Undergraduate Research Symposium

Apr 16th, 9:00 AM - 9:00 PM

2013 Abstract Booklet

Undergraduate Research Center, Minnesota State University, Mankato

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UNDERGRADUATE RESEARCH SYMPOSIUM

inspiring students creating scholars

april 16, 2013
Welcome to the 15th Annual Undergraduate Research Symposium at Minnesota State University, Mankato.

Every year at this time, the University community and I look forward to the opportunity to showcase the creative and scholarly achievements of our undergraduate students. The big ideas embodied in the student projects included this year came about through the collaboration of talented, motivated students and dedicated faculty mentors. It takes a tremendous amount of time, energy, and passion to complete a project for the Undergraduate Research Symposium; and I applaud all the students, faculty, and staff who participated in the process.

Participating in undergraduate research and working one-on-one with a faculty mentor in the process is a life-changing opportunity for many students. It not only enriches a student’s educational experience here at Minnesota State Mankato, but also has an impact that extends far beyond our campus. These experiences can lead to the pursuit of advanced degrees, encourage lifelong learning, and open doors to career opportunities.

Please join me in celebrating the achievements of everyone involved in the 2013 Undergraduate Research Symposium.

Richard Davenport
President
Minnesota State University, Mankato
On behalf of the Undergraduate Research Center, we would like to welcome all student presenters, faculty mentors and attendees to the 15th Annual Undergraduate Research Symposium. We are proud to be a part of the rich and meaningful experiences that undergraduate students at Minnesota State University, Mankato have through their participation in research and scholarly work.

This year our theme for the Symposium is “Inspiring Students, Creating Scholars”. Providing undergraduate students with the opportunity to participate in the research process allows them to engage in scholarship in new and exciting ways. One of the most important aspects of this experience is the Student-Faculty Mentor relationship. Through this partnership, students learn the importance of collaboration and collegiality, in addition to the lessons learned related to their discipline. We are happy to have the 2012 Faculty Mentor of the Year, Dr. Beth Sandell, as our keynote speaker this year. Dr. Sandell will discuss the importance of the mentor-mentee relationship, and the benefits to both the student and the professor.

In addition to the oral and poster presentations throughout the day, we will also showcase student creative works at the Art Gallery opening this evening. Scholarship takes many forms, and all are celebrated at the Symposium. We invite you to attend events throughout the day to experience firsthand the incredible research and scholarly work that are occurring across our campus.

Alexandra Hilt-Panahon, Ph.D.                             Marilyn Hart, Ph.D.
Coordinator, Undergraduate Research Symposium   Director, Undergraduate Research Center

