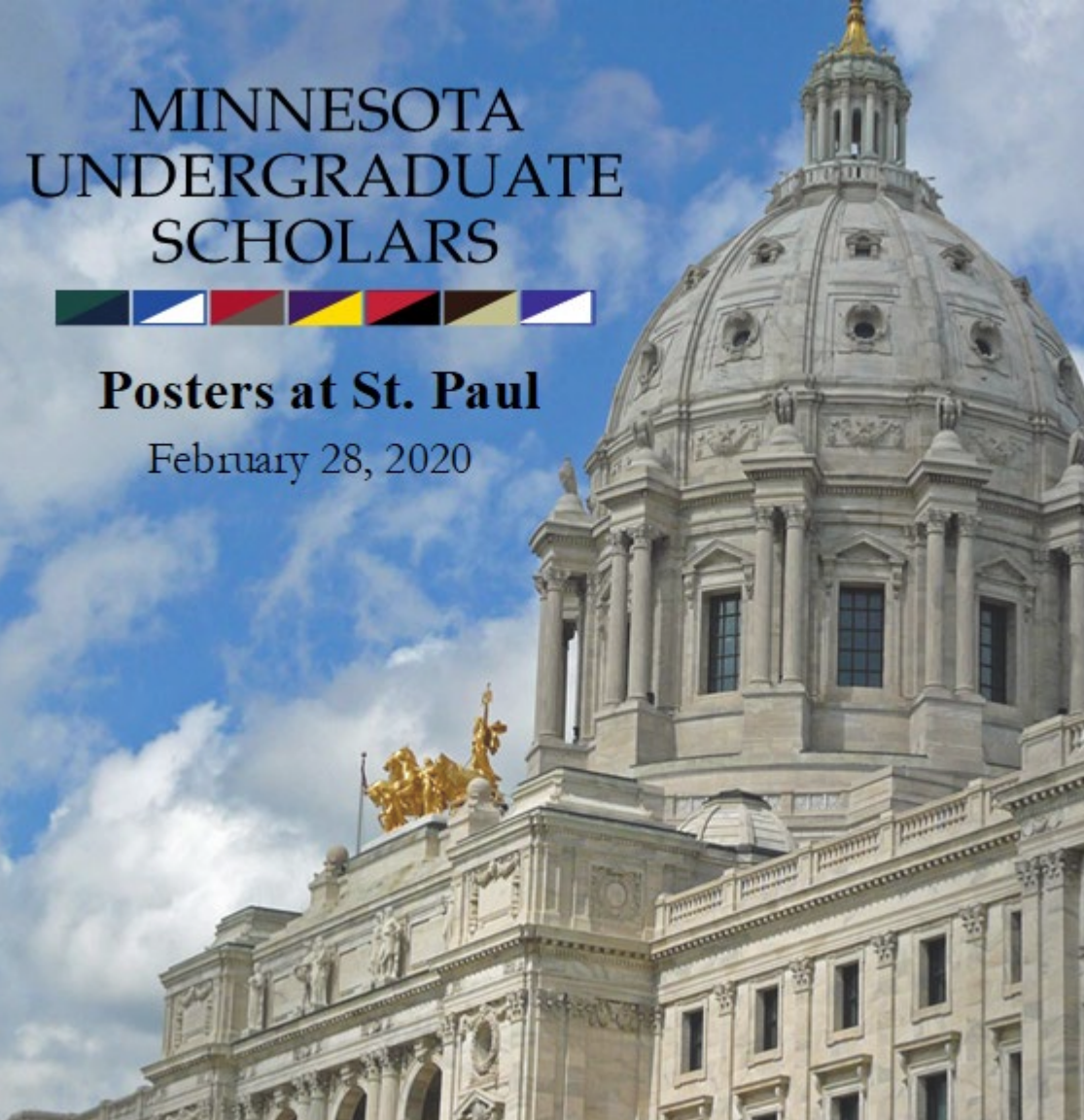


MINNESOTA UNDERGRADUATE SCHOLARS



Posters at St. Paul

February 28, 2020



Welcome

Welcome to the 7th annual Minnesota Undergraduate Scholars Poster at St. Paul! This event provides undergraduate students the opportunity to share their scholarly work with state legislators and other state government officials. These student researchers have been selected to share their work because of the important messages their research can share with the state of Minnesota and the community. It is our hope that this experience will showcase the incredible influence that research has on preparing students in becoming leaders in their future accomplishments. This year's event welcomes 26 projects from across 6 different campuses.

Through the combined efforts of the Minnesota Undergraduate Scholars Council, this event was made possible. We are appreciative for the dedication of the faculty mentors to their students. In addition, we want to recognize the student presenters for their commitment to excellence.

Sincerely,

A handwritten signature in black ink that reads "K. Agarwal". The letters are cursive and somewhat stylized.

Kuldeep Agarwal
MN Undergraduate Scholars Posters at St. Paul

MINNESOTA UNDERGRADUATE SCHOLARS



Minnesota Undergraduate Scholars is a consortium of institutions that supports the research, scholarly works and creative activity of undergraduates by providing avenues for funding, presentation resources and opportunities for undergraduates to present their work. We are committed to engaging undergraduate students throughout the Minnesota State Colleges and Universities system in scholarly activities that will enrich their collegiate experience, open doors to career opportunities and lead to a life-long love of learning.

Minnesota Undergraduate Scholars Council

Anoka-Ramsey Community College

Kristen Genet

Bemidji State University

Mahmoud Al-Odeh

Inver Hills Community College

David Higgins

Metropolitan State University

Alex Layne

Minneapolis Community & Technical College

Renu Kumar

Minnesota State University, Mankato

Kuldeep Agarwal

Minnesota State University, Moorhead

Oscar Flores

Rochester Community and Technical College

Heather Sklenicka

Southwest Minnesota State University

Emily Deaver

St. Cloud State University

Jennifer Howland, Jodi Kuznia and Megan Robillard

Winona State University

Mingrui Zhang

Participating Colleges & Universities

Metropolitan State University

Minneapolis Community and Technical College

Minnesota State University, Mankato

Southwest Minnesota State University

St. Cloud State University

Winona State University

Schedule of Events

Friday, February 28

- | | |
|-------------------------|--|
| 8:00 – 9:30 am | Arrival and Poster Set up |
| 9:30–11:30am | Poster Session in Capital Rotunda |
| 11:30-12:00pm | Conclusion and Certificate Distribution |
| 12:00pm- Evening | Students can meet with Legislators |

Table of Contents

Minnesota State University, Mankato

Comparative Study of Carbonaceous Meteorites using micro-Raman Spectroscopy and SEM/EDS
Rohil Kayastha.....9

Formulation and Implementation of CRISPR Edited Glioblastoma Cells to Evaluate Triplatin-Proteoglycan Interactions
Morgan Pitcher.....10

Applying Peer-Tutoring to Spelling in an Elementary Classroom
Nicholas Linell.....11

