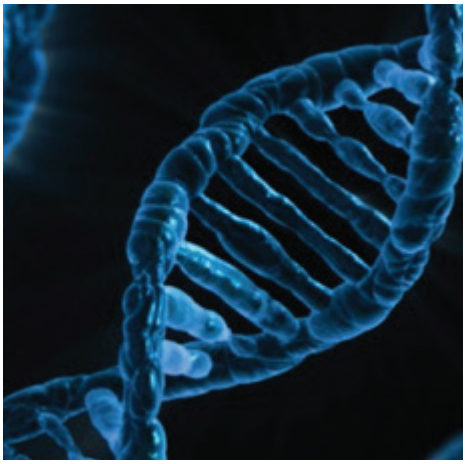
MINNESOTA STATE



HUMANS of Arts and Sciences

7th Annual
Minnesota Conference of

UNDERGRADUATE SCHOLARLY and CREATIVE ACTIVITY

Friday March 23rd, 2018

MINNESOTA STATE

30 East 7th Street, Suite 350
St. Paul, MN 55101-7804

651-201-1800
888-667-2848

I am delighted to introduce you to the Seventh Annual Minnesota Conference of Undergraduate Scholarly and Creative Activity, sponsored by Minnesota Undergraduate Scholars, a consortium comprised of a number of Minnesota State colleges and universities that supports the excellent research, scholarly works, and creative activity being carried out by our undergraduates.

The conference provides undergraduate students from any of Minnesota State's 37 colleges and universities with the opportunity to present projects through presentations, oral papers, visual arts, displays, and performance art. Studies have demonstrated that such projects – and the opportunity to share with peers the results of those projects – offers students both personal and professional benefits. There are also benefits for faculty members, because scholarly and creative projects give faculty an opportunity to spend time with and motivate undergraduates who want to take their work beyond the classroom setting.

Thank you for participating in the conference and celebrating the amazing accomplishments of these student-faculty collaborations!

Devinder Malhotra
Interim Chancellor

ROCHESTER
COMMUNITY AND TECHNICAL COLLEGE

President's Office

March 23, 2018

Dear Participants:

On behalf of the students, faculty and staff of Rochester Community and Technical College (RCTC), we welcome you to our campus, and to the Seventh Annual Minnesota Conference of Undergraduate Scholarly and Creative Activity Conference on our campus.

As the Interim President of this great institution, I'm excited for what the conference holds for you, as scholars. We are proud to be the oldest public two-year college in Minnesota, and to be the host for this year's conference. We know you'll find Rochester to be a welcoming and supportive community for undergraduate research.

With the assistance of our colleagues within Minnesota State, we look forward to a successful conference, and we wish each of you the best in your research.

Enjoy the tournament.

Sincerely,

Mary Davenport

Mary Davenport, Ph.D.
Interim President

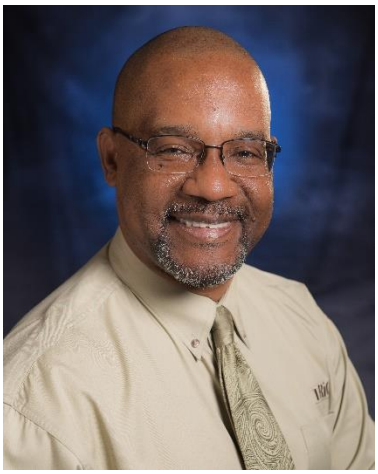
851 30th Avenue SE
Rochester MN 55904-4999
1.800.247.1296
RCTC.EDU

Keynote Presentation

Science as Art: Where Discovery and Creativity Embrace

We are taught from an early age that science is objective and art is subjective. But what if they have more in common than we were led to believe? How can art inform sciences? Let's discuss the skills, dispositions and knowledge base inherent to each area and how the sciences can benefit from a more intuitive approach.

Othelmo da Silva and Chao Mwatela
Rochester Community and Technical College



Othelmo da Silva was born in Rio de Janeiro, Brazil. He grew up minutes away from some of the most gorgeous beaches and richest rain forests in the world, which he particularly misses during Minnesota's seemingly endless winter months. He became an American citizen in 2003.

Othelmo claims that his college education has exceeded the limits of his intelligence. He holds a B.A. in Christian Education, a B.S. in Middle School Science Teaching, a licensure in K-6 education, and a Master's Degree in Education. He taught elementary, middle school, and high school in the Rochester and Dover-Eyota school districts prior to joining the TRiO Student Support Services staff as an academic advisor at the Rochester Community and Technical College in 2004.

Othelmo's advisees are more than just college students in pursuit of a degree. He understands that academics, albeit important, is only a slice of their lives. Each one of them has a unique makeup and he treats them as individuals with plans, dreams, aspirations, abilities, and unique challenges all their own. He thoroughly enjoys spending time with of his advisees to help them sort out this adventure called life. He loves the thrill of being alongside college students as they navigate the choppy waters of higher education and see them accomplish their academic, professional, and personal goals.

