Scholars at the Capitol 2017
Showcasing undergraduate student research

Minnesota Private College Council
Cover illustration by Bailey Martin
Minneapolis College of Art and Design, Class of 2017
Undergraduate research encourages students to explore disciplines that they may pursue as a career or in future education. Minnesota’s private colleges have a lasting emphasis on undergraduate research, which provides students with experiential learning opportunities and offers our communities better prepared graduates.

The 2017 Minnesota Private College Scholars at the Capitol showcases the work of 52 student researchers. Their 32 research projects address disciplines ranging from philosophy to nursing, chemistry to operations management — this breadth represents the wide range of opportunities at Minnesota’s Private Colleges.
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Cosmopolitan Café: A Third Place for Those without a First Place

STUDENT  Devin Wiggs

FACULTY ADVISOR  Dr. Diane Pike

DEPARTMENT  Sociology

Augsburg College

This inductive ethnographic project explores the “social contract” Cosmopolitan Café has with the homeless population in the surrounding university neighborhood, where it has a reputation for accommodating local “travelers, homeless, and home-free” persons. These findings elaborate Oldenburg’s third place typology in two capacities: they elucidate how the physical environment outside of the third place influences social relationships within it, and they reveal the heretofore neglected importance of the organization’s division of labor on these relations. Located between two “hangout spots” for homeless individuals in the neighborhood, the outdoor patio of the café acts as a bridge between domiciled and homeless actors, allowing homeless individuals to build rapport, create relationships, and enact civility to establish a positive reputation amongst domiciled patrons. Simultaneously, the café’s low division of labor allows employees to create “personal policies” that diverge from the official business policy of “No purchase, no service.” The autonomy made possible by the low division of labor allows employees to create personal policies.
Sentiment Analysis Framework and Classification of Word Sense in Product Reviews

STUDENT Mythoua Chang

FACULTY ADVISOR Shana Watters

DEPARTMENT Computer Science

Augsburg College

Sentiment analysis is the process of identifying the underlying attitude or feelings in text or spoken languages. This study seeks to determine the underlying opinions of product reviews. Our framework utilizes a decision tree that determines whether a reviewer would recommend or not recommend a product. The results of the decision tree algorithm are compared to a baseline algorithm using positive and negative words and the actual recommendation provided by the original reviewer. We collected 262 reviews from Walmart and JCPenney to classify using both the baseline algorithm and decision tree.
Effects of Low Fat Verses High Fat Milk Consumption on Short-Term Satiety Levels for High Calorie Junk Food

**STUDENT**  Travis Mord  
**FACULTY ADVISOR**  Dr. Jennifer Wosmek  
**DEPARTMENT**  Psychology  
**Bethany Lutheran College**

Various groups of milk consumers — including parents, schools, and hospitals have made a change in recent decades — from whole to skim milk as their primary dairy source. This change is commonly attributed to the influence of the fat free movement. However, more recent research points to the benefit of whole milk over skim milk. While there is much research about the nutritional differences of whole milk and skim milk regarding obesity ratings, cardiovascular risk, and vitamin absorption, there is limited research on the satiety effects. Current research suggests the fat content in whole milk may lead to higher satiety ratings than fat free milk; however, there is little to no empirical evidence to support whether this is the case. This study examines the satiety effects of various milk types on subsequent snack consumption. The findings therein may be used to inform institutions and consumer choices of milk beverages.
The “Abbot” and His “Monks:” The Wrath and Destruction of Ivan IV the Terrible and His Oprichniki History

STUDENT  Megan Sauer

FACULTY ADVISOR  Brian Hopp

DEPARTMENT  History

Bethany Lutheran College

The reign of Ivan IV the Terrible was long and full of hardship, trials, and misfortune for both the royal family and the general population of Russia. During the sixteenth century, Russia endured great social, economic, and political changes that affected the country until well into the 17th century when the Romanov rulers came to power. The Rurikid dynasty ended with the death of Ivan’s son Feodor I in 1598. By enduring lasting cruelties and insecurity as a young child, Ivan IV was molded into the mentally unstable and vicious ruler he was, specifically after his first wife died in 1560. This cruel and unstable beginning led him to feel insecure on the Russian throne, caused him to take out his insecurity on the people of Russia in various torture methods, either by his own hand or by the hands of those under his authoritarian control, and provoked a great psychological change in him after traveling to Aleksandrov.
Effect of Evaluator Training on Reliability of High-Stakes Assessment in Simulation: Results of a Pilot Study

