been a prominent feature of their foreign policy. Why? I will examine this question through three levels of analysis, the individual, state and system levels. No single level can fully explain the lack of democracy promotion in India’s foreign policy, but collectively, they provide a comprehensive explanation for their policy decision.

“My favorite part of the research process was working closely with my professor on a subject of great importance to him and being able to pick his brain to gain more insight.”
“I have enjoyed contributing to the current knowledge about how energy drinks are affecting college students, and then taking those results and using them to educate students and hopefully better the campus.”

Caitlin Kelly

PSYCHOLOGY

Energy drinks on college campuses: motivations, risky behaviors and health concerns

An online survey, distributed to 162 UST undergrad students (F=123, M=37), explored the demographics, motivations for use, and risk behaviors and health concerns associated with energy drinks on college campuses. Survey results showed the most prominent motivations for drinking energy drinks were a lack of energy, assisting alertness while studying, and the “boost” experienced from combining them with alcohol at parties. Survey results also indicated that consumers of more than three energy drinks/month, “high energy drink users,” were more likely, within the previous month, to have engaged in risky behaviors such as driving without the use of a seat belt, or driving drunk. Quite significantly, survey results showed that students with pre-existing medical conditions such as insomnia, ADHD, depression, anxiety, and anorexia are more likely to be high energy drink users compared to the general student population. The survey results demonstrate the importance of educating students about the potential risk behaviors and accompanying health concerns associated with the widespread usage of energy drinks on college campuses today.

YEAR
Senior

MAJOR(S)
Neuroscience

FACULTY MENTOR
Dr. Roxanne Prichard

PLANS AFTER GRADUATION?
After I graduate, I plan on earning a doctorate in Neuroscience. I am particularly interested in the research areas of drug addiction, other psychiatric disorders, and mindfulness.

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
My public speaking and writing abilities greatly improved when I presented this research at the American College Health Association conference in Boston in June 2013.
For the past three decades, moral psychologists have argued that moral judgment and moral identity are two distinct psychological processes with unique functions; however, little empirical research exists that confirms their theoretical notions. Reynolds and Ceranic’s study (2008) was one of the few empirical endeavors to directly test moral judgment’s and moral identity’s relationship to moral behavior. Their findings generally supported their hypotheses, yet their study had several problems, the most egregious being the manner in which the researchers operationalized and measured their variables. The purpose of the current study is to replicate Reynolds and Ceranic’s study using better definitions and measures. Particular attention will be given to the moral judgment measures, examining the degree to which the two measures are related as well as the extent to which Reynolds and Ceranic’s hypotheses are supported when using each moral judgment measure separately.
Psychological research has become increasingly interested in better understanding the development of personal identity into old age. Such research has identified generativity, or the desire to contribute to the well-being of future generations, as an important characteristic of healthy adult development (Erikson & Erikson, 1997) and theme within the life stories of aging adults (McAdams, 2006). Due to its importance in psychological development, psychologists are investigating what factors contribute to its development. Several studies have identified spirituality or religiosity as important factors (Dillon et al., 2003). Current research has yet to address directly how diverse spiritual experiences may contribute to generativity in older adults. My goal is to use a mixed-methods approach to investigate this relationship. Elder participants representing diverse faith backgrounds (Christian, Muslim, Jewish, Buddhist) will partake in a semi-structured interview about the story of their faith life. Additionally, quantitative measures of religiosity and generativity will be administered to assess a relationship between generativity and specific aspects of religiosity.
Research has been conducted on students’ and parental perspectives in regard to sexuality education. However, we lack information on the perspectives of those teaching the sexuality material, health educators. It is pertinent to understand their perspectives; educators’ experiences mold their instruction of the course. The purpose of this study is to explore the experiences of health educators that teach sexuality education, examining if their curriculum coincides with the topics they believe are imperative to the curriculum.

Tamnet Kidanu
PUBLIC HEALTH

The experiences of health educators’ teaching human sexuality curriculum

Research has been conducted on students’ and parental perspectives in regard to sexuality education. However, we lack information on the perspectives of those teaching the sexuality material, health educators. It is pertinent to understand their perspectives; educators’ experiences mold their instruction of the course. The purpose of this study is to explore the experiences of health educators that teach sexuality education, examining if their curriculum coincides with the topics they believe are imperative to the curriculum.

“...reading literature from studies conducted outside of the United States.”
Collaborative Inquiry  2013

COMMUNITY-BASED RESEARCH GRANT

“I designed this research project in my social work research methods course, but this opportunity will give me the chance to actually carry out the research and see the process all the way through.”

Shannon Koester

SOCIAL WORK

Ampersand Families foster care project

Older youth in foster care are a high risk population because they face the challenge of aging out of foster care and beginning adulthood with little financial help and minimal support available to them. Many older youth in foster care also have disabilities and participate in special education programs. Older youth in foster care are required by law to have ILPS, which are individual living plans for when they age out of the system. Since many youth are also in special education, they are required to have IEPs, which are individual education plans prepared for each individual student to meet their goals. In theory, these plans for each individual youth should have similar goals and future plans; however, in practice this is not always the case. Working with Ampersand Families, an organization that strives to support youth in developing permanent relationships with caring adults this study will analyze IEPS and ILPs for evidence of their complementarity, the inclusivity of the planning process, and the impact of finding permanency of the success of the transition planning process.