Effect of Disease Mutants in Calmodulin on Oxidation, Binding and Degradation
Jordan Julian.....12

Visualization of the Rearrangement of Cell-Cell junctions in Metastatic Cells
Taylor Johnson.....13

Steroid Hormone Effect on Neurons of the Amygdala and the Preoptic Area in the Brain of Green Anole Lizards
Georgia Muelken and Spencer Savannah.....14

High school sport injury influence on current physical activity and physical activity motivation
Krista Gadiant and Tyler Hobson.....15

Winona State University

Synthesis and electrochemical characterization of PdCo/MWCNT towards formic acid fuel cells
Jakeline Morataya.....16

HARDWARE astronomy Weather Station and All-Sky Camera for Robotizing Small Observatories with the ROBH.aT Network
Autumn Rasmussen.....17

Southwest Minnesota State University

Comparisons between the Functional Movement Screen Test and NFL Combine Scores in Pre-Professional Football Players
Zachary Buck, Christopher Fitzgibbons, and Kevin Martinez.....18

Lotka-Volterra Theory: The Mathematics Behind Predator-Prey Interactions
Austin Domeier.....19

A Gambling System
Nathan Kuhn.....20

St. Cloud State University

Math In Balance
Victoria Pounder.....21

Beyond Suffrage: Women of the Progressive Era
Andrea Langhoff.....22

Anti-diabetic Properties of Sodium Bicarbonate
in a Mouse Model of Type 1 Diabetes
*Jenna Nelson, Logan Olson, Jace Engelmann,
and Amira Zaher*23

Oppression and Resistance: Chinese Litigation in
the Late Nineteenth Century
Sonya Smetana.....24

Reiki and Well-being in Minnesota
Rachel Michl.....25

“This Is What Community Should Look Like”:
an Ethnographic Study of Community Building
Within a Local Nonprofit Organization
Maggie Powers.....26

Towards a Less Divided Government: Solving
the problem of uncompetitive electoral districts
through geography
Jessica Craig.....27

How One State Legislature Decided the
Presidential Election of 1876
Jennifer Sonterre.....28

Minneapolis Community and Technical College

Prevalence of Antibiotic Resistant Genes in
Environmental Isolates
*Ryan Bohara, Gregory Rossi, Alma Boric,
Mohamed Mohamed, Abdigadir Khalif, and Renu
Kumar*.....29

Metropolitan State University

I aced that! A study on the impact of proctor
gender on test-taker confidence
Myranda Lopez.....30

Applying Sorrell’s Intercultural Praxis Model to
Restorative Justice Practices in Schools
Jennifer Mukarram.....31

More or Less: The cognitive impact of cell phone
distractions
Robin Johnson.....32

Do Gesture-Like Hand Movements Disrupt the
Benefit of Gesture for Memory Even When the
Motor Contexts Match?
Rachel Hagen.....33

The Influence of Religious Identity on Attitude
Toward Immigration in the U.S.
Marti Martin.....34

Engaging Home Health Aides in Fall Prevention:
A Multi- Faceted Approach
Eyitayo Onayiga.....35

Student Images and Biographies.....36

Comparative Study of Carbonaceous Meteorites using micro-Raman Spectroscopy and SEM/EDS

Rohil Kayastha

Analia Dall'Asén, *Faculty Mentor*

Minnesota State University, Mankato

The formation of the planets in our solar system is not fully understood. Carbonaceous chondritic meteorites, considered the most primitive surviving materials from the early Solar System, can contribute to understand how planets formed from dust by studying their composition. These relics are mainly composed of chondrules (micro/millimeter-sized inclusions) surrounded by a matrix of microparticles. The mineralogical composition of the chondrules and surrounding matrix of this kind of meteorites can be characterized at the microscale using micro-Raman spectroscopy, while the topography and elemental composition of these relics can be studied at the micro/nanoscale using SEM/EDS (Scanning Electron Microscopy/Energy Dispersive X-ray Spectroscopy).

In this work, we present a comparative study of the mineralogical and elemental composition of the chondrules and surrounding matrix of carbonaceous chondritic meteorites using the aforementioned techniques. We examine how these properties vary in different regions of the chondrules and matrix. In general, Raman spectroscopy results show graphite, pyroxene, and olivine, both within and outside the chondrules. Well-defined chondrules, rims, and matrix are observed from the SEM images. The results obtained with EDS show that iron is most abundant in the matrix, while the chondrules are enhanced in magnesium. Silicon, aluminum, sodium, calcium, oxygen, and carbon are also found in both, chondrules and matrix. Iron and sulfur rims are observed around the chondrules. These findings contribute detailed information about the composition of these chondritic meteorites, helping to understand the origin of the found structures and to unravel the mysteries surrounding the formation of these relics.

Formulation and Implementation of CRISPR Edited Glioblastoma Cells to Evaluate Triplatin-Proteoglycan Interactions

Morgan Pitcher

Samantha Katner, *Faculty Mentor*

Minnesota State University, Mankato

Proteoglycans are ubiquitous protein/carbohydrate complexes that are found on all cell surfaces. They are able to regulate cell growth and vascularization, processes that are exploited by cancer. Heparanase, an enzyme that cleaves glypicans, can alter the structure of proteoglycans and change their bioactivity. These enzymes are overexpressed in glioblastomas and are thought to contribute to the rapid and aggressive growth of cancer. Here, we generate a glypican-3 (GPC3) knockout in glioblastoma cells using CRISPR editing with #31 sgRNA. To verify the knockout (KO), we use genomic analysis and western blot determination. We compare GPC3 KO in wild-type to CRISPR edited glioblastoma cells. The further exploration of GPC3 interactions could allow for tailored chemotherapeutic treatments to patients with glioblastoma and may pave the way for new molecular targets and more effective treatments for glial tumors in the future.

Applying Peer-Tutoring to Spelling in an Elementary Classroom

Nicholas Linell

Shawna Peterson-Brown, *Faculty Mentor*

Minnesota State University, Mankato

Technological advancements, such as spell-check, auto-correct, and predictive text, have contributed to a decreased emphasis on spelling in today's schools. However, it is important to remember that spelling supports the development of reading and writing skills. Spelling teaches and reinforces decoding and encoding, the skills required for reading and writing individual words using phonetic strategies. Despite the importance of acquiring spelling skills, few evidence-based spelling interventions exist (Reed, 2012). Peer tutoring has been defined as an instructional strategy that helps teachers individualize instruction, while providing students ample opportunity to be actively engaged during instruction. The benefits of peer tutoring include the ability to individualize instruction, increase active student engagement, and increase the extent to which students receive immediate feedback (Sideridis, et. al., 1997). Each of these features has the potential to enhance student learning. The purpose of this study is to examine if applying a peer tutoring intervention in a 3rd grade classroom will enhance spelling skills of elementary students compared to typical classroom spelling instructions. Results and implications of the study will be discussed.