When Othelmo is not a work, he likes to camp, fish, grill, and mix it up with his wife and SEVEN children. He has been involved in leadership positions in Scouting and the Civil Air Patrol as well as church and community volunteer organizations for a number of years. He enjoys American and world history, current events, acting, and Japanese culture.

Chao Mwatela was born in Kenya, East Africa. As a second child in a large family, she learned to be independent and outspoken at an early age and attended boarding school during her high school years.

The years of boarding school, plus an adventurous spirit made the choice of attending college abroad an easy one. Chao attended College at the University of Arkansas at Pine Bluff where she received a Bachelor's Degree in Biology with a minor in Chemistry. At the University of Arkansas at Pine Bluff, she worked as a work study student in a research laboratory and was encouraged by her mentor to do research of her own. She did, and had a paper published on the Use of Relative Abundance and Condition to Predict Survival of Hybrid Striped Bass (*Morone chrysops x M. saxatilis*) Fingerlings.

Chao has been hooked on the field of education since her first job right out of college as a high school Science Teacher. She has since worked as a Special Education Teacher, a College Laboratory Assistant and currently as a Multicultural Advisor at RCTC. She is also passionate about equity issues, particularly in education, and is currently completing a Master's degree in Organizational Leadership with an emphasis on Multicultural Education. When Chao is not at RCTC working with students or on diversity related initiatives, you will probably find her with her independent and outspoken 11 year old daughter, or with her nose in a book.

Conference Schedule

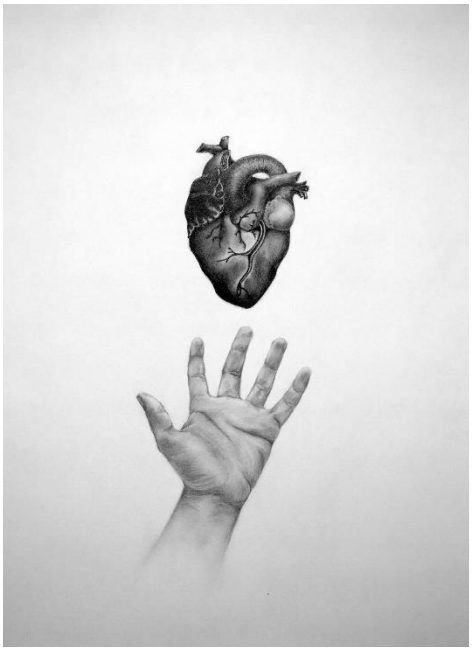
Friday, March 23rd 2018

9:00 – 10:30	Registration in the Atrium
9:00 – 11:15	Art students discuss their work in Art Gallery – College Center 2nd Floor
10:00 – 10:15	Drop off coats and learn how to communicate at poster sessions – HS 131
10:15 – 10:30	Set up Posters – Atrium
10:30 – 11:00	Poster Session A – Atrium
11:00 – 11:15	Set up Posters – Atrium
11:15 – 11:45	Poster Session B – Atrium
12:00 – 1:20	Oral Sessions – HS 128 and HS 136
1:30 – 3:00	Lunch, Keynote speaker, Awards – Cafeteria – College Center 3rd Floor

Light refreshments will be available during the poster sessions.

Student Art Exhibit

The Juried Exhibition is an annual exhibition that is open to RCTC students who have taken and Art or Design class within a year of the exhibition. Students can submit up to three works per person. We usually have well over one hundred entries with about half getting into the show. The juror also selects the recipients of $300 of awards that are announced at the reception. New this year is the Student Life Purchase prize of an artwork that will become a part of RCTC's permanent collection. The juried show is the most popular and well attended exhibition of the year.



Heart in Hand by Linnea Johnson

HUMANS Project

Please visit the "HUMANS of Undergraduate Scholarly and Creative Activity Booths" in the Atrium and in our Lunch area. We are seeking students to share their stories to help us better understand who we are as a group of creative and scholarly students. In the spirit of Brandon Stanton's Humans of New York project, we hope to develop a "daily glimpse into the lives of strangers" to find a sense of community. We'll take your photo (with your permission of course) and capture a short bio, then share your thoughts with others on our media centers.

Abstract Number

Poster Session A 10:15-10:45 Atrium – 1st Floor

1 The Role of Self-as-Doer Identity in Physical Activity: Increasing Behaviors by Increasing Self-Efficacy for Overcoming Barriers to Physical Activity.

Sydney Bendtsen, Abigail Evenson, Kristen Fish, Theodore Mickelson, and Jessica Schaefer
Advisor: Dr. Amanda Brouwer
Winona State University