STUDENT  Ashley Kollman
FACULTY ADVISORS  Dr. Ann Holland & Dr. Jone Tiffany
DEPARTMENT  Nursing
Bethel University

This project describes the results of a pilot study conducted to test the effectiveness of a training intervention in producing intra- and inter-rater reliability among nursing faculty evaluating student performance in simulation. The study is an extension of a four-year NLN study which evaluated the process and feasibility of using manikin-based high fidelity simulation for high stakes assessment in pre-licensure RN programs. The pilot study was guided by the question: What is the effect of (a) a training intervention and (b) faculty personality characteristics on faculty ability to achieve intra/inter-rater reliability when evaluating student performance during high-stakes simulation? With NLN approval, the student performance videos and the performance assessment tool produced for and used in the NLN feasibility study were used in the pilot study. The results of this pilot study and the experimental study have informed best practices in high stakes assessment using simulation in the future.
Independent Measurements of Lipids in Mixed Cell Populations

Student Katerina Estrada
Faculty Advisors Angela Stoeckman
Department Chemistry
Bethel University

Lipid droplets (LDs) are organelles that function primarily in lipid storage, energy metabolism, and cell signaling. LDs store triacyl-glycerols (TAGs) and cholesterol esters. LDs are characterized by a non-polar lipid core and a phospholipid monolayer studded with proteins. The excessive accumulation of lipids without metabolism is related to non-alcoholic fatty liver disease (NAFLD). NAFLD affects about 30 million Americans, causing swelling of the hepatocytes and often resulting in cirrhosis. Currently, the primary techniques being used to measure the amount of lipid content within LDs are fluorescence microscopy and triglyceride assays. These methods are time consuming and subjective. The goal of our project is to investigate a flow cytometry-based method to quantify LDs and compare the improvement over both traditional measurement techniques. We also plan to discriminate between varying amounts of lipids within a mixed cell population. In the future, this technique can be applied to clinicians looking at human samples which may have multiple cell types present.
Cooking is a source of indoor air pollution that causes negative climate impacts, health problems, and premature death. Ethiopian families use charcoal stoves indoors in both rural and urban areas. While more efficient cook stoves have been made, they are far too expensive to be practical. The cookstove project seeks to create an affordable stove that will heat efficiently and have reduced emissions. We ran controlled cooking tests and water boiling tests on seven different Top-Lit Updraft stoves. The PM 2.5 concentrations were measured using TSI DustTrak DRX instruments and Aircasting AirBeam instruments inside and outside of an experimental test kitchen, and aerosol particle composition measurements were made with a TSI Aerosol Time-of-Flight Mass Spectrometer.
MAP-ping Land Occupation in Border Regions of Ancient Greece: Mazi Archaeological Project 2016

STUDENTS Alex Claman & Julia Miller

FACULTY ADVISOR Alex Knodell

DEPARTMENT Classical Studies, Archeology & History

Carleton College

This summer we worked as student research assistants on the 2016 summer field season of the Mazi Archaeological Project in the Attiac region of Greece, an ongoing study led by Alex R. Knodell (Carleton College), Sylvian Fachard (University of Geneva), and Kalliopi Papangeli (Greek Ministry of Culture). The project used survey archaeology methods to examine diachronic occupation and land usage in the area of the Mazi Plain, a valley on the border between ancient Attica and Boeotia. This field season the project collected pottery, tile and lithic remains dating from the Neolithic to Byzantine eras. We also started to map several Neolithic and Late Roman Byzantine settlement areas. The data collected in this field season furthered our understanding of ancient settlement patterns and land use.
The Patron’s Pyramid: Social Networks, Patronage, and Collective Action in Turkish Politics