2012-2013 UNDERGRADUATE RESEARCH COUNCIL MEMBERS

Barbara Bergman                                Barry Ries
Emily Boyd                                    Laura Riness
Christopher Corley                            Elizabeth Sandell
Joseph Holtermann                             Kristin Scott
Mary Susan Johnston                           Mary Visser
Cindra Kamphoff                               Heather Von Bank
Karla Lassonde                                Trenton Vorlicek
Ihsuan Li                                     Gina Wenger
Steven Losh                                   Forrest Wilkerson
Mark McCullough                                Hongxia Yin
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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</thead>
<tbody>
<tr>
<td>8:15 a.m. – 4:00 p.m.</td>
<td>Student Presenter, Moderator, &amp; Judge Check-in Coffee and Snacks Available</td>
<td>CSU Ballroom Lobby CSU Ballroom</td>
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<tr>
<td>8:15 a.m. – 5:00 p.m.</td>
<td>Judging Room</td>
<td>CSU 256</td>
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<tr>
<td>9:00 – 10:00 a.m.</td>
<td><strong>Oral Session 1</strong> Art</td>
<td>CSU 201</td>
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<tr>
<td>9:00 – 10:00 a.m.</td>
<td><strong>Oral Session 2</strong> English &amp; History</td>
<td>CSU 203</td>
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<tr>
<td>10:00 – 12:00 p.m.</td>
<td><strong>Poster Session A</strong> Biological Sciences, Chemistry and Geology, Civil Engineering, Computer Information Science, Integrated Engineering, Management, Manufacturing Engineering Technology, Marketing and International Business, &amp; Mathematics and Statistics</td>
<td>CSU Ballroom</td>
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<tr>
<td>10:05 – 11:05 a.m.</td>
<td><strong>Oral Session 3</strong> Art</td>
<td>CSU 202</td>
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<tr>
<td>10:05 – 11:05 a.m.</td>
<td><strong>Oral Session 4</strong> History &amp; Sociology</td>
<td>CSU 204</td>
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<tr>
<td>10:05 – 11:05 a.m.</td>
<td><strong>Oral Session 5</strong> Mathematics and Statistics, Physics and Astronomy, &amp; Chemistry and Geology</td>
<td>CSU 238</td>
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<tr>
<td>11:10 – 12:10 p.m.</td>
<td><strong>Oral Session 6</strong> Psychology &amp; Ethnic Studies</td>
<td>CSU 201</td>
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<tr>
<td>11:10 – 12:10 p.m.</td>
<td><strong>Oral Session 7</strong> World Languages and Cultures &amp; Communication Studies</td>
<td>CSU 203</td>
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<tr>
<td>11:10 – 12:10 p.m.</td>
<td><strong>Oral Session 8</strong> Elementary and Early Childhood Education</td>
<td>CSU 253</td>
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<tr>
<td>12:10 – 1:15 p.m.</td>
<td>BREAK</td>
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<tr>
<td>1:15 – 2:15 p.m.</td>
<td><strong>Oral Session 9</strong> Gender and Women’s Studies</td>
<td>CSU 202</td>
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<tr>
<td>1:15 – 2:15 p.m.</td>
<td><strong>Oral Session 10</strong> Automotive Engineering Technology</td>
<td>CSU 204</td>
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<tr>
<td>1:15 – 2:15 p.m.</td>
<td><strong>Oral Session 11</strong> Electrical Engineering</td>
<td>CSU 238</td>
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<td>Time</td>
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<tr>
<td>2:00 – 4:00 p.m.</td>
<td><strong>Poster Session B</strong>&lt;br&gt;Anthropology, Art, Communication Disorders, Communication Studies, Construction Management, Dental Hygiene, Elementary and Early Childhood Education, Family Consumer Science, Gender and Women’s Studies, Geography, Government, Human Performance, Psychology, Sociology, Urban and Regional Studies, &amp; World Languages and Cultures</td>
<td>CSU Ballroom</td>
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<tr>
<td>2:20 – 3:20 p.m.</td>
<td><strong>Oral Session 12</strong>&lt;br&gt;Gender and Women’s Studies</td>
<td>CSU 201</td>
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<tr>
<td>2:20 – 3:20 p.m.</td>
<td><strong>Oral Session 13</strong>&lt;br&gt;Economics &amp; Management</td>
<td>CSU 202</td>
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<tr>
<td>2:20 – 3:20 p.m.</td>
<td><strong>Oral Session 14</strong>&lt;br&gt;Automotive Engineering Technology &amp; Integrated Engineering</td>
<td>CSU 203</td>
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<td>3:25 – 4:25 p.m.</td>
<td><strong>Oral Session 15</strong>&lt;br&gt;Economics</td>
<td>CSU 202</td>
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<td>3:25 – 4:25 p.m.</td>
<td><strong>Oral Session 16</strong>&lt;br&gt;Gender and Women’s Studies</td>
<td>CSU 204</td>
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<td>3:25 – 4:45 p.m.</td>
<td><strong>Oral Session 17</strong>&lt;br&gt;Biological Sciences</td>
<td>CSU 238</td>
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<tr>
<td>5:30 p.m.</td>
<td><strong>Undergraduate Research Symposium</strong>&lt;br&gt;Celebration Dinner</td>
<td>CSU Ballroom</td>
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<tr>
<td>7:00 – 9:00 p.m.</td>
<td><strong>Creative Works Exhibit</strong></td>
<td>CSU Gallery</td>
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Art

A SERIES OF PARANOIA
Ashton Bird
Mika Laidlaw, Faculty Mentor (Department of Art)
URC SUPPLY GRANT RECIPIENT

ANISH KAPOOR'S 2009 RETROSPECTIVE: AN ANALYSIS OF HERITAGE AND IDENTITY
Joshua Schutz
Alisa Eimen, Faculty Mentor (Department of Art)

A MOMENT IN FLUX: TOTEMS
Megan Moriarty, Kate Cincoski, & Miranda Hicks
Mika Laidlaw, Faculty Mentor (Department of Art)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

SUPERFLAT
Desaree Simon
Alisa Eimen, Faculty Mentor (Department of Art)
A SERIES OF PARANOIA
Ashton Bird
Mika Laidlaw, Faculty Mentor (Department of Art)

A Series of Paranoia is a series using five photos to depict the manifestation of paranoia. The photos are seen as if they were scenes in a short narrative. As the scenes progress, the delusions of paranoia control and manipulate the central figures presented in the story. Two characters are used in a staged environment to give me control of what will be seen in each photo. The characters and environment remain anonymous throughout the photos. The set used was constructed out of 8’ by 4’ pegboard panels attached to an additional structure made for support. The final structure was a cubicle shape that was 8’ by 8’ by 8’. After construction, I covered the walls, ceiling and floor in water and painted white on top of the damp pegboard. This created a raw aesthetic that was fitting for my theme. The cold weather at the time further pushed the dimensions of the cubicle by warping the pegboard; this additional effect adds an element of eeriness to the environment being used. A single light was hung off centered to show the depth of the room, characters and also to dramatize the relation between the two characters in their environment. This opportunity has given me much knowledge on how to control an environment that depicts the idea I want to prove in my theme. In the future, I want to use the skills learned to create more dynamic scenarios in photographs.