Introduction: Only 21% of adults meet the recommended amount of physical activity (PA) each week. PA is associated with better health, lower disease risk, greater academic achievement, and weight control. Barriers to PA (e.g., bad weather, scheduled constraints, lack of support, etc.) tend to limit PA whereas increased self-efficacy is associated with more PA. The self-as-doer identity, a motivational identity which aims to describe oneself as the doer of one's behavior, is also associated with more PA. It is unknown, however, how the self-as-doer identity changes PA behaviors. Perhaps increasing self-as-doer identity is linked with increasing self-efficacy for overcoming barriers to PA. We explored whether the relationship between self-as-doer identity and PA is mediated by self-efficacy for barriers to PA.
Methods: Participants (N=219, Mage=20.05, SD=2.95) completed a survey and a writing activity assessing self-as-doer identity for PA. Mediation analyses using bootstrapping procedures (Preacher & Hayes, 2008) were conducted to test the indirect effect of self-as-doer identity on PA through self-efficacy for PA barriers.
Results: There was a significant indirect effect of the self-as-doer identity on PA through self-efficacy for overcoming barriers, b= 417.25, 95% CI [176.78, 709.89].
Discussion: Findings demonstrate that as self-as-doer identity increases, so does self-efficacy for overcoming barriers to PA. Results are consistent with the self-as-doer theory in that embracing an identity as the doer of oneâ€™s behavior motivates engagement in oneâ€™s behavior even when there are barriers. Those who are struggling with barriers might benefit from focusing on PA doer identities as a way to increase their ability to overcome barriers to PA.

2 Political Identity Influences Response to Ingroup-committed Violence

Drew Brinker and Devin Bremer
Advisor: Dr. Jamie Mahlberg
Rochester Community and Technical College

Previous studies have found that under some conditions, individuals with differing political identities (conservative or liberal) rely on different coping mechanisms when presented with instances of a member of their ingroup committing a violent act. It's also been found that the strength of one's identification with the values of the group committing violence engage in defensive coping strategies that may contribute to poorer health outcomes in the long term. We expected to find that individuals with a conservative political identity would engage in more victim blaming and rationalization than individuals with a liberal political identity when reading a scenario of ingroup-committed (rather than outgroup-committed) violence. Participants provided information about some of the attitudes they had related to authoritarian leadership, conservative values, and social dominance. They then read an imaginary news article of an example of violence between two groups: one of which they may identify with. They then provided perceptions of how they might cope with this type of news. Overall, our hypothesis was supported in the direction predicted in that individuals with a conservative political identity reported more rationalization in response to an ingroup-committed act of violence than an outgroup-committed act of violence. Additionally, individuals with a liberal political identity did not differ in their rationalization response regardless of who committed the violence. More research is needed to explore the reactions of those with more diverse political identities.

3 Statistical Analysis of the SMSU Women's Basketball Team

Alana Christianson
Advisors: Dr. Heather Moreland and Dr. Wije Wijesiri
Southwest Minnesota State University

The purpose of this presentation is to analyze statistics from the SMSU women's basketball team. By analyzing statistics from the last seven seasons, we are able to determine if there is a correlation between different variables that would lead to winning more games. We started the analysis by constructing boxplots for each variable. Then we investigated the correlation between each variable. A chi-square test was completed and we concluded that there was no significance to SMSU playing at home. Lastly, a logistic regression was completed and we were able to find a statistically significant model

based on game statistics to predict the chance of winning the game. Utilizing these results will hopefully assist the team in producing better results, thus translating into victories!

4 Variable Temperature Thermochromic Switching Under Varying Illumination

Alexis Corbett
Advisor: Dr. John Sinko
St. Cloud State University

Thermochromic materials are those which change color as a result of a temperature change. The specific thermochromic pigments used for this research make this change at different temperatures (20, 25, and 30° C). Below these temperatures, the thermochromic coating formed from the pigments is black, but once they reach their critical temperatures, the pigment becomes translucent. While this has often been used for whimsical purposes, such as painting a table which turns clear after sitting down or coating a vehicle to display a message when a certain temperature is reached, with this research, more practical applications are being explored. A coating using a thermochromic pigment can help regulate the temperature of the surface it is on, which could be used for buildings to help reduce the cost and energy used for heating and cooling a building. This may also be used in other situations where heat retention is necessary to hold a device or component within a desired temperature range. Measuring the temperature over time at different light intensities will show how well the thermochromic coating avoids temperature change compared to the material without a coating. Further analysis will also be done to put the thermochromic coating in real world scenarios and test the limits of the coating.

5 Exploring the Use of Computational Chemical Software at the Two-Year College

Nicholas Elliott
Advisor: Dr. Heather Sklenicka
Rochester Community and Technical College

The use of computational chemistry software is a growing trend in academia at the undergraduate university level and has been a great complement to existing labs within curricula. Advancements in software provide students at each level the capability to calculate, interpret, and apply data that supports chemical phenomena they see in a lab and in their textbooks. The use of these programs is not widely used at the two-year college level, because of the smaller student population. This study aims to determine if the software would be beneficial to students at the two-year college level. The purpose of this research was to find software that could potentially be incorporated into the Rochester Community and Technical College Chemistry Department's course sequences. After researching multiple sources for a program, Spartan software was chosen, based on its aesthetic layout and easy-to-use interface, depth of calculations and functions, and was cost effective for the institution. Surveys will be used to gauge the interest in computational chemistry from both the students and faculty's perspective. Tutorials are being developed to assist students understanding the directions and purpose of each experiment before they are completed in lab. The study will be used to present to the administration at RCTC to support the expenditure of getting site licenses for school computers. The goal of this study is to introduce computational chemistry to students and give them the opportunity to delve deeper into their understanding of the chemistry needed to be successful in their future studies in the field.