YEAR
Senior

MAJOR(S)
Social Work

FACULTY MENTOR
Dr. Katharine Hill

WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?
I hope to learn more about how policies affect people, gain experience about how research is done, and learn more about child welfare.
I examined attorneys’ political preference on the left (liberal) to right (conservative) spectrum, the correlation with their legal specialization, and its effects on their attitudes towards immigration and its reform. Two slightly conflicting hypotheses were formed: (1) that liberal and conservative ideologies would be more similar than different, and (2) that immigration attorneys would be more liberally-biased than non-immigration specializing attorneys. A random sample of five immigration and five non-immigration attorneys was drawn from the UST-provided online base of alumni practicing law in the Twin Cities. A qualitative method study was conducted consisting of individual face-to-face interviews. The Likert-type scale was used to measure their attitudes towards immigration and government. Semi-structured questions allowed for elaboration of opinion.

“As a politically-interested person, learning and understanding the multiple perspectives that revolve around the issue of immigration was truly exhilarating.”

Priscila Barron-Sanchez

SOCIOLGY & CRIMINAL JUSTICE

Compromising law: a study of attorneys’ attitudes on immigration legislation

I examined attorneys’ political preference on the left (liberal) to right (conservative) spectrum, the correlation with their legal specialization, and its effects on their attitudes towards immigration and its reform. Two slightly conflicting hypotheses were formed: (1) that liberal and conservative ideologies would be more similar than different, and (2) that immigration attorneys would be more liberally-biased than non-immigration specializing attorneys. A random sample of five immigration and five non-immigration attorneys was drawn from the UST-provided online base of alumni practicing law in the Twin Cities. A qualitative method study was conducted consisting of individual face-to-face interviews. The Likert-type scale was used to measure their attitudes towards immigration and government. Semi-structured questions allowed for elaboration of opinion.
While previous studies have examined the influence of mass media on the beliefs and behaviors of viewers and concern over the threats of global warming have increased environmental consciousness, the two fields have seldom been examined together. Mass media is a crucial part of social influence; viewers observe behaviors modeled in the media and learn the behaviors. If mass media models unsustainable behaviors and conveys messages about exploiting and degrading nature, people will engage in those unsustainable behaviors and internalize those messages. Little research has been done concerning the relationship between humans and nature as depicted on the silver screen. This study will examine the portrayal of nature in both documentaries and dramatic/fictional movies. Content analysis of documentaries and movies created within the past fifteen years will be used to identify themes, symbols, and messages as well as examine the personification of nature.

**Reel view of nature: analysis of environmental images and messages on the silver screen**

"I had never thought to look at movies from an environmental point of view, and I think it is an important and fun perspective to consider."

**Sarah Strain**

**Sociology & Criminal Justice**

**YEAR**
Senior

**MAJOR(S)**
Sociology and Criminal Justice and Psychology

**FACULTY MENTOR**
Dr. William Kinney

**PLANS AFTER GRADUATION?**
Undecided, but considering graduate school at some point.

**WHAT SKILLS HAVE YOU LEARNED AS A RESEARCHER AT UST?**
I have learned to dig deeper and ask questions. I have learned to consider theories and ideologies different from my own and have seen how they add to the field of knowledge.
The history of Black-White intimate relationships in America is extensive. These relationships have existed since the beginning of slavery in America, with a significant number of Black-White marriages in New York City occurring as early as the year 1850. One would think that perceptions of such relationships would be more favorable over time given their history of occurrence. Various studies suggest that unfavorable attitudes toward Black-White intimate relationships and stereotypes of such relationships still exist. This study aims to understand attitudes toward and stereotypes of Black-White intimate relationships today. This is a qualitative study that is being carried out using personal interviews to collect data on these attitudes and stereotypes.
Allison Thul

SPECIAL EDUCATION

Autism and employment: creating a program to successfully transition college age individuals with autism into the workplace

The goal of education is to create life skills for individuals to obtain positive post-secondary outcomes. One indicator of that success is securing a vocation. However, some students who have autism spectrum disorders (ASD) experience challenges that impede their opportunity to reach this vocational goal. This research endeavor is seeking to create a program that could be implemented at a higher education institute that enables individuals with ASD to become successfully employed.

“I have enjoyed interacting with all of the students on the autism spectrum. They have taught me more in this summer than I could have ever read or researched reading books and articles.”

YEAR
Senior

MAJOR(S)
General Business

FACULTY MENTOR
Dr. Lynn Stansberry-Brusnahan

PLANS AFTER GRADUATION?
I plan to attend graduate school.

FAVORITE PART OF CONDUCTING RESEARCH?
Two skills I have acquired while conducting research this summer include paying attention to detail and going with the flow. It has been important for me to adapt to unexpected results and changes.
The goal of this project is to use Eleanor of Castile as a reference point and look into how the public perception of her changed from her lifetime and into the centuries that followed until the present day. This understanding will give insight into the development of the idea of medieval womanhood and the role of this queen. During the course of this project Eleanor will be examined in the context of biographies written about herself and her family, travel guides which contain reference to the Eleanor crosses, as well as other historical textbooks written in each century.

McKenzie Anderson
THEOLOGY

Eleanor of Castile: her life and abiding legacy

The goal of this project is to use Eleanor of Castile as a reference point and look into how the public perception of her changed from her lifetime and into the centuries that followed until the present day. This understanding will give insight into the development of the idea of medieval womanhood and the role of this queen. During the course of this project Eleanor will be examined in the context of biographies written about herself and her family, travel guides which contain reference to the Eleanor crosses, as well as other historical textbooks written in each century.

“Reviewing the existing literature on my topic has given me an idea of where scholarly dialogue currently stands and a context in which to conduct my own work.”

YEAR
Junior

MAJOR(S)
Communication and Journalism; French minor

FACULTY MENTOR
Dr. Steven McMichael

PLANS AFTER GRADUATION?
With my communications and journalism major and my french minor I hope to get a job in the field of journalism and one day become a foreign correspondent.

FAVORITE PART OF CONDUCTING RESEARCH?
There is something so rewarding about taking the time to pick over texts for hours only to find exactly what you were looking for, or even figuring out why you did not find what you were expecting.