ANISH KAPOOR'S 2009 RETROSPECTIVE: AN ANALYSIS OF HERITAGE AND IDENTITY
Joshua Schutz
Alisa Eimen, Faculty Mentor (Department of Art)

Some artists intentionally comment on their socioeconomic status, ethnic background, and other relevant aspects of their identity when creating works of art. But when artists work in the realm of modernity and abstraction, is all meaning lost? By picking the contemporary, multicultural artist, Anish Kapoor, and relating his work to his heritage and religious upbringing, I strive to uncover the extent to which his past influenced his present. Utilizing several journal articles outlining his 2009 exhibition at the Royal Academy of Art, a book surveying the vast history of Indian art, and photographs of Kapoor’s retrospective, I was able to come to some conclusions about the importance of identity and heritage concerning the artist. While commencing my research it was apparent there was a strong disconnect between the work and any possible influences from his upbringing in India. The resulting paper proves a point by illustrating the obvious flaws of focusing on certain aspects of an artist. By looking at any possible influences to his art related to his Indian identity, the truth is revealed that the only fair way to examine a contemporary artist’s work is through a modern lens including all relevant sociopolitical, economic, and artistic contexts.
A MOMENT IN FLUX: TOTEMS
Megan Moriarty, Kate Cincoski, & Miranda Hicks
Mika Laidlaw, Faculty Mentor (Department of Art)

A Moment in Flux is an exploration of the relationship between two different mediums and how they play off each other. By combining ceramic objects and acrylic gel medium sculpture, we explored the relationship between the ceramic’s tendency to feel heavy and gel medium’s flimsy nature. Our goal was to reverse this, working the acrylic gel medium in such a way that it becomes structurally sturdy and the clay forms become precious and delicate. This would represent the idea of a moment in flux. The materials challenge each other and the space between them suggesting such a change and tension. The inner ceramic items are called “totems” because they are precious objects, encased by the unearthly-looking gel medium. This idea of entrapment is something we discovered while researching. The changing relationship of the objects depend on how they are encased. We experimented with how that moment of flux changes when the ceramic object is totally enclosed versus when we leave openings in the gel medium. We were successful in creating this relationship and are excited by all of the fluxes moments we have created for our viewers.

SUPERFLAT
Desaree Simon
Alisa Eimen, Faculty Mentor (Department of Art)

History reveals Western cultures continuous interest in Eastern art from impressionism to today. When a culture, like Japan, was so suddenly disconnected from its identity, what kind of art was, and still is, produced which influences the Western world? After Japan’s surrender in World War II there was an integration of American culture which shifted Japan’s traditional values. Superflat, a movement that has inspired artists from around the world, takes on the challenge of identification by referencing and combining the values and characteristics of Japan’s subculture with high culture; therein blending several social aspects: art & history, memory, and consumerism. From a multitude of articles and books discussing Japanese culture, contemporary artists, as well as Superflat and its relation to Japan’s identity, I found culture to be a key characteristic as it relates popular, high, and otaku together. Outside cultures, as well as those within Japan, adopt and/or criticize the movement and its representation of Japan as a simplistic society. Through the evaluation of Japan’s history in relation to the several aspects of Superflat, I am beginning to believe that the movement is a national form of subconscious introspection wherein a gained ‘self-awareness’ might contribute to a discussion of the nation’s social and cultural principles.
TRENDING NOVELS FOR CHILDREN
Teagan Schmidt
John Banschbach, Faculty Mentor (Department of English)

ENG444 ADVANCED POETRY WORKSHOP - CLASS READING
Thomas Delano, Lawrence Wiggins, Heidi Sampson, Max Peterson, & Lillian Lamoreux
Roger Sheffer, Faculty Mentor (Department of English)

CLEANING THE GANGES RIVER
Caroline Bluth
Mary Susan Johnston, Faculty Mentor (Department of English)

INTERNET CENSORSHIP IN CHINA
Alexander Sorenson
Tao Peng, Faculty Mentor (Department of History)
Thomas Hagen, Faculty Mentor (Department of English)
TRENDING NOVELS FOR CHILDREN
Teagan Schmidt
John Banschbach, Faculty Mentor (Department of English)

According to a recent article by Melissa Wilson and Kathy Short, middle-reader novels are seeing a new trend. Instead of the more classic plot of the "home/away/home" pattern, the new trend in children's literature is the children are not being supported by adults (who are behaving more like children) or the child is abandoned, and the child must seek to find or create their own home. This is called the "postmodern metaplot." This trend was seen in a variety of children's novels described by Wilson and Short, novels which received commendation awarded from adults. My study will compare books given awards by children, (specifically the Maud Hart Lovelace award) to see if the books commended follow this "Postmodern" trend or if they follow the more classical structure, and what we can accordingly learn about children's tastes in books.

ENG444 ADVANCED POETRY WORKSHOP - CLASS READING
Thomas Delano, Lawrence Wiggins, Heidi Sampson, Max Peterson, & Lillian Lamoreux
Roger Sheffer, Faculty Mentor (Department of English)

Students will present various poems they have created and revised during the Spring 2013 semester, with brief explanations of what led to the creation of a poem and the techniques used in and out class to bring poems to their finished states. These presentations will encompass the various forms of theory and interpretation used throughout English courses at MSU, and ultimately argue how those practical tools of study lead to the creation of art. In the class poems are read aloud and timed, and students will use this practice to create a 7-10 minute collection of poems to read to an audience. These presentations will also stand as an example of the various literary arts that are being enjoyed and practiced by students within the English and Creative Writing classes.
CLEANING THE GANGES RIVER
Caroline Bluth
Mary Susan Johnston, Faculty Mentor (Department of English)

Last semester I took a course on Indian American women writers. In order to understand many of the stories properly, I had to “think like a Hindu.” I choose to do a project at the end of the semester about the Ganges River, which flows across northern India. Hindus believe that the Ganges is a goddess who is revered for her cleansing powers. Unfortunately, the Ganges is also an ailing river that is seriously threatened by a multitude of pollutants and the increasing global temperature. Most of the 400 million people who live along the Ganges River and whose livelihood depends on the Ganges are Hindu. While researching my project about the perils of the river, it became impossible to ignore the conflict between environmental issues and religion. I read articles and books to research the different influences affecting the river, particularly matters that were cited in the 1980 Ganga Action Plan. The Ganga Action Plan established the National Ganga River Basin Authority to address the hazards. I concluded that the efforts of the Ganga Action Plan did not meet expectations and the lack of religious consideration given to the project contributed to its failure.