6 Investigation of Enzyme Activity

Corbin Ketelsen
Advisor: Dr. Heather Sklenicka
Rochester Community and Technical College

The purpose of this research is to improve the "Investigation of Enzyme Activity" lab that is used by the second semester General, Organic, and Biological Chemistry course (Chem 1118) at RCTC. This lab shows how the functionality of the enzyme sucrase can be changed by manipulating some factors surrounding it. The first week of the lab shows students that by changing factors such as pH, temperature, or enzyme concentration you can affect the activity of the enzyme. The second and third weeks of the lab, students create their own experiment and perform it. The goal of this project is to improve the basic functionality of the first week of the lab. Currently the lab results don't match with the theory of protein structure. An early issue that has been uncovered is that the 4.4 pH buffer is made out of acetic acid which reacts with the sodium carbonate in the Benedict's reagent. The results from converting to another buffer solution and tests of temperature and concentration will be presented.

7 Characterization of Tree Species in the ADM-SMSU Environmental Learning Area at Southwest Minnesota State University

Melissa Klecker
Advisor: Dr. Emily Deaver and Dr. Thomas Dilley
Southwest Minnesota State University

Studies on trees demonstrate their ecological importance to plants and animals. Overtime, the composition of tree species change as forests mature. In Marshall, MN the ADM-SMSU Environmental Learning Area provides an opportunity to study these types of changes. The purpose of this study was to document species, diversity and density of the current forest and to evaluate the changes in forest species since it was first planted. Tree species were identified, species relative abundance (SRA), relative dominance and age were determined. Out of 192 trees measured, 20 different tree species were identified, with red pine, quaking aspen and green ash being most abundant and dominant. The ages measured did not correlate to the year of the initial plantings, which suggest that native, re-generational growth or undocumented plantings were measured. In the future, tree species will continue to change within the forest community and be studied in order to document those changes.

8 Prevalence of Antibiotic Resistant Genes in Environmental Isolates

Mohamed Mohamed and Abdikhalif Khadir
Advisor: Dr. Renu Kumar
Minneapolis Community and Technical College

The majority of U.S meat, poultry, eggs, and milk factory farms uses feed-additive antibiotics. These type of factory farms utilize non-therapeutic amounts of antibiotics as feed-additives to enhance animal's health and meat production. However, these factory farms create enormous amount of animal waste that contaminate the water and soil, thus creating a harmful environment for both animals and humans. Recent studies indicated a relationship between the uses of antibiotics in these factory farms with the rise in antibiotic resistance bacteria and increase numbers in untreatable infections in our society. Human micro flora bacteria are exposed to these additives and becoming resistant to several antibiotics. This study focuses on studying prevalence of antibiotic resistance bacteria in soil and water samples collected from a fence-line near an animal farm in Minnesota. More specifically, we focused on detecting a group of ampicillin-resistance genes. Forty-seven bacterial colonies were isolated from the soil and water samples, and purified by using streak plate technique. Bacterial strains were categorized based on gram stain morphology. Most of the strains were gram-positive bacteria. Kirby Bauer method was performed to determine antibiotic profile of these bacterial isolates. The preliminary results revealed that several of these bacteria strains were resistance to ampicillin, penicillin and susceptible to tetracycline. DNA was isolated from bacterial colonies and polymerase chain reaction was used to identify the presence of three beta-lactamase antibiotic resistance genes. The information acquired from this research will enhance our understanding of prevalence of antibiotic resistance bacteria and the farming industry in the U.S. Having more detailed analysis in faming environment will help understand the relationship between clinical outbreak of antibiotic resistant bacteria infection and the environmental reservoirs of resistant bacteria.

9 How American Business Students Change During Study Abroad: An Experiential Approach to Developing Interculturality

Carly E. Rhyner
Advisor: Dr. Nikolaus T. Butz
University of Wisconsin - Stevens Point

More than ever before, employers are seeking graduates with an understanding of people from other linguistic, cultural, religious, and geographic backgrounds. Universities have responded by encouraging students to undertake study abroad programs; however, studying abroad is a highly personal experience with a wide range of outcomes. The purpose of this study was to examine how participation in study abroad enhanced the interculturality of undergraduate business students. This mixed methods study used pre-post surveys along with student journal entries to collect differing, yet complementary, data on intercultural learning outcomes. The findings suggested that program leaders can take certain actions to promote student appreciation of cultures that differ from their own. Overall, the results provided a more complete understanding of the relationship between participation in a study abroad program and students' interculturality.

10 Love at First Murder

Lul Sharif

Advisor: Dr. Heather Sklenicka

Rochester Community and Technical College

Thin layer chromatography is a technique to separate mixtures on a thin layer of absorbent material such as silica gel. The components each move at a different rate. This chemistry research project concentrates on a thin-layer chromatography lab that provides insight into forensic chemistry, the goal is to find a solvent and stain for clear visualization of different pigments in lipstick. The chosen solvent needs to elute the plate in an appropriate amount of time for the two-hour lab session. It was determined 1-Butanol, the solvent in the sample lab, is not an effective eluting solvent. Using 1-Butanol as the mobile phase, the TLC plate took 45 minutes to develop. The TLC plate took 10 minutes to develop using ethyl acetate and hexane as the mobile phase. Stains such at potassium permangante and anisaldehyde were tested to see their ability to visualize the pigments. This lab will provide students the opportunity to try a real-world separation technique while solving the crime.