Effect of Disease Mutants in Calmodulin on Oxidation, Binding and Degradation

Jordan Julian

Rebecca Moen, *Faculty Mentor*

Minnesota State University, Mankato

Catecholaminergic polymorphic ventricular tachycardia (CPVT) is an inherited disease that causes episodic syncope and sudden cardiac arrest, particularly in infants. Various amino acid point mutations, including N54I and N97S, in the protein calmodulin (CaM) are thought to be the primary cause of the genetic disease. Calmodulin is a key protein in calcium binding and signaling in all human muscles. CaM's impaired binding to both calcium ions as well as the ryanodine receptor (RyR2) in heart muscle is thought to be the primary cause of CPVT. In addition to disease-causing mutations, CaM has also been shown to be highly susceptible to oxidation, particularly at its nine methionine residues. Oxidation of these side chains reduces the binding ability of CaM to RyR2 and calcium ions. The degradation of CaM is also affected by the oxidation of these methionine side chains and has not been fully studied. The reduced binding affinity of mutant CaM when paired with oxidation can be observed through its binding to RyR2 with the analysis of tryptophan fluorescence. The point mutation effects on the protein can be further observed through the proteasomal degradation of both the mutant and its oxidized form.

Visualization of the Rearrangement of Cell-Cell junctions in Metastatic Cells

Taylor Johnson

Marilyn Hart, *Faculty Mentor*

Minnesota State University, Mankato

Cancer is a collection of disorders where the body's cells rapidly divide and metastasize. Cancerous cells disengage from neighboring cells, change shape and have increased mobility due to actin remodeling which ultimately leads to additional tissue invasion. Actin filaments are a underlying component of cell: cell junctions (adherens junctions), securing the membranes of neighboring cells to allow for the integrated structure of tissues. Actin is regulated by a large group of accessory proteins including actin capping protein (CP). The focus of my research was to characterize the disengagement of cancerous cells by analyzing the cell: cell junctions of metastatic cells. Using CP as a marker, I sought to characterize the regulation of actin organization in focal adhesions. I generated a clone which consists of a fusion protein of CP and a fluorescent marker and introduced the construct into a living metastatic cell. Cells that incorporated the fusion protein were visualized for the fluorescent marker via advanced fluorescent microscopy. Fluorescent microscopic analysis revealed an irregular appearance and distribution of CP near adherence junctions of metastatic cells, indicating that CP does play a role in the reorganization of adherence junctions in metastatic cells.

Steroid Hormone Effect on Neurons of the Amygdala and the Preoptic Area in the Brain of Green Anole Lizards

Georgia Muelken and Spencer Savannah

Rachel Cohen, *Faculty Mentor*

Minnesota State University, Mankato

Testosterone has distinct effects on seasonal brain morphology and behavior. The seasonally breeding green anole lizard, *Anolis carolinensis*, has distinct behaviors during the breeding season, such as reproductive displays and territorial behaviors. Interestingly, these behaviors are not observed during the non-breeding season. We are examining two forebrain areas, the preoptic area (POA) which facilitates masculine reproductive behavior under androgen treatment, and the amygdala (AMY) which plays a role in fear behaviors. These areas are also known to change volume seasonally, but the specific mechanism is unknown. Our experiment seeks to understand the mechanism by which steroid hormones act on nuclei in the forebrain to induce seasonal differences using gonadectomized breeding season males. Each individual was treated with testosterone, dihydrotestosterone, estradiol, or vehicle. We expect to see soma size and cell numbers in steroid hormone treated lizards to be restored to breeding season levels within the POA and the AMY, as has been shown in previous work. Overall, our experiment suggests that steroid hormones can impact brain morphology. Future studies may investigate different factors that may contribute to the increase in POA or AMY volumes in the breeding season like glial cell count or measuring the distances between neurons.

High school sport injury influence on current physical activity and physical activity motivation

Krista Gadiant and Tyler Hobson

Jessica Albers, *Faculty Mentor*

Minnesota State University, Mankato

Testosterone has distinct effects on seasonal brain morphology and behavior. The seasonally breeding green anole lizard, *Anolis carolinensis*, has distinct behaviors during the breeding season, such as reproductive displays and territorial behaviors. Interestingly, these behaviors are not observed during the non-breeding season. We are examining two forebrain areas, the preoptic area (POA) which facilitates masculine reproductive behavior under androgen treatment, and the amygdala (AMY) which plays a role in fear behaviors. These areas are also known to change volume seasonally, but the specific mechanism is unknown. Our experiment seeks to understand the mechanism by which steroid hormones act on nuclei in the forebrain to induce seasonal differences using gonadectomized breeding season males. Each individual was treated with testosterone, dihydrotestosterone, estradiol, or vehicle. We expect to see soma size and cell numbers in steroid hormone treated lizards to be restored to breeding season levels within the POA and the AMY, as has been shown in previous work. Overall, our experiment suggests that steroid hormones can impact brain morphology. Future studies may investigate different factors that may contribute to the increase in POA or AMY volumes in the breeding season like glial cell count or measuring the distances between neurons.

Synthesis and electrochemical characterization of PdCo/MWCNT towards formic acid fuel cells

Jakeline Morataya

Jennifer Zemke, *Faculty Mentor*

Winona State University

A growing global population, technological advances, and the push towards greener energy brings a great need for alternative sources of energy. Direct formic acid fuel cells (DFAFCs) show great promise in being able to keep up with increasing global demand. However, the need for a cost effective, robust and efficient anodic catalyst towards DFAFCs is still imminent. This study aims to investigate the efficiency, conductivity, and stability of palladium and cobalt binary nanocomposites on multiwalled carbon nanotubes (MWCNTs) substrate. Six nanocomposites were synthesized with varying amounts of cobalt (0%, 7.5%, 10% 12.5% and 15%) and a fixed amount of palladium (20%) on MWCNTs using a simple one pot synthesis utilizing sodium borohydride as a reducing agent. This allowed the palladium and cobalt nanoparticles to disperse along the carbon nanotube surface to provide greater catalytic surface area. Morphology and composition were characterized by scanning electron microscopy (SEM) imaging technique and Fourier-transform infrared spectroscopy (FTIR). Cyclic voltammetry (CV) was then employed for the electrochemical characterization of formic acid oxidation (FAO) using the nanocomposites in a 0.50 M HCOOH with 0.10 M H₂SO₄ electrolyte. A glassy carbon working electrode (GCE) was modified with a fixed amount of the nanocomposites (0.025 mg/cm² GCE) to enable correct comparisons of the catalytic effect of various amounts of cobalt. The nanocomposites have demonstrated the direct formic acid oxidation pathway facilitated by a bifunctional effect. This along with all other electrochemical data was compared to a standard commercially available 20% palladium on carbon Pearlman catalyst.