INTERNET CENSORSHIP IN CHINA
Alexander Sorenson
Tao Peng, Faculty Mentor (Department of History)
Thomas Hagen, Faculty Mentor (Department of English)

China’s stance on Internet censorship has routinely been in the news. But judging China using Western values without a basic knowledge of Chinese culture and values fails to explain why Chinese citizens are not rebelling against Internet censorship. Interest in this research was first stimulated by enrolling in a class that taught Chinese history and culture through reading and analyzing the primary texts of Daoism and Confucianism, and then looking at Chinese artwork and poetry and history through that philosophic lens. Both Western and Chinese articles on internet censorship were also read and all of this material was used in order to attempt to find the truth among conflicting points of view. My research concluded that filial piety is still a powerful force in modern China and that the social and governmental desire for harmony explains some of China’s official attitudes toward censorship. Despite these powerful cultural characteristics, my research also revealed that the people of China rather easily circumvent the censorship. My research revealed that internet censorship in China is not as serious a problem as most Western media outlets portray it to be, and that with some understanding of Chinese history and culture, one can find a more plausible explanation for the Chinese point of view and their apparent lack of rebelliousness regarding restrictions on internet use.
1. **EFFECTS OF STRONTIUM IN THE BONE DENSITY OF MICE**  
   Kali Trukki, Ashley Ledding, & Breanna Ganther  
   *Michael Bentley, Faculty Mentor (Department of Biological Sciences)*  
   MINNESOTA FOUNDATION GRANT RECIPIENT

2. **IN VITRO ENZYMATIC ACTIVITY OF APEE ESTERASE WITH PHOSPHOLIPIDS**  
   Sarah Tanvir & Chery Vang  
   *Christopher Conlin, Faculty Mentor (Department of Biological Sciences)*  
   MINNESOTA FOUNDATION GRANT RECIPIENT

3. **METABOLIC DIVERSITY IN BACTERIA ASSOCIATED WITH EARTHWORM COCOONS**  
   Jeremy Balster & Mark Walchuk  
   *Dorothy Wrigley, Faculty Mentor (Department of Biological Sciences)*

4. **REGULATION OF CRONOBACTER SAKAZAKII APEE OUTER MEMBRANE ESTERASE**  
   Oumar Sanogo  
   *Christopher Conlin, Faculty Mentor (Department of Biological Sciences)*  
   URC SUPPLY GRANT RECIPIENT

5. **RUBIDIUM AS SUBSTITUTE FOR POTASSIUM IN RAT CARDIAC TISSUE**  
   Christina Mangan & Bisola Asaolu  
   *Victor Esenabhalu, Faculty Mentor (Department of Biological Sciences)*  
   *Michael Bentley, Faculty Mentor (Department of Biological Sciences)*  
   URC SUPPLY GRANT RECIPIENT

6. **ANALYSIS OF CHEMICAL ELEMENTS IN FISH SCALES**  
   Callie Sinclair & Natacha Tasha  
   *Michael Bentley, Faculty Mentor (Department of Biological Sciences)*  
   URC SUPPLY GRANT RECIPIENT

7. **INTRACELLULAR LOCALIZATION OF NOVEL POLYGLUTAMINE PROTEIN FAM171B**  
   Seth Hintze & Brittany Stamer  
   *Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)*  
   URC SUPPLY GRANT RECIPIENT

8. **HOW INTRA-CLONAL DENSITY-MEDIATED COMPETITION AMONG RHIZOMES AFFECTS THE DISTRIBUTION OF RAMETS IN THREE TYPHA SPECIES**  
   Joseph Bottoms & Breeanna Bateman  
   *Bradley Cook, Faculty Mentor (Department of Biological Sciences)*  
   URC SUPPLY GRANT RECIPIENT

9. **EFFECTS OF DEVELOPMENTAL HYPOTHYROIDISM ON COCHLEAR HAIR CELLS IN MICE**  
   Molly Haack & Steven Piroso  
   *David Sharlin, Faculty Mentor (Department of Biological Sciences)*  
   URC SUPPLY GRANT RECIPIENT
10. THE ABUNDANCE AND DIVERSITY OF INTESTINAL PARASITES COLLECTED FROM BLUE-WINGED TEAL AND RING NECKED DUCKS INHABITING LAKE WINNIBIGOSHISH, MINNESOTA
Omolayo Ogunnowo
Robert Sorensen, Faculty Mentor (Department of Biological Sciences)
URC SUPPLY GRANT RECIPIENT