Poster Session B 11:15 – 11:45 Atrium – 1st Floor

11 Distribution of Lichen on Granite Outcrops in the Minnesota River Valley

Brayden Anderson

Advisors: Dr. Thomas Dilley and Dr. Emily Deaver

Southwest Minnesota State University

Lichens are a symbiotic association between an algae or cyanobacteria and a fungus. This study was done to identify lichen distribution and abundance growing on five different granitic outcrops in the Minnesota River Valley to determine if slight chemical changes in the rock influenced lichen growth. Lichen were identified and species' areal distribution were sampled in two randomly separated grids at each outcrop. Eleven species of lichen were found with Cumberland rock shield being the most abundant on 4 of the 5 rock types. Several lichen species showed no statistical differences between the sites while others were unique to a particular site. Lichen at all 5 sites did differ to varying degrees suggesting rock chemistry may control lichen distribution. However, other factors such as topography, microclimates, site disturbances, and fire frequency must be considered as well.

12 An African Plant and Type 1 Diabetes

Emily Barbaro, Kaitlyn Mailhot, Kholood Abuhadid, and Jacob Walling

Advisor: Dr. Marina Cetkovic-Cvrlje

St. Cloud State University

Type 1 diabetes (T1D) is an autoimmune disorder that results with self-reactive lymphocytes (T-cells)-induced pancreatic beta cells damage. Since beta cells no longer produce insulin, an elevation of glucose levels in blood (hyperglycemia) occurs. In West and Central Africa, seeds' extract from the native Garcinia kola (GKE) plant is consumed, as it is believed that it provides numerous health benefits, including lowering hyperglycemia. To test potential anti-diabetic effects of GKE through its influence on T-cells, male 7-wk-old C57BL/6J mice received GKE (100 mg/kg) in a drinking water, followed by induction of T1D with streptozotocin. Treatment continued until 13 weeks of age. Throughout experimental period, glycemia and body weight measurements were performed biweekly to monitor the development and severity of T1D. At the experimental endpoint, mice were sacrificed, their spleens removed, and splenocytes isolated to characterize T-cell by flow cytometry and examine their function using mitogenic assay. This study might provide an answer whether GKE can affect T-cells and therefore show promise as a potential anti-diabetogenic drug.

13 Comparative analysis of language classification algorithms

Uzma Ghazanfar

Advisor: Dr. Nina Marhamati

Winona State University

Natural language processing is a complex problem that is of high-interest in our world today. However, a problem this complex cannot altogether be solved in one attempt and it must be broken down into several smaller tasks. Classification of documents by language is one of those smaller tasks and there have been many algorithms and techniques that do the job pretty well.

There are numerous language classification algorithms today and in this paper, we will be discussing and analyzing the different natural-language classifier algorithm and techniques available. We will be discussing the methodology, their benefits, their limitations, scenarios they work in best, and comparisons in performance of each of the algorithms. We will also be looking at the means of refining and fine-tuning them so that their performance is improved. We will be working with the same data set across the board so that we can have consistency and objectively judge which algorithms perform better than others.

14 Exploring Kaon Properties with Computational Physics

Jimmy Hickey
Advisor: Dr. Sarah Phan-Budd
Winona State University

The NOvA (NuMI Off-Axis Electron Neutrino Appearance) experiment observes neutrino properties and oscillations by sending neutrino beams from Fermi National Accelerator Lab in Batavia, IL to a near detector at Fermilab and a far detector stationed near Ash River, MN. Though these experiments focus on the electron neutrino, other particles are observed as well. One such particle is the Kaon, a meson consisting of a strange (anti)-quark and an up or down (anti)-quark. Understanding the properties of Kaons both helps filter them out of the neutrino data as well as offers insight of its own. Kaons have played an integral role in our understanding of particle physics in areas such as the Standard Model and our understanding of the violation of CP symmetry. Using data simulated and collected at the NOvA near detector, characteristics of the Kaon sample can be studied. This focus of this experiment is finding the Kaonâ€™s mass peak and other observable quantities.

15 Be The Change

Eric Hiel
Advisor: Dr. Monica Janzen
Anoka-Ramsey Community College

I felt really upset with the image skateboarders portrayed through the community. It seems this image grows worse each year. I knew that change was needed. An ethical figure Gandhi once said “You must be the change you wish to see in the world”. I specifically chose to go to multiple skate parks and pick up trash because I wanted to make the difference in the skateboarder image.

I started out by creating a group chat on Facebook with 3 friends who also are concerned on this topic. We then figured out a date which worked for all of us. My boss at Dairy Queen was caring about this as well. She donated a few trash bags to our activity. Sometimes seeking help from others is essential. The goal was to try to do the greater good and spread the word to others.