HARDWARE.astronomy Weather Station and All-Sky Camera for Robotizing Small Observatories with the RObH.aT Network

Autumn Rasmussen

Andrew Ferstl, *Faculty Mentor*

Winona State University

The Robotic Observatory by HARDWARE.astronomy and Telescope (RObH.aT) Network, is an open hardware project, driven by undergraduate students, to develop the equipment and software necessary for robotizing small observatories. Critical components of the RObH.aT Network include a weather station and all-sky camera. The weather station-- developed with low cost devices-- gathers data on current weather conditions, allowing the telescope to observe safely. The all-sky camera identifies cloud cover, characterizes light pollution, and ensures accurate photometric calibration. Here I report on work to develop these tools, including mechanical and electrical design, software, and prototypes. I will discuss current status, future work, and availability of the designs to the community.

Comparisons between the Functional Movement Screen Test and NFL Combine Scores in Pre-Professional Football Players

Zachary Buck, Christopher Fitzgibbons, and Kevin Martinez

Morgan Betker, *Faculty Mentor*

Southwest Minnesota State University

Introduction: Long-term football participation can increase sport-specific performance, but may decrease functional movement capability, which can lead to future injury.

Purpose: The purpose of this study was to determine differences between the Functional Movement Screen (FMS; seven measures) and NFL combine (six measures) scores between football players of varying levels of experience. **Methods:** Participants were recruited from Twin Cities Area high schools and semi-professional football programs.

The FMS and NFL combine skills were performed during one visit in a temperature controlled athletic complex. **Results:** High school football athletes significantly outperformed semi-professional players in three FMS assessments including the Deep Squat ($p < 0.0001$), the In-Line Lunge ($p = 0.002$), Shoulder Mobility ($p = 0.008$). However, high-school athletes significantly underperformed in four NFL combine assessments, including the 40-Yard Dash ($p = 0.023$), Bench Press ($p < 0.0001$), Broad Jump ($p = 0.002$), and the Shuttle Run ($p = 0.046$) when compared to pre-professional football athletes. **Conclusion:** In conclusion, this study shows that athletes with less experience and skill-specific training have better functional mobility yet perform worse in football combine skills than their semi-professional counterparts.

Lotka-Volterra Theory: The Mathematics Behind Predator-Prey Interactions

Austin Domeier

Heather Moreland & Mu-wan Huang, *Faculty Mentors*

Southwest Minnesota State University

Predator-prey interactions are a vital aspect of population dynamics. Understanding interspecific interactions can help describe past and future relationships between species. In 1925, Alfred J. Lotka and Vita Volterra independently proposed a system of differential equations to model predator-prey interactions. The predator-prey system in northern Minnesota of white-tailed deer (*Odocoileus virginianus*) and gray wolf (*Canis lupus*) populations was studied to help understand the impacts of environmental factors on these species. Data collected by the Minnesota Department of Natural Resources from 2013-2017 was used to determine initial population sizes and growth. Lotka-Volterra theory was used to model predator-prey interactions using standardized interaction rates. Although Lotka-Volterra theory has assumptions that rarely exist in the natural environment, it is essential for simulating effects on population dynamics and can lead to more accurate models of interspecies interactions in the natural environment.

A Gambling System

Nathan Kuhn

Heather Moreland & Mu-wan Huang, *Faculty Mentors*

Southwest Minnesota State University

Gambling is a huge industry in the United States from sports betting to casino games. A few forms of theoretical betting, such as progressive betting, have been developed to beat the casino. However, these are not fool proof. Oscar's System, or Oscar's Grind, is the best approach to beat a casino. This method looks at a bettor who has high probability to win its bet back. In order for this betting system to be successful and to accumulate large profits, lots of hours (grind), is required. This betting system is modeled using Markov Chains which show each bet size and the bet number in each sequence to yield a profit of one unit. It is shown that over the long run, this system will provide increasing profits.

Math in Balance

Victoria Pounder

Melissa Hanzsek-Brill, Patty Waletzko, and Bruce Klemz, *Faculty*

Mentors

St. Cloud State University

Math In Balance is an educational app created to help anyone who struggles solving single variable equations. Users can select from one of three characters to follow a unique path to solving equations. This app is formatted so the user is presented with a linear equation and asked to solve for x . Using the interactive scale, users balance the equation as a visual reminder that what is done to one side must also be done to the other. Once the problem is solved correctly, the user gets a stamp and can move onto the next equation. Each path has 10 equations and can be completed multiple times with different problems appearing each time.

Beyond Suffrage: Women of the Progressive Era

Andrea Langhoff

Robert W. Galler, Jr, *Faculty Mentor*

St. Cloud State University

Many textbooks and history lessons highlight women's suffrage as the epitome of women's rights of the Progressive era. While the right for women to vote is indeed something to be celebrated, women of the era fought for much more than the chance to cast a ballot. The Progressive era was known for extensive social activism, and suffrage was not the only thing activists were seeking to accomplish for women. Mary Church Terrell was a civil rights leader who was among the first African American women to serve on a school board and was a charter member of the National Association for the Advancement of Colored People (NAACP). Clemencia Lopez was an advocate for Philippine independence and shared her anti-imperialist principles among women suffrage organizations. The Women's Trade Union League formed to improve wages and working conditions of women and Mary Kenney O'Sullivan was the first official female in the male-dominated American Federation of Labor. Zitkala-Sa advocated for the preservation of Native American culture and also for full rights of citizenship for Native Americans. Women worked for access to education, better working conditions, freedom from the institution of marriage, and for racial equality. Women were major contributors in the challenging task of reforming and modernizing early 20th century America. To gain an expanded view of the fight for women's rights during the Progressive era it is consequential for educators to go beyond suffrage and the 19th Amendment.

Anti-diabetic Properties of Sodium Bicarbonate in a Mouse Model of Type 1 Diabetes

Jenna Nelson, Logan Olson, Jace Engelmann, and Amira Zaher

Marina Cetkovic-Cvrlje, *Faculty Mentor*

St. Cloud State University

Type 1 diabetes (T1D) is a chronic inflammatory autoimmune disease in which T cells destroy insulin-producing β -cells in the pancreas, leading to hyperglycemia. Some T cells directly kill β -cells, such as T-cytotoxic (Tc), or indirectly such as T-helper (Th), while regulatory T cells actually protect them. A recent study showed that sodium bicarbonate (SB) exhibited anti-inflammatory activity by affecting immune cells other than T cells, speculating its potential for the treatment of autoimmune diseases. Since SB has never been tested in an experimental mouse model for autoimmunity, we studied the effects of SB treatment on the development and severity of T1D, as well as on T cell subsets and T cell function. It was hypothesized that SB administration (200 mM, administered via drinking water) would decrease the incidence and severity of streptozotocin-induced T1D in 8-week-old C57BL/6 mice by its action on T cells. Glucose and body weight measurements were taken biweekly until mice were sacrificed four weeks later, and their spleens obtained for analysis of cell counts, viability, T cell proliferation, and quantification of T cell subsets by flow cytometry. There were no differences in splenic lymphocyte counts and viability between SB-treated and control mice. Although results showed that SB significantly decreased glucose levels and delayed diabetes development, it does not seem to affect the frequency of T cell populations nor their proliferation capacity. Our results suggest beneficial effects of SB in the prevention of mouse autoimmune T1D and highlight the need for further studies on its mechanism of action.