**STUDENT**  Matthew Lillehaugen

**FACULTY ADVISOR**  Dr. Daniel Biebighauser

**DEPARTMENT**  Political Science

**Concordia College**

Collective action is central to the understanding of many political phenomena, but too little research has been done to assess the role that the network structure of social relations may play in either facilitating or preventing collective action. This project seeks to fill that gap by developing a new model for networked collective action and demonstrating how this might be applied to the case of Turkey. It builds upon Henry Hale’s paradigm of patronalism and develops the paradigm into a concrete mathematical model of collective action through network formation. This model differs from most existing game-theoretic models of network formation by allowing for ‘ebb and flow’ in a sort of dynamic equilibrium, as well as endogenous shocks to the system that incorporate issues such as coups and revolutions. The project then examines the specific case of Turkey and demonstrates that Hale’s patronalism is applicable to the Turkish case. This allows for a new perspective on Turkish and Ottoman history.
Morphological and Biochemical Variation in Elodea spp. in their Native and Invasive Ranges

STUDENTS  Rebecca Dahl & Ruth Sexton

FACULTY ADVISOR  Dr. Michelle Marko

DEPARTMENT  Biology

Concordia College

Elodea nuttallii (Hydrocharitaceae) and E. canadensis are two aquatic plants common throughout North America. They provide valuable shelter and grazing opportunities for fish, muskrats and waterfowl in lake or river ecosystems, but can also become overgrown nuisances in their native ranges. In Europe, E. canadensis and E. nuttallii have different invasion histories, which may have created morphological and biochemical changes as each responded to the unique circumstances of their invasion. In some cases, E. canadensis is considered to be an environmentally harmless naturalized species, whereas E. nuttallii is often considered a nuisance species. Three populations of E. canadensis and E. nuttallii from Minnesota and France were observed for morphological and chemical differences. E. canadensis was found to have greater biomass, leaf area, and leaf width than E. nuttallii. Understanding differences that exist in the invasive and native ranges will help determine whether there are variables that can be exploited in controlling invasive plants.
“St. Thomas supported me every step of the way — teaching me how to do scholarly research and how to be successful in presenting effectively.”

—Nykeesha Greer, University of St. Thomas (page 41) ▼
Macalester College (page 24) LEFT
L-R: Garrett Eichhorn, Kaitlyn Lindamann, Shanai Matteson (outside collaborator), Dr. Roopali Phadke and Dr. Valentine Cadieux (Hamline University).

The College of Saint Scholastica
FAR LEFT (page 39)
Sun Ny Yang and Dr. Elyse Carter-Vosen

Bethany Lutheran College (page 9)
NEAR LEFT Megan Sauer

Gustavus Adolphus College
BELOW (page 20) L-R: Jacob Westfield, Caitlin Clause, Dr. Laura Triplett and Connor Smith
Tissue engineering can have a variety of important implications in medicine, including the replacement of damaged neuronal cells. It involves the incorporation of several important factors, including cellular adhesion, growth, and successful differentiation. Here we demonstrate how to induce chemical and topological changes to our scaffold, polydimethylsiloxane (PDMS), in order to properly promote the adhesion, growth and differentiation of neuron-like cells. We found that through topological changes of PDMS we can tune its surface hydrophilicity to help cell adherence. In addition, through boiling PDMS in deionized water for one hour also introduced hydroxyl groups on the surface of the polymer, may further aid in cell attachment. The altered surface properties were validated by measuring water-contact angle and performing IR spectroscopy. We hypothesize the increased hydrophilicity attributed to chemical and topological changes could allow better cell attachment to PDMS and promote growth.
Study of the carriage and characterization of a common bacterium, Staphylococcus aureus, on the campus of Concordia University - St. Paul

STUDENTS  Astri Duncan, Elena Koncar & Emily Shinn

FACULTY ADVISORS  Leanne Bakke, Amanda Brosnahan & Taylor Mach

DEPARTMENT  Science

Concordia University, St. Paul

A team of 32 students has studied the nasal carriage rate of Staphylococcus aureus on the Concordia University - St. Paul campus. Samples were obtained by swabbing the anterior nares of on-campus consenting adults.