11. COMPARISON OF ESCHERICHIA COLI 0157:H7 WITH A LABORATORY STRAIN ON THEIR ABILITY TO COLONIZE PRODUCE
Karenzha Huwae
Dorothy Wrigley, Faculty Mentor (Department of Biological Sciences)
URC SUPPLY GRANT RECIPIENT

12. STEATOSIS INDUCED BY A HIGH FAT DIET IN MALE MICE LIVERS
Rachel Yates Swedberg
Steven Mercurio, Faculty Mentor (Department of Biology)
Courtney Kupser, Graduate Student Mentor (Department of Biology)

13. IDENTIFICATION OF PROTEINS IN THE PIGMENT DISPERSION FACTOR PATHWAY (PDF) FOR GENETIC BEHAVIOR IN FRUIT FLIES (DROSOPHILA MELANOGASTER)
Laura Boon & Nilsu Demirci
Daniel Toma, Faculty Mentor (Department of Biology)
Adam Voss, Graduate Student Mentor (Department of Biology)
URC SUPPLY GRANT RECIPIENT

14. INTRACELLULAR LOCALIZATION OF THE NOVEL POLYGLUTAMINE PROTEIN FAM171B – SEARCHING FOR LOCALIZATION USING A RECENTLY AVAILABLE ANTIBODY
Bradly Pape & Allison Helget
Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

15. EFFECT OF REDUCED NITRIC OXIDE ON KIDNEY SODIUM HANDLING IN FEMALE RATS
Kaleb Short
Penny Knoblich, Faculty Mentor (Department of Biological Sciences)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

16. EFFECTS OF ULTRAVIOLET RADIATION ON THE BROWN MIDRIB MUTATION IN SORGHUM BICOLOR AND ZEA MAYS
Maegan Cross
Christopher Ruhland, Faculty Mentor (Department of Biological Sciences)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

17. GENE REGULATION OF LIP1 IN PHOTORHABDUS
Taylour Hanson
Christopher Conlin, Faculty Mentor (Department of Biological Sciences)
URC SUPPLY GRANT RECIPIENT

18. FINDING CHARACTERS THAT WILL DIFFERENTIATE SIX VERY SIMILAR PACKERA (RAGWORT) TAXA IN THE UPPER MIDWEST
Erika Magnusson
Alison Mahoney, Faculty Mentor (Department of Biological Sciences)
Sarah Soderholm, Graduate Student Mentor (Department of Biological Sciences)
19. BLACK CRAPPIE POPULATION DEMOGRAPHICS IN RELATION TO CONNECTIVITY IN MINNESOTA RIVER BACKWATERS
   Michael Wolf
   Shannon Fischer, Faculty Mentor (Department of Biological Sciences)
   Brett Nelson, Graduate Student Mentor (Department of Biological Sciences)

20. INTRACELLULAR LOCALIZATION OF FAM171B-GFP USING DIFFERENT FIXING TECHNIQUES
   Brian Gilbert & Steven Gilbert
   Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)

21. DOES KIAA1946 MISLOCALIZE TO POLYGLUTAMINE DISEASE INCLUSION BODIES?
   James Gilbert
   Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)
   NORTH STAR STEM ALLIANCE GRANT RECIPIENT

22. FUNCTION OF NEPHRIDIAL BACTERIA
   Mabin Sainju
   Dorothy Wrigley, Faculty Mentor (Department of Biological Sciences)
   URC SUPPLY GRANT RECIPIENT

23. BONE MICROVASCULATURE OF MALE MICE WITH REDUCED TESTOSTERONE LEVELS
   Katie Sonnabend & Nick Jobeun
   Michael Bentley, Faculty Mentor (Department of Biological Sciences)
   URC SUPPLY GRANT RECIPIENT

24. EXAMINING THE INTERACTIONS OF DECANAL AND TRANS-2-DECENAL WITH VARIOUS NUCLEOTIDE BASES
   Neil Ranals
   Danae Quirk Dorr, Faculty Mentor (Department of Chemistry and Geology)
   URC SUPPLY GRANT RECIPIENT

25. THE EXPRESSION OF AT1R IN HYPERTENSIVE MALE AND FEMALE RAT KIDNEYS
   Sonika Sainju
   Theresa Salerno, Faculty Mentor (Department of Chemistry and Geology)
   MINNESOTA STATE FOUNDATION GRANT RECIPIENT

26. EFFECTS OF MECHANICAL WOUNDING ON THE EXPRESSION OF PEA LEAF LIPOXGENASE ISOFORMS
   Briana Frolov
   Theresa Salerno, Faculty Mentor (Department of Chemistry and Geology)
   URC SUPPLY GRANT RECIPIENT

27. PHOTOPRODUCED REACTIVE SPECIES IN NATURAL WATERS: INFLUENCE OF CHROMOPHORIC DISSOLVED ORGANIC MATTER PROPERTIES
   Kurtis Malecha
   John Thoemke, Faculty Mentor (Department of Chemistry and Geology)
   URC SUPPLY GRANT RECIPIENT