Oppression and Resistance: Chinese Litigation in the Late Nineteenth Century

Sonya Smetana

Robert Galler, *Faculty Mentor*

St. Cloud State University

Chinese immigrants began to steadily enter the United States starting in 1849 and were almost immediately seen as a threat by white Americans. Fears of white racial purity, jobs, and change to culture prompted lawmakers to pass discriminatory laws against Chinese immigrants throughout the end of the nineteenth century. These oppressive measures culminated in the Chinese Exclusion Act of 1882, which banned the entry of Chinese laborers. A common misconception is that Chinese immigrants did not fight back against oppression; however, they did resist their mistreatment, mainly through litigation. The Chinese Consolidated Benevolent Association of San Francisco and the Chinese Consulate in San Francisco were two organizations that provided leadership and financial support that made it possible for hundreds of Chinese immigrants to go to court. Wong Kim Ark, Chew Heong, Chan Yong, and Lin Sing were among the many Chinese people to challenge oppressive American laws at state and federal levels before the turn of the century. The legal battles of Chinese organizations and individuals highlight agency and persistence in their fight for equality.

Reiki and Well-being in Minnesota

Rachel Michl

Kelly Branam MaCauley, *Faculty Mentor*

St. Cloud State University

Reiki is an example of a holistic healing practice that can be used for the participants overall well-being. Well-being can be seen through mental, emotional, and physical forms with my participants. Some examples include the calming effect Reiki was said to have on my participants, and its ability to help with pain, in my personal experience it reduced the irritation from my poison ivy and hives. Reiki can be described as a holistic energy healing that focuses on moving of energy through the body to help realign or balance the recipient's energy and help heal ailments. Previous research shows that Reiki and other forms of holistic healing have been used for well-being for a number of years. Hahn, Reilly, & Buchanan(2014) discuss the use of Reiki in helping hospital patients cope with their pain and anxiety. Through the use of participant observation I was able to experience how and why Reiki is used and directly see it's influence on the recipients well-being. In this paper, I argue that Reiki is used as a method of well-being, in similar ways that yoga, massage, and meditation. Rosenbaum, & Van de Velde (2016) discuss their research and describe that Reiki is even more effective in reducing pain in cancer patients compared to other methods such as massage and yoga.

“This Is What Community Should Look Like”: an Ethnographic Study of Community Building Within a Local Nonprofit Organization

Maggie Powers

Kelly Branam Macauley, *Faculty Mentor*

St. Cloud State University

This ethnographic study is based off of six weeks of participant observation and ethnographic research with Neighbors to Friends, a local grassroots organization in Central Minnesota that facilitates a free laundry program and runs a mobile shower vehicle that provides showers to those experiencing homelessness. By fully participating in the day-to-day operations of Neighbors to Friends, the purpose of this project is to gain a holistic understanding of how this unique nonprofit organization creates a sense of community for those experiencing homelessness and poverty. Nancy Dyson, the director of Neighbors to Friends, has a leadership style that allows for volunteers, community partners, and the people they serve to take ownership in the program and creates a sense of community where all are welcome. In a capitalistic society, people are often seen as commodities and value is often placed on a person based on what they can contribute to society financially. Neighbors to Friends rejects this ideal and finds value in people just because they are human. By comparing my observations to scholarly research about community and grassroots leadership styles, I argue that Neighbors to Friends not only meets the physical needs of marginalized individuals experiencing homelessness and poverty, but fosters an environment where community is created and the need to belong is met as well.

Towards a Less Divided Government: Solving the problem of uncompetitive electoral districts through geography

Jessica Craig

Gareth John, *Faculty Mentor*

St. Cloud State University

In today's polarized political climate, it's hard to believe we will ever be united again. In my research, I explore the highly controversial topic of electoral bias, also known as gerrymandering, and what can be done to heal political divides. States must redraw voter districts to address population shifts after census results are released every decennial cycle. As geographers, our role can play an important part in the elimination of partisan districting through mapping technology. Drawing on work from the middle of the 19th century with the Rotten Burroughs of Britain, through today's Supreme Court Cases in the United States, as well as analyzing existing maps, I hope to show that as technology advances, sophisticated mapping technology can help in the elimination of electoral bias.

How One State Legislature Decided the Presidential Election of 1876

Jennifer Sonterre

Robert W. Galler, *Faculty Mentor*

St. Cloud State University

Reconstruction following the Civil War was a long and arduous task which left the country unsure of what was next for the country. In the years following the Civil War the powers of the federal government had devolved, which put much of that power and influence into the hands of the states. The election of 1876 pitted Republican Rutherford B. Hayes against Democrat Samuel J. Tilden, neither of who were powerful choices. When the votes were tallied in November 1876, there still wasn't a winner. After much debate, it was decided that an Election Commission should be formed. The Commission would be made up of five U.S. Senators, five U.S. Representatives, and five Supreme Court Justices. Supreme Court Justice David Davis had been tapped to head up the Commission. In the hopes of swaying the decision of the newly appointed Election Commission, the Democrats in the Illinois Legislature abruptly nominated Supreme Justice David Davis to fill a Senate seat that had been sitting vacant for weeks. Davis accepted the nomination but surprised the country by resigning his seat on the Election Commission. Supreme Court Justice, and Republican, Joseph Bradley was named as the new head of the Commission. Bradley cast his vote for the Republican and gave the election to Hayes and the Republicans. This strange case of backroom deals, compromises, and uncertainty shows how important the role of the state legislature can be, not only in their home state, but also on a national level.

Prevalence of Antibiotic Resistant Genes in Environmental Isolates

Ryan Bohara, Gregory Rossi, Alma Boric, Mohamed Mohamed,
Abdigadir Khalif, and Renu Kumar
Minneapolis Community and Technical College

According to the Center of Disease Control and Prevention, nearly 270,000 people die in the United States as a result of antibiotic resistant septic infections. Where are these antibiotic resistant infections coming from? How does mass use of antibiotics in agriculture effect the local microbiome? In the agricultural industry, large amounts of antibiotics are used to enhance animals for poultry and meat productions. These type of factory farms use antibiotics as feed-additives which leads to animal waste being deposited into surrounding ecosystems affecting animals and humans. Recent studies indicated a correlation between the use of antibiotics in factory farms with rise in antibiotic resistant bacteria resulting in the increased numbers of untreatable infections in our society. This study focuses on antibiotic resistant bacteria isolated from the soil and water samples collected from a fence-line near an animal farm in Minnesota. In the study, 47 bacterial colonies were isolated. Then were purified by using streak plate technique. Kirby Bauer method was performed to determine antibiotic profile of these bacterial isolates. Results revealed that several of these bacteria strains were resistance to ampicillin, penicillin and tetracycline. Genetic analysis through DNA Isolation and PCR identified the presence beta-lactamase antibiotic resistance genes in a few isolates. The information acquired from this research will enhance understanding of antibiotic resistant bacteria in the farming industry. By detailed analysis of faming environments, we start to understand the relationship between outbreaks of antibiotic resistant infections and the environmental reservoirs of resistant bacteria.