The presence of S. aureus was determined using mannitol salt agar (MSA), colistin-nalidixic acid blood agar (CNA), DNase, coagulase, catalase, and Gram stain tests. All S. aureus isolates were subsequently tested for methicillin resistance (MRSA) using the Kirby-Bauer assay. Positive samples are also undergoing analysis for the production of the following proteins involved in pathogenesis: alpha toxin (hemolysin), TSST-1, SEA, SEB, and SEC (superantigens). In order to understand the genetic distribution of these toxins we have also analyzed the prevalence of the associated genes.

Of the 534 samples that have been collected 281 have been fully characterized. Of those 281, 85 were positive for S. aureus and 196 were negative, a carriage rate of 30% which is in accordance with previous literature findings.
Toward a solution to pollution in the Minnesota River

STUDENTS  Caitlin Clause, Connor Smith & Jacob Westfield

FACULTY ADVISOR  Laura Triplett

DEPARTMENT  Geology

Gustavus Adolphus College

The Seven Mile Creek watershed, located between St. Peter and Mankato in southern Minnesota, is a relatively small watershed that is typical of the agricultural landscapes in southern Minnesota. The region contributes a significant amount of nitrate to the Gulf of Mexico. Excess water exits the soybean and corn fields through drainage tiles and carries nutrients such as nitrate and phosphorus. The nutrients then drain into the Minnesota River followed by the Mississippi River and are finally deposited into the Gulf of Mexico. This creates algae blooms, which makes the water susceptible to hypoxic conditions that damage fisheries. Working to solve this problem, farmers in the Seven Mile Creek watershed are voluntarily implementing new methods to mitigate the amount of nitrate entering the creek. Over the summer of 2016 three sites within the Seven Mile Creek watershed were monitored for nitrate and total suspended solids, to begin assessing how much improvement we gain from these kinds of land-use change.
Somaliennials: Becoming American

STUDENT  Noah O’Ryan

FACULTY ADVISOR  Martin Lang

DEPARTMENT  Communication Studies

Gustavus Adolphus College

In Southern Minnesota, young Somali immigrants live their lives. They go to college, work, mosque, and the gym. They work hard, sometimes struggle, and try to make their parents proud. They are multilingual and multicultural, proud to be Somali and American. More Somalis have settled in Minnesota than any other place in the U.S. We see them often in the media, but only through a very narrow, often negative, lens. Beginning in summer of 2016, twelve young Somali-American men and women from Mankato, St. Peter, and Faribault offered us a chance to capture a slice of their lives. We got a glimpse into their unique experiences growing up in the U.S. while still being very in touch with their Somali culture. During our production, we met many amazing people and hope this film gives them a chance to speak to a world that does not often stop to listen.
Investigating the Role of Feeding-Related Peptides on Mammalian Suckling

**STUDENT**  Fathima Mohamed  
**FACILITY ADVISOR**  Irina Makarevitch  
**DEPARTMENT**  Biology  
**Hamline University**

Mammalian suckling is an instinctive and well-conserved behavior. This behavior is crucial to survival and it’s the first functional behavior in the brain. Despite its importance in neurobiology, there isn’t much literature on the brain regions that control this behavior, and the role of peripheral hormonal cues in stimulating the behavior. Studies have tried to address the role of hunger on suckling, however there is no clear consensus in the field. My research addresses the role of feeding-related peptides on mammalian suckling. After injecting neonates with Orexin, SB-334867, Leptin, and Ghrelin, weight change, righting reflex and latching latency were recorded. Orexin did not have strong effects but Leptin decreased suckling intake in neonatal mice. Since there were no changes in latching latency and righting reflex between the treatment and the control, Leptin doesn’t appear to alter latching and its effects are suckling specific. Our studies enable us to further investigate the influence of peripheral cues on this behavior.
The Katyn Massacre: Cover-up, Suppression, and the Politics of War, from an American Perspective.