This activity exercises many virtuous skills. These skills include self-discipline, awareness, helpfulness, and much more! I suggest considering this project for what ever activity you do. Whether it is cleaning a skateboard park or even as simple as picking up trash while taking a dog on a walk. Try relating this to something you are passionate for. Be the change you are giving back to the community. This also builds character and virtue and helps accomplish the greater good. Even something as little and spending 5 minutes picking up trash at the park will make a big difference.

16 Sex differences in dental attrition in Weddell's saddleback tamarins (Leontocebus weddelli) from northern Bolivia

Ashley Kalar
Advisor: Dr. Matthew Tornow
St. Cloud State University

Primate field studies often focus on sex differences in foraging and its relationship to differing energetic and dietary demands of females and males. Whereas field sampling methods often rely on time spent foraging for food items as a proxy for consumption, the relationship between foraging time and the quantity of food items consumed remains unclear. In this study, we evaluate the possibility that differential foraging strategies between female and male Weddell’s saddleback tamarins may be inferred from differential tooth wear, irrespective of age. Dental casts from adult members of a population of Weddell’s saddleback tamarins from Bolivia were scored for wear on the anterior (i1 and p2) and posterior (p4 and m1) dentition. Monkeys were assigned to one of two age categories based on canine eruption and

dentine exposure. Findings indicate that there is no relationship between canine wear and attrition on any of the other teeth examined; however, there are sex differences in anterior and posterior tooth wear. Whereas both sexes show relatively little wear in the premolar dentition and relatively high amounts of wear on the central incisor, females show relatively more wear on m1 ($p<0.05$). Principal components analysis indicates that variation within each sex is driven by wear in different tooth classes. In males, most of the variation in tooth wear is driven by wear in the first incisor and first molar, whereas in females, variation in tooth wear is driven by wear in the premolar dentition. Although we cannot demonstrate conclusively that these sex differences in tooth wear are directly related to dietary differences, these data are useful for generating hypotheses regarding sex-based differences in the foraging behavior of wild tamarins.

17 Understanding Commuting Patterns of St. Cloud State University Students

Nathan Porttiin
Advisor: Dr. David Wall
St. Cloud State University

St. Cloud State University (SCSU), Minnesota is attended by a surprising number of students who commute considerable distances to attend classes. With 15,461 total students and only 2,097 living is residence halls during the Fall 2015 semester, the majority of students live off campus. Its central location within the state, close proximity to a US Interstate and two US highways, generous offering of online and hybrid classes, designation of commuter-based parking lots, and bus services, make SCSU an attractive choice for commuter students. Drawing on randomly administered student surveys, this research aims to locate and map the catchment area of SCSU's commuter-student body and, considering factors such as housing, non-school related obligations, distance, and number of online classes taken, explain why so many SCSU students decide to commute.

18 Boundary Extension: Is it all about the big picture?

Elise Porttiin
Advisor: Dr. Leslie Valdes
St. Cloud State University

After observing a scene, people frequently recall having seen more of the scene than was initially visible, an error known as boundary extension or BE (Intraub & Richardson, 1989). Valdes and Neill (2016) found that BE was influenced by the size of the background and the size of a focal object with rating the size of the pictures. They also found that participants rated unstudied close scenes as having been wider at study. This study investigated response bias associated with recognition as a measure. Participants studied 60 pictures of amorphous shapes on various backgrounds of leaves, adapted from Valdes and Neill (2016). The background perspective (closer or farther) was a within participants variable. Each picture will be presented for five seconds. After performing a delay task for 10 minutes, participants indicated whether 80 pictures were studied or not along with rating the confidence of their memory on a four-point scale. Half of the pictures were from the preceding part of the study and the residual pictures were either completely new to the study or had an altered viewpoint (e.g., if the scene had a close background at study, at test the background was expanded or had a far viewpoint). It is expected that participants will be more accurate at recognizing far viewpoint pictures than close pictures. For pictures that are presented new to the study or altered, participants will be more susceptible to make mistakes for pictures that denote a greater field of view. In other words, participants will have a predisposition to misremember pictures that have more background. This study will increase our understanding of scene perception and yield insight on bias contributing to the boundary extension effect. Implications for multisource model of Intaub (2010) and effects of normalization (McDunn, Brown, Hale, & Siddiqui, 2016) are discussed.

19 Understanding Employability: A Mixed Methods Study of Hiring Decisions in Central Wisconsin

Jordan M. Stuart
Advisor: Dr. Nikolaus T. Butz
University of Wisconsin - Stevens Point

Future employability is a key concern for postsecondary programs and the students enrolled in them. Likewise, employers seek qualified graduates with a skillset and disposition that complements their organization. To this end, gaining a better understanding of the factors that employers consider or prioritize when making hiring decisions is the first step in increasing the economic value of higher education. The purpose of this study was to explore the variables affecting hiring decisions for postsecondary entry-level positions in Central Wisconsin. This study used a convergent parallel mixed methods approach. Data were collected from regional employers using a mix of multi-item scales and open-ended survey

questions. The results indicated that employers valued differing, yet mutually attainable skills based on their position within the North American Industry Classification System (NAICS). Furthermore, it was found that few employers considered the size of the degree-granting institutions when evaluating job applicants. Overall, the findings of this study have the potential to benefit postsecondary administrators, employers, and job seekers.