I aced that! A study on the impact of proctor gender on test-taker confidence

Myranda Lopez

John Schneider, *Faculty Advisor*

Metropolitan State University

Feelings of over-confidence on exams can lead to disappointment and surprise. The current study investigates the impact that proctor gender has on test-taker confidence. Studies suggest that women are viewed as kinder and not taken as seriously as men so the hypothesis for this study is that higher confidence will occur in the class with a female proctor. A short GRE style exam was given to two groups with opposite gendered proctors and confidence was measured. No significant difference in confidence was found between the two conditions.

Applying Sorrell's Intercultural Praxis Model to Restorative Justice Practices in Schools

Jennifer Mukarram

Shannon Skarphol Kaml, *Faculty Advisor*

Metropolitan State University

The culture of young people is unique and different than that of older adults. In working with young people experiencing conflict in school settings, the goal of an older adult is to position oneself in a manner that better understands the unique position of that young person. Dr. Kathryn Sorrells' Intercultural Praxis Model is used to explore and navigate these cultural differences. By applying the six steps of this model (inquiry, framing, positioning, dialogue, reflection, and action), a mediator and restorative justice practitioner is permitted an in-depth understanding of how to best approach resolution to the conflict that a young person may be experiencing.

The goal of restorative practices in schools is to keep the young person/s in school, despite their experience with conflict. This provides an alternative to the typical punitive methods within an institutionalized setting that would otherwise include school suspensions, and which are often a barrier to learning. The restorative justice practice provides an environment of empowerment and autonomy for young people to resolve their conflicts by engaging in meaningful communication practices. These practices not only relieve a current situation, but also offer life skills for the young person to use as they move forward through the inevitable circumstances of conflict throughout life.

By understanding the cultural differences of young people compared to their adult counterparts, the adults are better equipped to help the young people. Bridging this barrier is an integral step in effective mediation and restorative practices. The success of these restorative practices is key to providing a safe and encouraging environment; where learning can remain a priority for young people in school settings.

More or Less: The cognitive impact of cell phone distractions

Robin Johnson

Kerry Kleyman, *Faculty Advisor*

Metropolitan State University

A multitude of studies have looked at the negative impact of cell phone distractions on our ability to perform complex cognitive tasks such as driving. While evidence seems indisputable that cell phones interfere with our ability to focus on such cognitively demanding tasks, there have been further experimental findings of significant interference from cell phones on other attention demanding tasks. Much has been made of the potential diminished task performance as a result of cell phone distractions; however, there has been less attention given to how it compares to other environmental distractions. This within subject experiment has been designed to examine the difference between distractions from cell phones and comparable environmental distractions. Each participant in this study performed a Sustained Attention Response Task (SART) requiring them to withhold a response to a stimulus. Lack of response withholdings resulted a commission error. Commission error rates were analyzed along with rapid response times to determine any statistical significance. It was hypothesized that there would be a difference between the two forms of distraction with cell phone related distractions resulting in a greater number of commission errors. Statistical analysis revealed that there were more errors made in the environmental distraction condition than either of the two cell phone conditions.

Do Gesture-Like Hand Movements Disrupt the Benefit of Gesture for Memory Even When the Motor Contexts Match?

Rachel Hagen

Kimberly Halvorson, *Faculty Advisor*

Metropolitan State University

We all gesture! Gesture isn't limited to specific languages, cultures or professions but occurs cross-culturally and linguistically. Broadly defined as the spontaneous hand movements which accompany speech, gesture isn't limited to conversational expression. Interestingly, Wagner Cook, Mitchell & Goldin-Meadow found that gesture facilitates learning when children are on the cusp of comprehending a new math concept (2007). While previous research has studied the benefits of gesture for the speaker, little is known regarding the involved mechanisms which facilitate recall accuracy for the listener. Utilizing the design from Iani & Bucciarelli (2017: 2018) and incorporating the motor task assigned from Ping, Goldin-Meadow, Bielock (2014), participants were assigned to a motor task condition and subsequently viewed a video clip containing a list of action sentences. The participants were given ninety seconds to recall the action sentences as accurately as possible. With the incorporation of the motor task utilized by Ping et al., it is hypothesized that the benefit for gesture will be most apparent when the encoding and retrieval contexts match, specifically the control condition or when motor task occurs during both contexts.

The Influence of Religious Identity on Attitude Toward Immigration in the U.S.

Marti Martin

Kerry Kleyman, *Faculty Advisor*

Metropolitan State University

Using data from a recent Pew Research Center survey, this study investigated a) whether identifying as evangelical Christian impacted attitudes about immigration in the US and b) if race was an additional factor for how evangelical Christians view immigrants and immigration. To determine a composite construct for Immigration Attitude, exploratory factor analysis was conducted on nine variables related to attitudes about immigration. Results indicated that evangelicals had a more negative attitude about immigration than did Christian participants who did not identify as evangelical. Further analysis revealed that white evangelical Christians had a more negative attitude about immigrants and immigration than did non-white evangelical Christians. Results from this study raise intriguing questions about why some evangelical Christians appear to hold opposite views as those found in the Bible. This study may point to further evidence (see Patrikios 2008) that identifying as an evangelical today may increasingly be about political ideology as much as, or potentially more, than religious identity.

Engaging Home Health Aides in Fall Prevention: A Multi- Faceted Approach

Eyitayo Onayiga

Christine Milbrath, *Faculty Advisor*

Metropolitan State University

Falls occur more frequently for the elderly living in Skilled Nursing Facilities (SNFs) or Assisted Living Facilities (ALFs) than for individuals living in other locations. The purpose of this quality improvement project was to implement a comprehensive evidence-based innovation to engage health aides (HAs) in falls prevention program by improving the HAs' ability to identify residents at risk due to change in conditions and to improve the falls-risk communication processes. Evidence supports communication and team work, education, and recognition as the most successful interventions for engaging staff to support a new practice.

The project was conducted in an ALF caring for 59 years and older that experienced an increase in the number of falls. A pre and post implementation survey was administered to the HAs (n=39). Three months pre and post intervention fall data was collected. Mixed method design was used for data analysis. Result revealed an improvement in communication between nurses and HAs, increase in number of changes in residents' condition reported, and a statistically significant increase in HAs' perception of their roles related to fall prevention, pre ($M= 2.889$) to post ($M = 4.112$), $p = 0.000$. Fall rates increased pre and post implementation (6.6% to 10.2%). The project demonstrates positive results related to HAs and nursing staff members perception of the role of the HAs in fall prevention. Ongoing orientation and education to maintain knowledge and engagement is warranted. Additional efforts need to be considered related to interventions for individuals that are actively dying and or agitated.

Student Presenter Biographies and Pictures



Rohil Kayastha is currently a senior at Minnesota State University, Mankato. He is from Lalitpur, Nepal. He is majoring in Physics and minoring in Astronomy and Mathematics. He is currently the vice president of the Physics and Astronomy Club. He has presented his research work at several regional and national conferences for undergraduate research (e.g. NCUR 2019).