**Student** Joseph Grundhoefer

**Faculty Advisor** Nurith Zmora

**Department** History

**Hamline University**

In the spring of 1940, roughly twenty two thousand Polish officers, the cream of Poland’s intelligentsia, were executed in Katyn forest. While the Soviet Union blamed Nazi Germany for the massacre, in the past seventy years all gathered evidence including documents from the Soviet archives, point to the Soviet Union as responsible for the killings. However, the British and American governments, who had knowledge of the Katyn Massacre, were engaged in a suppression of the truth, during the war and into the early years of the Cold War, even while they confronted the Soviet Union over Poland’s independence. The question is why? By examining the memoirs of the main officials in Truman administration who were involved in the cover up—Dean Acheson, George Kennan, William Averell Harriman and Truman himself— as well as studying the recent declassified 1951-1952 Congressional Report on Katyn Massacre, my study offers explanations for the U.S. decision to withhold information from the American public.
What will the future of mining in Minnesota look like? Mining companies throughout the world, and their industry associations, claim that they can usher in a new era of “responsible” and “sustainable” mining. Mining scholars have evoked the term “social license” to describe how a mining company gains the support of local communities. With Polymet and Twin Metals projects as our case studies, we explored if and how new mining projects are achieving a social license in the 21st century given the globalization of metal supplies, increasing concerns over wilderness protection, and the need to mine metals to support new green energy technologies. Our poster describes the competing landscape identities at play across the Iron Range and the range of opinions about what responsible innovation should look like in the future.
The Effect of NAFTA on Minnesota Agriculture

**STUDENTS**  Isabella Soparkar, Henry Whitehead & Millie Varley

**FACULTY ADVISOR**  Christina Manning

**DEPARTMENT**  Environmental Studies

**Macalester College**

Twenty years ago, the North American Free Trade Agreement (NAFTA) reinforced the decades-long push by OECD countries to open economic borders and liberalize international commerce. The argument for free trade is most often rationalized by numbers such as GDP, total exports, and number of jobs created as proof that the population of the United States is better off as a result. We find that such measures fail to capture the nuances of trade’s effect on individuals. In particular, we focus on Minnesota farmers. Our study contrasts the promises made at NAFTA’s inception with the realities faced by farmers across Minnesota in the last two decades. We find that exports have grown, but Minnesota farms have become fewer, bigger, and more specialized, creating difficulties for small, family farmers. We also find that farmers have been impacted by increased Mexican immigration and the rise of renewable energy.
Preserving Dignity in End of Life Care

STUDENT  Libby Cronican

FACULTY ADVISOR  Jean Keller

DEPARTMENT  Philosophy

College of Saint Benedict

Caring for a dying individual creates a unique type of relationship between the caretaker and the patient. As one approaches death, they go through a series of losses: from the loss of physical or mental ability to the ultimate loss of life. These losses make the individual vulnerable to harms that can come from a variety of sources. The choices others make out of the relationship they hold with the patient is one such source. Some of these choices fail to recognize the individual’s dignity. Within my research, I explore different notions of dignity before settling on Nordenfeldt’s two part definition of dignity: dignity as merit and inherent human dignity. Using this definition, I discuss how altered notions of relational autonomy and the feminist perspective of care can directly assist nurses in preserving the dignity of their patient. These blended ideas prove useful even given limiting factors to the nurse’s practice: for example, an overwhelming patient load or being underpaid.
Arts Integration and the Elementary Classroom: Storytelling through Folktales and Classical Music

STUDENT Paige Merwin
FACULTY ADVISOR Amy Grinsteiner
DEPARTMENTS Elementary Education/Music
College of Saint Benedict