28. EFFECT OF DROUGHT ON THE EXPRESSION OF LIPOXYGENASE ISOFORMS IN PEA LEAVES AND ROOTS
   Farjana Siddika
   Theresa Salerno, Faculty Mentor (Department of Chemistry and Geology)
29. QUANTIFYING HYDROXYL RADICAL IN NATURAL WATERS: AN IMPORTANT PATHWAY FOR POLLUTANT DEGRADATION
Andria Sellner
John Thoemke, Faculty Mentor (Department of Chemistry and Geology)
URC SUPPLY GRANT RECIPIENT

30. REACTIONS OF SINGLET OXYGEN WITH FREE AMINO ACIDS
Danielle Hron
John Thoemke, Faculty Mentor (Department of Chemistry and Geology)

31. COMPLETE SUBSTITUTION OF CALCIUM BY LANTHANUM (III) IN SYNTHETIC CALCIUM VANADATE APATITE
Hilary Deragisch & Nicole Stenzel
Lyudmyla Stackpool, Faculty Mentor (Department of Chemistry and Geology)

32. DO ALDOSTERONE LEVELS AFFECT THE EXPRESSION OF MR IN RAT KIDNEYS?
Alec Ganske & Clayton Miller
Theresa Salerno, Faculty Mentor (Department of Chemistry and Geology)
MINNESOTA FOUNDATION GRANT RECIPIENT

33. RE(VII) REDUCTION IN THE PRESENCE OF SORBED FE(II): PLAUSIBLE REMOVAL PATHWAY IN SUBOXIC POREWATERS
Clayton Wagner, Paul Yanez, & Megan Maloney
Trenton Vorlicek, Faculty Mentor (Department of Chemistry and Geology)

34. PREPARATION OF ARYL DIETHYL PHOSPHATE ESTERS
Selam Mebratu
Michael Lusch, Faculty Mentor (Department of Chemistry and Geology)

35. X-RAY DIFFRACTION AND SCANNING ELECTRON MICROSCOPE FINGERPRINTING OF REGIONAL FINE SEDIMENT SOURCES
Ryan Bonney
Chad Wittkop, Faculty Mentor (Department of Chemistry and Geology)
URC SUPPLY GRANT RECIPIENT

36. EFFECT OF METHYL JASMONATE ON THE EXPRESSION OF LIPOXYGENASE 5 IN SOYBEAN LEAVES
Sharmin Hossain
James Rife, Faculty Mentor (Department of Chemistry and Geology)
URC SUPPLY GRANT RECIPIENT

37. INVESTIGATING THE REACTIVITY OF CITRAL AND OCTANAL TOWARD DNA
Brittany Leeder
Danae Quirk Dorr, Faculty Mentor (Department of Chemistry and Geology)
URC SUPPLY GRANT RECIPIENT

38. THE STUDY OF THE EFFECTS OF P-ANISALDEHYDE AND 3,4-DIMETHOXYBENZALDEHYDE ON 2’-DEOXYADENOSINE AND 2’-DEOXYGUANOSINE
Jenna Bowman
Danae Quirk Dorr, Faculty Mentor (Department of Chemistry and Geology)
URC SUPPLY GRANT RECIPIENT
39. TWO-DIMENSIONAL GEL ELECTROPHORESIS ANALYSIS OF SOYBEAN LEAF PROTEINS
   Paurakh Subedi
   *James Rife, Faculty Mentor (Department of Chemistry and Geology)*
   MINNESOTA STATE FOUNDATION GRANT RECIPIENT

40. ANTIMICROBIAL PROPERTIES OF LIPOXYGENASES ENZYMES IN WOUND INDUCED
    SOYBEAN LEAVES
   Keean Rustad
   *James Rife, Faculty Mentor (Department of Chemistry and Geology)*
   MINNESOTA STATE FOUNDATION GRANT RECIPIENT

41. MODELING BIO-FUEL PRODUCTION THROUGH ALGAL GROWTH: GROWTH KINETICS
    Steven Muir
    *Stephen Druschel, Faculty Mentor (Department of Civil Engineering)*

42. ANALYSIS OF IT PROJECT FAILURES FROM A MULTI-CULTURAL PERSPECTIVE
    Zainab Hamza
    *Susan Schilling, Faculty Mentor (Department of Computer Information Science)*
    URC SUPPLY GRANT RECIPIENT

43. DATABASE UTILIZATION FOR THE HONORS PROGRAM
    Ryan Colakovic
    *Cyrus Azarbod, Faculty Mentor (Department of Computer Information Science)*

44. C.A.D.S. (COMPRESSED AIR DELIVERY SYSTEM)
    Kali O’Brien & Danielle Goebel
    *Ronald Ulseth, Faculty Mentor (Department of Integrated Engineering)*

45. IMPLEMENTING A GENETIC NEURAL NETWORK
    Joseph Kolhoff
    *Dean Kelley, Faculty Mentor (Department of Integrated Engineering)*

46. WATER FILTER PROJECT
    Katie Olafson, Justin Magnusen, & Kody Kamunen
    *Ronald Ulseth, Faculty Mentor (Department of Integrated Engineering)*

47. THERMAL EXPANSION EXPERIMENT DESIGN & ANALYSIS
    Allie Jurvelin
    *Ronald Ulseth, Faculty Mentor (Department of Integrated Engineering)*

48. AN AUCTION-BASED PRICING MODEL FOR START-UP COST MINIMIZATION FOR
    RESTAURANTS
    Beka Yahya
    *Queen Booker, Faculty Mentor (Department of Management)*
    URC SUPPLY GRANT RECIPIENT