Morgan Pitcher is a senior at Minnesota State University, Mankato. She is currently studying biochemistry but also previously completed a Bachelor's degree in psychology with a music emphasis. She will combine her passions for the behavioral and biological sciences as she starts dental school in the fall of 2020. Whenever she has free time, she enjoys reading, practicing and playing piano, working in a research lab, volunteering, hiking, and traveling.





Nicholas Linell grew up in Oakdale, MN, and graduated from North St. Paul High School in 2017, and is now a senior at Minnesota State University, Mankato. Nicholas is majoring in Psychology and obtaining a minor in Art Studio. He has worked with Dr. Chip Panahon and Dr. Shawna Petersen-Brown on a school psychology research team as an undergraduate research assistant, and is currently performing independent research on how installation artists use knowledge of sensation and perception to create immersive artistic experiences.

Jordan Julian is a senior at Minnesota State University, Mankato. Jordan is majoring in Biochemistry and minoring in mathematics. He has presented his research previously at MNSU's URS in Mankato and is scheduled to present at NCUR in 2020. After graduation from MNSU, Jordan plans to continue his education with a Ph.D.





Taylor Johnson is a recent graduate who currently works as a Clinical Lab Technologist at Mayo Clinic in Rochester, MN. Before starting at Mayo, Taylor completed a Bachelor's degree in Microbiology at Minnesota State University where her interest in molecular PCR and bacteriology in identifying disease stemmed. Taylor's research earned her a Foundation Grant and she presented her research at the Undergraduate Research Symposium in 2019. Taylor hopes to continue spreading her love for biology to younger generations. She also would like to go back to school for her PhD in Microbiology, so she can be a professor. In her spare time, Taylor enjoys traveling, reading and painting.

Jakeline Morataya is a senior at Winona State University majoring in ACS Biochemistry and Biology Allied Health. She currently works as a certified pharmacy technician and hopes to pursue a career in drug research and development. She also enjoys participating in various other areas of science including current research in electrochemistry and biology. She enjoys being involved in student activities and holds a position as vice president of the WSU chemistry club. In her free time, she enjoys relaxing with friends, family, and her dog





Autumn Rasmussen was born in Baldwin, Wisconsin where she grew up working at her relatives' farm and fireworks store and diversifying through participation in a plethora of extracurricular activities. Today, she is tying a bow on both a physics and math major at Winona State University. Not to stray far from her childhood dream of becoming a pharmacist, she will be applying to graduate schools with the intention of becoming a medical physicist. In her time at WSU, she has become president of Physics Club, council to the dean of the College of Science and Engineering, helped establish and mentor in a mentorship program, and learned many skills such as coding and 3D printing. The spring semester of 2020, she is attending the 235th Meeting of the American Astronomical Society, Conference for Undergraduate Women in Physics, Posters at St. Paul, and the American Association of Physicist in Medicine Clinical Meeting.

Zachary Buck: Zachary is a veteran of the United States Army where he served as an Air Assault Infantryman in support of Operation Enduring Freedom 12 & 13 in the Kunar Province of Afghanistan. Upon completion of his service, Zachary enrolled at Southwest Minnesota State University (SMSU) to pursue a Bachelor of Science degree in Exercise Science. He currently coaches high school and semi-professional football; he also coaches high school Olympic and power lifting. He recently married his wife, Cassidy and they currently live together with their two dogs, Roger and Mea. Zac and





Christopher Fitzgibbons: Christopher is a recent graduate from Southwest Minnesota State University (SMSU) with a Bachelor of Science in Exercise Science. Previously, he played Division-II lacrosse at Missouri Valley College before transferring to SMSU in the spring of 2016 to pursue his Exercise Science degree. He currently coaches youth lacrosse programs for the City of Farmington and assists with their high school team as well. Chris plans to attend graduate school for Clinical Exercise Physiology next fall and further hopes to pursue a future career in cardiac rehabilitation.

My name is **Austin Domeier** and I am currently a senior at Southwest Minnesota University (SMSU) in Marshall, Minnesota. My major at SMSU is mathematics with a minor in environmental science. I grew up in rural, west-central Minnesota and enjoy spending time in the outdoors, such as hiking, hunting, and camping. Following my graduation from SMSU in the spring of 2020, my plan is to pursue a graduate degree in wildlife or natural resource management. During graduate school, it will be interesting to learn more aspects of ecology and





Nathan Kuhn is double majoring in Corporate Finance and Applied Computational Mathematics. I am a senior and will be graduating in the Spring of 2020. I play for the baseball team at Southwest Minnesota State University. I will be playing my third year at short stop for the Mustangs. I love other sports as well. In my free time, I like to play basketball and golf with friends. I am a huge Minnesota sports fan as well. I have always had an aptitude for mathematics, numbers, statistics which lead to an interest in the financial world. When I graduate this Spring, I plan to get a master's degree in finance.

Victoria Pounder is a junior Mathematics Education student at St. Cloud State University. She serves on the board of the SCSU chapter of the National Society of Leadership and Success. Victoria discovered her passion for math back in 7th grade with the help of an amazing teacher and has made it her goal to help as many students as possible enjoy math. This was her inspiration behind creating "Math In Balance", an app geared toward helping students learn basic algebra in a





Andrea Langhoff is in pursuit of becoming a licensed 5th-12th grade teacher in the Social Studies Education program at St Cloud State University. While Andrea currently lives and works in the Brainerd Lakes Area, she was born and raised in Wisconsin. Andrea enjoys visiting state parks, traveling to the Twin Cities for concerts, and reading from her stack of borrowed library books. In addition to work, school, and trips to the library, you can find Andrea competing weekly at trivia night. Andrea has presented at the Huskies Showcase at St Cloud State University and the Northern Great Plains History Conference in Brandon, Manitoba. Andrea will be student teaching during the Fall of 2020 and hopes to find herself leading a Minnesota classroom in 2021.

Jenna Nelson graduated from Rush City High School (Rush City, MN) in 2016 and went on to pursue her bachelor's degree in biomedical sciences at St. Cloud State University. She graduated with that degree in May 2019 and is currently working towards achieving her master's degree in cellular and molecular biology. She has been involved in type I diabetes research for two years and plans to continue that research during her career after she graduates.





Logan Olson is currently a junior attending St. Cloud State University. He is majoring in nursing with hopes of continuing his education by attending medical school and or nurse anesthesia school. Logan has been involved with immunology research since the fall of 2018. In addition to his coursework, Logan is the vice president of St. Cloud State's pre-medicine club and volunteers his time as a reserve officer for the St. Cloud Police Department.

Jace Engelmann is currently finishing his last undergraduate semester as a biomedical science major. Jace has a passion for acquiring knowledge and helping people. He is planning to go to medical school the fall of 2020 with high hopes of becoming a surgeon one day.