Through a ten-week collaborative project with fifty-five fourth grade students and three classroom teachers at Avon Elementary, I integrated creative arts into the classroom and connected them with the MN state English language standards surrounding theme and dramatic storytelling. I designed and taught ten 40-minute original integrative lessons blending classical music, theater, and English language arts. The project culminated in a 45-minute joint performance by me and the students. I performed classical piano music by Beethoven, Medtner, and Tcherepnine that the students had previously practiced critically listening to, and the students performed original creative reader’s theater renditions of six different folk tales from around the world. Giving students a chance to showcase what they had learned, the performance was the final experience of this project that connected character, theme, and emotion in music and literacy for elementary students.
The aim of the present study is to understand the mental health behaviors related to study abroad and returning from an abroad experience. The study accounts for such factors as homesickness, alcohol consumption, and adjustment to the host culture to comprehend students’ experiences. The subjects (n=19) volunteered and were selected upon their decision to study abroad in South Africa and attendance of the College of Saint Benedict (CSB) or St. John’s University (SJU). The Homesickness Questionnaire, the Multidimensional Scale of Perceived Social Support, and alcohol consumption habits were obtained throughout the time abroad as well as having returned to the university. The Sojourner Adjustment Measure was solely administered abroad, while the Reentry Shock Scale was only administered upon return to CSB or SJU. The data has yet to be analyzed, but will be completed within one month of data collection completion.
Emerging Adult Social Network

STUDENT Tim Immelman

FACULTY ADVISORS Richard Wielkiewicz, Michael Livingston, Pamela Bacon & Steve Stelzner

DEPARTMENT Psychology

Saint John’s University

The main hypothesis of the present proposal is that more variety in an emerging adult’s social network should predict less stress, higher overall happiness, and higher levels of autonomy. Participants were from two small, Catholic liberal arts institutions in the Upper Midwest. The breadth, dimensionality, and diversity of an individual’s social network was measured by a researcher-developed inventory. Social support diversity was measured by asking whether they have a mix of close friends and casual acquaintances and other indicators of social-network diversity. Stress will be measured by the Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983). Social network variation should also relate to higher levels of perceived autonomy, as measured by the 10-item Self-Determination Scale (SDS; Sheldon & Deci, 1996). It is also predicted that introversion-extraversion will moderate these relationships. Social network strength will be measured by the researcher-developed social network strength scale (SNSS).
“Hamline University greatly supported my research. I was awarded a paid collaborative research scholarship. I hope that the work I have done so far is just a small stepping stone to a larger research project.”

—Joe Grundhoefer, Hamline University (page 23)
“St. John’s supported me by granting a research fellowship. I hope to publish and continue research in graduate school. I just finished applying to PhD programs in Clinical Psychology.”

—Timothy Immelman, Saint John’s University (page 29)
Expression of Hepatic Acetyl-CoA Carboxylase (ACACA) in Mice (Mus musculus) Exposed in utero to Atrazine

**STUDENTS**  Acacia Wimmer, Jay Heinle & Raelynn Speltz  
**FACULTY ADVISOR**  Dr. Debra Martin  
**DEPARTMENT**  Biology  
**Saint Mary’s University of Minnesota**

Atrazine (ATR) is a commonly used herbicide that has contaminated water sources to levels above the EPA safe level of 3 ppb. Previous research found that ATR increased serum fatty acid levels. The committed step for fatty acid synthesis is acetyl-CoA carboxylase (ACACA). To investigate ATR’s effect on ACACA protein level, mice exposed in utero to 0 ppb, 3 ppb and 30 ppb ATR were studied. Liver extract was analyzed by immunoblot to determine the amount of ACACA protein expression. Using a one-way ANOVA, it was determined there was a significant increase (p<0.05) between the control group and the 3 ppb group (p=0.000), a decrease between the 3 ppb group and the 30 ppb group (p=0.000), but no difference between the control group and the 30 ppb group (p=0.523). RNA extraction followed by quantitative real-time RT-PCR with ACACA-specific primers was also performed to analyze gene expression of ACACA mRNA in liver samples.
The Impact of the Dietary Supplement HemoHIM on Humoral and Cell-mediated Immunity

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**Saint Mary’s University of Minnesota**