49. THE IMPACT OF UNAUTHORIZED AND FAKE SOCIAL MEDIA PROFILES ON THE
    FINANCIAL PERFORMANCE OF TOP US-BASED AND INTERNATIONAL COMPANIES
    Jeffrey Nestrud
    *Queen Booker, Faculty Mentor (Department of Management)*
50. PARAMETRIC MODELING OF THE SCHLEMM’S CANAL USING FUSED DEPOSITION
   Mallory Westphal
   Winston Sealy, Faculty Mentor (Department of Manufacturing Engineering Technology)
   Michael Bentley, Faculty Mentor (Department of Biological Sciences)
   MINNESOTA STATE FOUNDATION GRANT RECIPIENT

51. IS THE AMERICAN DREAM DEAD AMONG COLLEGE STUDENTS?
   Kathryn Olson
   Kristin Scott, Faculty Mentor (Department of Marketing and International Business)
   URC SUPPLY GRANT RECIPIENT

52. MATHEMATICAL MODELING AND SIMULATION OF FATIGUE MUSCLE FIBER MECHANISM
   Sanghee Moon, Sobyuk Son, & Taeyeung Hong
   Namyoung Lee, Faculty Mentor (Department of Mathematics and Statistics)
   URC SUPPLY GRANT RECIPIENT

53. STATISTICAL MODELING IN RENEWABLE ENERGY SECTOR OF THE US
   Bijaya Silwal
   Deepak Sanjel, Faculty Mentor (Department of Mathematics and Statistics)
1. **EFFECTS OF STRONTIUM IN THE BONE DENSITY OF MICE**  
Kali Trukki, Ashley Ledding, & Breanna Ganther  
*Michael Bentley, Faculty Mentor (Department of Biological Sciences)*

Dietary strontium is readily incorporated into bone tissue of rodents. In prior studies dietary strontium has been shown to inhibit calcium metabolism and has further been shown to prevent osteopenia in ovariectomized rats. In the present study, we evaluate changes in bone density of mice receiving low calcium diet and strontium chloride in the drinking water. The study includes 14 of male mice. A surgical procedure was performed to remove the testes from all of the mice through two small incisions in the scrotal area. The mice were put under anesthesia using isoflurane gas and received 0.02 ml dosage of Rimadyl post-surgery to help with pain. The surgery followed our Institutional Animal Care and Use Committee approval guidelines. All of the mice are weighed by group on a weekly basis to document weight gain and consumption of water and chow. After two months of the water and diet regimen the mice will be euthanized by carbon dioxide inhalation and the long bones will be dissected for analysis with a JEOL 6510 scanning electron microscope (SEM) equipped with a Thermo Noran silicon-drift energy dispersive spectroscopy (EDS) system. This system provides a means to measure strontium, calcium, phosphorous, and other mineral elements in bone tissue. We anticipate finding strontium incorporation and increased bone density in the mice using the Strontium Chloride and low calcium water and food regiment.

2. **IN VITRO ENZYMATIC ACTIVITY OF APEE ESTERASE WITH PHOSPHOLIPIDS**  
Sarah Tanvir & Chery Vang  
*Christopher Conlin, Faculty Mentor (Department of Biological Sciences)*

The apeE gene found in Salmonella typhimirium, a pathogenic gram-negative bacterium that causes infections ranging from mild, self-limiting enterocolitis to systemic typhoid fever. It encodes an outer membrane esterase whose expression is induced by phosphate starvation. Prior studies have shown that ApeE esterase is active against a variety of chromogenic ester substrates and the synthetic lipid analogue Tween80. However, the physiological substrates for the enzyme have not been determined. In order to study the in vitro activity of the ApeE esterase against phospholipids, the amino terminal domain of ApeE, which encodes the esterase activity, was cloned into an expression vector with seven histidine residues attached to the amino terminus. The esterase activity was purified by affinity chromatography using a nickel-chelating resin. Electrophoresis and p-nitrophenyl caprylate (chromogenic esterase) assay were also used to determine the purity and activity of the esterase. Purified ApeE esterase was incubated with the phospholipid phosphotidylcholine, and the extracted products were analysed using thin layer chromatography. Results showed that phosphatidylcholine was indeed hydrolyzed by the enzyme, further supporting the hypothesis that ApeE is used by the bacterium to scavenge phosphate from phospholipids.
3. METABOLIC DIVERSITY IN BACTERIA ASSOCIATED WITH EARTHWORM COCOONS
Jeremy Balster & Mark Walchuk
Dorothy Wrigley, Faculty Mentor (Department of Biological Sciences)

The cocoons of Eisenia fetida, a common earthworm species, contain diverse populations of symbiotic bacteria. Bacterial species are found in the surrounding soil or are passed directly from the parent earthworm to the offspring. It is important to understand the behavior of these symbionts as they are a vital component in the fitness of Eisenia fetida. To determine metabolic diversity, cocoons were selected and sterilized using ethanol. The contents were then squeezed onto individual Petri dishes containing tryptic soy agar (TSA). These plates were incubated at room temperature in microaerophilic conditions. From these plates, six organisms were selected based on colony morphology and isolated onto their own plates. Oxidase, citrate, and thioglycolate tests were performed on each of these six isolates. Of the six isolates, all but one tested positive for oxidase, and all isolates tested positive for citrate utilization. Five of the six organisms showed strictly aerobic growth, while the sixth showed facultatively anaerobic growth; this was the same organism which was negative for oxidase. From these results, it can be concluded that diversity in metabolic behavior does exist within the simbiont population of Eisenia fetida cocoons. Further tests will be performed to reinforce these results, including gram reactions of the organisms and nitrate tests, which will provide further information on each organism, leading eventually to a better understanding of each organism’s effect on the fitness of Eisenia fetida.