20 Laser Ablation of Polymer Materials

William Voss
Advisor: Dr. Kannan Sivaprakasam
St. Cloud State University

This experiment studies the effects of light on various types of polymers common in everyday plastics. To do this, high energy lasers target films of polymers to study the physical and photochemical effects of light on these materials. Polystyrene and poly(methyl methacrylate) films are prepared by dissolving 0.1g of the polymers in chloroform in a petri dish, then allowed to dry. The resulting films will then have lasers pulse light at them repeatedly in nanosecond intervals. The samples are be studied and characterized both before and after laser treatment using infrared spectroscopy, x-ray diffraction, scanning electron microscopy, thermomechanical analysis, differential scanning calorimetry, and thermogravimetric analysis.

21 Renewable Energy Resources for RCTC

Mehrubon Yunusov
Advisor: Dr. Heather Sklenicka
Rochester Community and Technical College

With global warming and climate change being a global problem, renewable energy resources have attracted people's attention more than ever before. Using the renewable energy resources will lessen the damage to the environment and prevent non-renewable energy resources to go extinct and become expensive.
With this goal in mind, I would like to see RCTC increase its use of renewable energy resources such as solar panels or wind turbines. Although it can save some money for the school, I believe that if students themselves contribute towards the switch to renewal power, it will be something that RCTC can be proud of. The goal of this project is to research a variety of renewable energy systems and to compare their initial cost, maintenance costs, energy production, and technology to propose a move towards renewable energy that is fiscally and environmentally responsible.

Abstract Number

Panel Discussion 12:00-1:15 HS 131

22 HUMANS Project: Experiential Learning and Intercultural Communication

Lydia Hansen, Bonita Hottel, Tina Reisner, Rebekah Lobdell, and Rebecca Rose
Advisor: Lori Halverson-Wente
Rochester Community and Technical College

This session will highlight the unique approach the panelists have taken to research and explore experiential learning within intercultural communication. Participants will lead a round table discussion on how personal interviews, participation in the Human Library Project, and site visits have factored in their study of intercultural communication. This session will end with an open "round table discussion" with the audience members on how to build the communication skills necessary to build intercultural communication competence and to better understand how intercultural communication impacts our daily lives.

Abstract Number

Oral Session A 12:00 – 1:20 Health Sciences Room 128

23 Characterization of the Phosphoribsyl Transferase ToyH; an Essential Enzyme in the Production of the Antibiotic Sangivamyin

Cody Aston
Dr. Nathan Bruender
St. Cloud State University

Antibiotic resistance is an increasing threat to the young and the elderly in the world today. As the current antibiotics lose their utility, new medications with different mechanisms of action need to be developed in order to face this challenge. One method to discover new medications is the discovery of new metabolite biosynthetic pathways in nature. For example, Streptomyces rimosus naturally produces secondary metabolites that have antibiotic and antitumor therapeutic properties. However, it is unclear how S. rimosus synthesizes these 7-deazapurines, known as toyocamycin and sangivamycin. Recent work showed that guanosine 5'-triphosphate is the precursor to toyocamycin and sangivamycin and through the action of 4 enzymes S. rimosus produces PreQ0, which is proposed to be a precursor to both toyocamycin and sangivamycin. The exact pathway in S. rimosus transforms PreQ0 into toyocamycin and sangivamycin is currently not known, but a 2008 report by McCarty and Bandarian has proposed that PreQ0 can be converted to toyocamycin through the action of 5 enzymes. This poster focuses on the purification and enzymatic characterization of a putative phosphoribosyl transferase (ToyH) that has been proposed to catalyze ribosylation of PreQ0.

24 Band-Aids, Bandages, and More

Darren Anes Dy Quiangco
Advisor: Dr. Heather Sklenicka
Rochester Community and Technical College

The main objective of this lab is to test different alternatives for adhesive band-aids as there is a population of people who are sensitive to adhesive ingredients. There are also times in which a band-aid is not readily available, and an alternate solution must be found. To figure out the best solution, five different samples were used and underwent three different tests; the tests were: liquid retainment and repellent, range of movement at elbow and knee joints, and lastly durability and resistance against abrasion. The different solutions currently under testing are: duck-tape, waterproof paper tape, gauze, adhesive band-aid, and NewSkin liquid bandaid. From these five selections only two to three solutions are safe for adhesive-sensitive skin, on the other hand, all selections will be tested to find the best alternate solution.