HemoHIM is a health supplement comprised of a mixture of the herbs Angelica radix, Cnidii rhizoma, and Paeonia radix. Chemicals isolated from these herbs affect immune cell activation, including cytokine production. The goal of the present study was to determine whether commercially available HemoHIM also affected immune function. To do this, two groups of mice were fed HemoHIM in water or water alone for 10 weeks. After four weeks of treatment, mice were immunized with ovalbumin (OVA) to elicit an antibody response. Serum samples were collected at various time points post-immunization, and anti-OVA antibody titers were measured. Splenocytes were also isolated from the mice and cultured with LPS or ConA to induce TNF-α and IL-2 production, respectively. Results indicate that HemoHIM treatment did not significantly impact antibody production (humoral immunity). However, splenocytes isolated from HemoHIM-treated mice produced significantly greater amounts of IL-2 and TNF-a production compared to splenocytes isolated from control mice, suggesting that HemoHIM treatment does impact cell-mediated immunity.
Asia in Minnesota: Exploration of Hmong, Vietnamese, and Southeast Asians

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DEPARTMENTS  Economics & Asian Studies

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The unique yet often untold stories of the Hmong, Vietnamese, and other Southeast Asian Americans in Minnesota forms the core of this study, with a focus on their generational differences, economic successes and challenges, as well as cultural and social barriers. According to the US Census (2010), Asians have been one of the fastest growing ethnic groups in Minnesota for the past two decades, rising from 1.8% (1990) to about 4% (2010) of the total population. However, the Asian Americans in Minnesota encompass diverse ethnic origins and backgrounds. The current research thus extends the earlier project Asia in Northfield (2014) and aims to provide a more comprehensive look and gain a better understanding of the complex Asian American communities in the North Star state. As the local Asian population continues to grow, this project hopes to begin a more inclusive and insightful documentation of the Asian American experiences in Minnesota.
Digital Art Song Perspective of Latin America

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The genre of art song in the Classical music tradition is defined as a vocal music composition for voice and piano accompaniment. It originated from 19th century German lieder (art songs) by composers such as Schumann and Schubert. Between the late 19th and mid-20th centuries, art songs proliferated in Latin America with some countries demonstrating both their pride and nationalism in music. Argentina and Brazil were the two countries best known for their production of Latin American art song including recognized composers such as Heitor Villa-Lobos, and Alberto Ginastera. Yet, a significant portion of the 2,500 quality art songs and the composers who produced them go unacknowledged. The goals of the website project are to: discover obtainable art song selections for further study and/or performance and gain a richer experience of the Latin American art song tradition where individuals will be able to obtain selections of Latin American art songs from this period on a single, interactive platform.
As wetland invasive species, reed canarygrass (Phalaris arundinacea) out-competes native plants, changing habitat structure and decreasing plant diversity. However, reed canarygrass populations have not come to dominate any of the eleven wetlands at the Cedar Creek Ecosystem Science Reserve over 27 years. One possible explanation is that these populations are not the invasive variety. Genetic studies indicate the native populations are diploid (2N=14) and the more invasive Europe strains are tetraploids (2N=28). To test the hypothesis that reed canarygrass in these sites is the native, diploid variety, we used a grass protocol for karyotyping root tip cells. Although chromosomes were not condensed or spread optimally for accurate counting, they appear too low in number to be tetraploid. A second method using enzymes and a steam treatment may better separate chromosomes for accurate counts. Verification of the diploid status of these non-invading populations will indicate a need to focus eradication efforts on populations that are confirmed to be the invasive variety.
Child spacing decision-making and couple communication among Somali men and women in the Twin Cities

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**DEPARTMENT**  Public Health