Amira Zaher is a senior at St. Cloud State University majoring in Biomedical Sciences. She is passionate about education and translational biomedical research. Amira is planning to pursue a PhD focused on cancer biology to establish a career as a scientist and a professor.

Sonya Smetana is a senior at St. Cloud State University majoring in Social Studies Education with a history minor. She is originally from North Branch, MN. Sonya has presented at Huskies Showcase at St. Cloud State University and the Northern Great Plains History Conference in Brandon, Canada. She currently works as a student mentor with the MN History Day Program. She is involved in Students for Choice, It's on Us, and the Social Studies Teaching Club at SCSU. Sonya plans on student teaching in fall of 2020 and becoming a teacher upon graduation.





Rachel Michl is from Waite Park, Minnesota. She is currently a junior double majoring in Anthropology and Community Psychology at St. Cloud State university. She is the co-president of the Anthropology Collective and a member of The National Society of Leadership and Success. Her project this year is about the use of Reiki for the well-being of her participants in Minnesota, as well as a discussion of participant observation as a method of data collection. After graduation she plans to continue on for her masters in the Rehabilitation Counselor Education Program at St. Cloud state University. Using her education she hopes to find a career as an equine therapist working with kids who have disabilities or mental health problems.

Maggie Powers was born and raised near St. Cloud, Minnesota and after moving around the state for a few years after high school, she decided to move back to Central Minnesota to attend school. Maggie is currently in her final year at St. Cloud State University and is studying Anthropology. She will graduate in May 2020. Maggie is passionate about social justice, her rescue dog named Ttoya, playing piano, and enjoying the outdoors. After graduation, Maggie would like to continue her education and attend graduate school.





Jessica Craig will be graduating in the fall of 2020 from St. Cloud State University with a major in Geography and a Political Science minor. Jessica has volunteered with many campaigns and holds locally elected non-partisan office in her home city of Maple Grove. This year, Jessica will be presenting her work at both the Huskey Showcase in St. Cloud as well as the National Convention for the American Association of Geographers in Denver, Colorado. She is a member of the Gamma Theta Upsilon Honor Society and hopes to use her geography education towards a career as a GIS Analyst.

Jennifer Sonterre was born and raised in Anoka, Minnesota. She and her husband, along with their three children, have called Saint Francis, Minnesota home for the past twenty years. Jennifer has worked as administrator of a church in Isanti, Minnesota for the past four years. She is a senior History major and Political Minor at St. Cloud State University who will graduate with honors in May 2020. She is a member of Phi Alpha Theta and Pi Sigma Alpha. Thanks to the SCSU History Department, she has had the opportunity to present at the Northern Great





Myranda Lopez. I am a recent graduate of Metrostate University. I graduate magna cum laude with a major in Biology (BS) and dual minors in psychology and chemistry. I currently work for the Department of Human Services for a group home as an assistant program manager and I am always looking for ways to help people. This May I will be applying to MD/PhD programs across the country with the plan to help people with disabilities. My greatest interests are in cancer research and advocacy work for people with disabilities.

Jennifer Mukarram. After 6 years of military service in the U.S. Air Force., and more than 15 years of business ownership, Jennifer returned to school to study communications and public relations. She plans to start law school in Fall, 2020 to study business and environmental law, while also pursuing a dual MBA. Her goal is to work in corporate sustainability.





Robin Johnson is a senior at Metropolitan State University pursuing her bachelor's degree in Psychology with a minor in Biology. She was accepted into the Graduate with Distinction Program for Psychology majors in Fall 2018 and inducted into Psi Chi, The International Honor Society in Psychology, in Spring 2019. Serving as the student campus representative for the Association for Psychological Science's Student Membership, Robin stays connected to multiple professional organizations in her chosen field and is passionate about research. Her recent research efforts have focused on the cognitive impacts of cell phones; however, her larger interests are rooted in understanding how our mental and physical states of being interact. After graduation Robin is seeking to secure a Research Assistant position in the community to gain valuable skills as she applies to doctorate programs to continue her education and pursue her profession.

Rachel Hagen graduated from Metropolitan State University in December 2019 with a Bachelor of Arts in Psychology. She is currently the interim Psychology Lab Manager at Metropolitan State University where she continues to assist with ongoing research. Her previous research has studied gesture and memory, the criminalization of black youth, and the mechanisms utilized by partisan media which contribute to political polarization.





Marti Martin will graduate in Fall 2020 with a BA in Psychology from Metropolitan State University, and will pursue post-graduate theological and psychological study. Marti is a member of Psi-Chi International Honor Society, the Graduation with Distinction honors program at Metrostate, and a volunteer musician at her church. Marti's research poster on the topic of evangelical attitudes toward immigration was awarded Most Creative Poster and Best Psychology Poster in December 2019. Marti is also a graphic designer, permaculture gardener, and passionate pit-bull advocate.

Eyitayo Onayiga. Date of Birth: 5/13/71, Education Qualification: BSN, DNP student at Metropolitan State University, Working Experience: North Memorial Health (RN, 2012-present) Walker Elder Suites (Assessment nurse/interim Director of Nursing, 2006-2012) Allina Health (Home Care Nurse, 2013-2014), Languages Known: English/Yoruba, Gender: Female, Marital Status: Married with 6 children, Hobby: Cooking, Travelling.





Georgia Muelken is from Prior Lake, Minnesota. She is a senior majoring in Biomedical Sciences at Minnesota State University, Mankato. She will be graduating in May and plans to continue her education to become a Physician's Assistant. Georgia has been researching behavioral neuroendocrinology and reproduction in green anole lizards for two years with her research mentor, Dr. Rachel Cohen.

Savannah Spencer is a senior at Minnesota State University, Mankato studying biology with emphasis on public health. She is from Blaine, Minnesota. She plans on attending the University of Minnesota, Twin Cities for her masters and PhD in epidemiology. She is interested in global health epidemiology and working with the Centers for Disease Control and Prevention. She is also involved in the Environmental Sustainability Organization at the university.





Ryan Bohara started at Minneapolis College as a PSEO student during his junior year in high school. While finishing out the prerequisites to get into the 2 year nursing program at Minneapolis College, he found a passion in the science of microbiology. During the summer of 2019, he participated in the Tiny Earth research fellowship in hopes of finding new antibiotics from soil bacteria. He then continued researching antibiotic resistant bacteria and antibiotic production. His future plans for research include researching the genetic components of antibiotic production and experimental evolution of bacteria. When he is not at school or conducting research, he works at a local hospital in the Emergency Department helping other people in need. This Eagle Scout also enjoys volunteering his time as an Emergency Medical Technician in disaster health services with the Red Cross and at high adventure camps with the Boy Scouts of America.

Tyler Hobson is a fourth-year student at Minnesota State University, Mankato. He is studying exercise science with hopes to become an occupational therapist and personal trainer. His main area of interest includes examining the effectiveness of pain prevention and management through manual therapy as an alternative to drug therapy. In his free time, Tyler enjoys weightlifting, downhill skiing and camping.