25 Spherical Lens vs. Microlens for Laser Propulsion

Tyler Baxter
Advisor: Dr. John Sinko
St. Cloud State University

The application of spherical lenses in the field of laser propulsion is fairly common and well understood, however, the utilization of arrays of microscopic lenses (microlens arrays) within the same field is not very well documented in the literature. Additionally, there are certain physical drawbacks (such as plasma shielding) that could potentially be mitigated using a microlens array in place of a spherical lens. This study develops the understanding of laser-mediated chemical propellants intended for laser propulsion using a microlens array. The immediate intent is experimentally testing space-based laser 'tractor beam' propulsion using this method. The suggested process would produce reversible thrust on distant macroscopic objects via confined ablation for development of a retrieval system for astronauts, space assets, or satellite deorbit. We believe this process may hold niche utility for beamed energy propulsion in sensitive operations by providing negative chemical feedback to prevent a runaway reaction that could lead to propellant explosion.

8 Prevalence of Antibiotic Resistant Genes in Environmental Isolates

Mohamed Mohamed and Abdikhalif Khadir
Advisor: Dr. Renu Kumar
Minneapolis Community and Technical College

See full abstract above

Time Number **Oral Session B** **12:00 – 1:20** **Health Sciences Room 136**

26 Telling Secrets to the Trees

Alexandra Krohn

Advisor: Marianne Zarzana

Southwest Minnesota State University

Alexandra Krohn's short nonfiction and fiction is inspired by firsthand experiences and her observations of the world. She will read "The Other Side of the Glass," a nonfiction piece where the natural and man-made worlds collide. Her flash fiction story, "Silent Alarm," is about the justifiable fear women experience along with the sacrifices they make and the economic pressures they face.

27 SCSU Sense of Belonging Research

Erik Nordmeyer, Andrea Richards, and Joshua Toftey

Advisors: Dr. David Robinson and Dr. Melissa Hanzsek-Brill

St. Cloud State University

As St. Cloud State University's enrollment and retention rates have declined in recent years, the University has both worked to find the causes and to reverse this negative trend. Through research by scholars like David S. Yeager at the University of Texas, the sense of belonging has been found to have an effect on student success, and in particular the retention rate. The sense of belonging is how accepted and valued a student feels on the campus and by the people with whom the student is in contact. Our research is focused on developing and understanding how to measure the sense of belonging of first-year SCSU students. We began by analyzing a university survey with over 200 questions, called Mapworks, which was taken by first-year students in the Fall 2014 and 2015 semesters. A "Belonging Index" was created by averaging one's responses to survey questions that related to their sense of belonging at SCSU. This index proved to be a useful predictor of first-time students' retention rate; providing insights into differences in retention for students based on financial situation, living arrangement, and other demographic characteristics. Building on the importance of the previous Belonging Index, a new survey unique to SCSU was developed to measure the sense of social belonging. A subset of ten questions was chosen to be in the new survey, the ten questions most associated with retention based on the Mapworks data. In addition, new questions were added to gauge students' sense of academic belonging. This revised survey was first administered in Fall 2017, and will continue to be given to first-time students annually. This measure of a sense of belonging will provide SCSU with insights into which students are most likely to succeed and which students would most benefit from interventions aimed at social integration and community.

28 Mathematics and Problem Solving in Art

Talen Rabe

Advisor: Dr. Joyati Debnath

Winona State University

The struggle faced by most visual artists is that of representing a three-dimensional space, the real world, on a two-dimensional surface, their canvas. In this research, a means of mapping points (or lines, or surfaces) in three-space directly to points on a given plane by means of projection is developed. In doing this, a mathematical description of traditional â€œvanishing pointsâ€ used by artists to create the illusion of depth is explored. The next part of the research is concerned with a physical application of these methods as a model of a large architectural space is described, and mapped to an actual canvas to be painted. By approaching problems in art from the perspective of a mathematician, highly detailed images of entirely imaginary places in perfectly real perspective can be created.

29 Refugee Crisis and Its Impact on Crime Trends in Germany

Taisiia Stanishevska

Advisor: Dr. Nimantha Manamperi

St. Cloud State University

The refugee crisis in Europe has been a major source of debate and controversy for the past two years. The phenomenon of "Wir schaffen das" (We'll manage it by Chancellor Angela Merkel) draws attention to Germany as a country, which consistently helps refugees to find a new home despite criticism and lack of support from other European countries. This paper uses time series data from 1976-2015 to analyze the effect of refugee influx on total crime and violent crime in

Germany. An autoregressive-distributed lag (ARDL) model is used to identify the long run relationship and a vector error correction (VEC) model is used for the short run relationship. Finally, a granger causality test is used to identify the causality between total crime and refugees. The results indicate a positive effect of refugee influx on total crime rate in the long run, however no significant effect is detected for the short run. Moreover, the impact of refugees on violent crime rate is found to be insignificant in both long run and short run. Lastly, no cause and effect relationship between refugees and total crime is identified. The empirical results of this study can be used to improve the quality of integration courses for refugees and come up with more effective safety measures in times of rapid demographic change in Germany.

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Winona State University
Kubilay Gok and Mingrui Zhang

Tulip by Vlako Ivkovic

Taste the Rainbow
by Chanda Ounkong

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Damun Stephen – Award design and creation
Student Volunteers from across campus

Thanks Everyone!
Heather Sklenicka
Conference Chair

RCTC Main Campus

← North