**St. Catherine University**

Understanding factors that influence contraceptive use among couples desiring to space their children is essential for the health of children, women, and families. Currently there is a lack of research on contraception among Somali immigrants. This study explores child spacing decision-making and couple communication among Somalis in Minnesota, home to the largest Somali population outside of Africa. Qualitative interviews were conducted, a preliminary analysis was completed, and a coding scheme was developed based on the following themes: motivational factors (e.g. birth of first baby), decision-making (e.g. circumstantial prioritization of spouses’ desires), gender (e.g. disruption of traditional gender roles after migration to U.S.), and religious influence (e.g. religious beliefs about contraception). Transcripts will be coded and themes will be identified and stratified. The findings will contribute to knowledge of sexual and reproductive health in the Somali community, identify factors that influence men’s participation in family planning, and inform and strengthen child spacing programs and public health services for Somali immigrants.
Indole/indazole and quinolone sub-units are found in numerous biologically active compounds; many of which are known to exhibit anticancer, antibiotic, and/or antimicrobial activity. Therefore, a research project with the overriding goal of exploring the anticancer/antibiotic/antimicrobial activity of compounds that contain both the indole/indazole and quinolone sub-units was developed. The project is highly amendable to being divided into sub-projects that focus on different locations of indole/indazole and quinolone sub-unit connectivity, with each individual early stage sub-project focusing on the synthesis of a handful of analogues that share the same indole/indazole and quinolone sub-unit connectivity. Our specific sub-project focused on synthesizing indole-quinolone and indazole-quinolone analogues with sub-unit connectivity located at the N1 of the indole/indazole sub-unit and the C6 of the quinolone sub-unit, which we synthesized via use of an ortho-disubstituted precursor. We successfully synthesized a handful of analogues with this specific N1-C6 sub-unit connectivity and our research collaborators are conducting in vitro biological studies testing the anticancer/antibiotic/antimicrobial activity of each compound.
Kwv Txhiaj, The Hmong Tradition of Intertwined Music and Speech

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FACULTY ADVISOR   Elyse Carter Vosen

DEPARTMENTS   Education & Music

The College of St. Scholastica

Kwv txhiaj is an ancient practice that can be traced back to Hmong people in China (Miao). It is chant-like, but has a distinct melodic character that demonstrates regional and dialectal differences in China, Laos, Thailand, and the U.S. It has universality in that it is sung everywhere, following the journeys of Hmong people. Kwv txhiaj is the major style of singing heard on the radio every day in Hmong communities. It marks the older generations’ identity as Hmong, and carries a great deal of emotional weight. It holds many daily life experiences and stories that tie Hmong people together. This study examined the small body of scholarly work on kwv txhiaj to provide a more thorough understanding of how the tradition is practiced and how it relates to Hmong language and instrumental music. My analysis concentrated on how it is shaped and preserved through media and what role it plays in shaping Hmong identity.
The prediction of posttraumatic stress symptoms and quality of life among veterans who served in Iraq and Afghanistan

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FACULTY ADVISOR  Brian E. Engdahl

DEPARTMENT  Neuroscience

University of St. Thomas

This study sought to investigate and identify risk and protective factors of increased PTSD symptom severity (PTSS) and decreased non-mental health quality of life (QOL) in Operation Enduring Freedom and Operation Iraqi Freedom veterans. Six factors were evaluated as predictors of the outcome variables PTSS and QOL. A structural equations model (SEM) was developed, exhibiting the following: warzone perceived threat and living conditions were found to strongly predict elevated PTSS and decreased QOL; lifetime exposure to potentially traumatic events predicted increased PTSS; childhood family dynamics and educational level were directly predictive of enhanced QOL; and social support postdeployment was inversely predictive of PTSS. The SEM also demonstrated that childhood family dynamics and warzone perceived threat and living conditions exerted indirect effects upon PTSS mediated by social support. Thus, all the examined variables were significant risk or protective factors for one or both outcome variable(s), with warzone perceived threat and living conditions accounting for the greatest variance in PTSS and QOL.
Examining the Benefit of Multiple Supplier Diversity Certifications

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**DEPARTMENT**  Operations Management

**University of St. Thomas**

This research examines the financial and non-financial impacts of supplier diversity certifications from the perspective of current certification holders. Minnesota suppliers with two or more diversity certifications were surveyed to investigate whether obtaining multiple certifications is beneficial to their business. This research uses descriptive statistics to provide insight into supplier perceptions of multiple supplier diversity certifications. The purpose of this research is to provide insights into the current state of the supplier perspective of supplier diversity certifications in Minnesota. Results show that suppliers were very optimistic that multiple certifications would benefit their companies only to find out that there isn’t much benefit.
“By allowing a first year [student] the opportunity to do collaborative research, Hamline introduced me to a new world of scientific inquiry. I was able to learn from alumni panels, department lunches, poster workshops, and Strengths Quest workshops.”

— Fathima A. Mohamed, Hamline University (page 22)
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