4. REGULATION OF CRONOBACTER SAKAZAKII APEE OUTER MEMBRANE ESTERASE
Oumar Sanogo
Christopher Conlin, Faculty Mentor (Department of Biological Sciences)

C. sakazakii bacterial infection is mainly observed in infants, where the primary source of the organism and the main vehicle for its transmission is rehydrated, powdered infant formula. The organism is also found in many plant materials such as cereals, wheat, corn, soy, rice, herbs and spices; in rats, and flies; and in other food products. To begin studying the possible roles of the outer membrane esterase ApeE in this organism, we have cloned the promoter for the C. sakazakii apeE gene and begun studying its regulation. First, we amplified the promoter region of the C. sakazakii apeE gene outer membrane esterase through the polymerase chain reaction (PCR) process, and then cloned the PCR fragments into the pRS550 vector where it drives expression of the gene for the easily assayed enzyme β galactosidase. Second, we transferred the pRS550+PCR fragment reporter plasmid into strains of E. coli containing deletions of various regulatory genes, and the amount of β galactosidase expressed from the C. sakazakii apeE promoter was measured. Our results showed that β galactosidase expression in the rpoS mutant was reduced by about 50 fold compared to the wild type. This is different from the regulation of the homologous gene in the related bacterium Salmonella enterica where it is regulated by PhoB. Since RpoS regulates genes that are highly expressed when the bacterium enters stationary phase, we intend to confirm these results by studying expression of the C. sakazakii apeE gene during both exponential growth and stationary phase.
5. **RUBIDIUM AS SUBSTITUTE FOR POTASSIUM IN RAT CARDIAC TISSUE**
Christina Mangan & Bisola Asaolu

*Victor Esenabhalu, Faculty Mentor (Department of Biological Sciences)*
*Michael Bentley, Faculty Mentor (Department of Biological Sciences)*

A normal cell contains a sodium/potassium ATPase pump that functions to maintain a high intracellular level of potassium (K+) inside the cell and high level of sodium (Na+) outside the cell. Since rubidium shares similar chemical properties with potassium and has a similar ionic radius it can replace potassium in cellular processes (Olga Jilkina et al). We used rat hearts as a model to quantify how rubidium will take over as potassium in the sodium/potassium pump. First, we used the Langendorff system to infuse the aorta of the rat heart with a buffer solution containing rubidium chloride so that it circulates through the coronary arteries. The Langendorff apparatus provides a means to control pH, temperature and pressure of the solutions perfusing the heart. A sequel to this procedure is the addition of ouabain to the buffer solution, which inhibits the activity of the sodium/potassium pump. Following each procedure, the hearts were freeze dried and examined by scanning electron microscopy (SEM). The percentage of rubidium in the cardiac tissue is measured using an Energy-Dispersive X-Ray Spectroscopy system associated with the SEM. The heart continues to beat for up to one hour in the Langendorff apparatus. During this time, rubidium is taken up by the cells of the heart in a positive slope with respect to time while the heart continues to beat. In the sequel procedure with ouabain introduction, the rubidium uptake is expected to decrease while sodium is expected to accumulate inside the cell, causing the heart to stop beating.

6. **ANALYSIS OF CHEMICAL ELEMENTS IN FISH SCALES**
Callie Sinclair & Natacha Tasha

*Michael Bentley, Faculty Mentor (Department of Biological Sciences)*

In Minnesota, the land of 10,000 lakes, one tends to not think about what chemical elements make up our lakes. Pollution has been a growing concern in our state. Although one may not see the effects directly, by observing other resources we can find what chemical elements are not only found in these waters but also how these elements affect other organisms. Fish scales are plates of bone that show rings with growth patterns according to seasonal cycles. With growth, the bone in the scales incorporates chemical elements. Since very little to no research has been done on fish scales, we began by researching the chemical components and morphology of these scales. To explore the scales chemical elements and morphology, we placed fish scales of different Minnesota species under an electron microscope. We then used energy dispersive spectroscopy to obtain our data needed. Our results concluded the scales chemical components are very similar to those of bone, which is what we hypothesized. We were also able to map out where the chemical elements are in relation to the morphology of the scale. Our results were very essential to be able to understand the fundamentals of a fish scale. By developing this important data, we are able to continue our research in finding potential unwanted chemical elements in fish scales, which will lead us to probable causes of pollution in our lakes.
7. INTRACELLULAR LOCALIZATION OF NOVEL POLYGLUTAMINE PROTEIN FAM171B
Seth Hintze & Brittany Stamer
Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)

Approximately 25,000 different proteins have been identified via the human genome project. FAM171B is one of those uncharacterized proteins. This protein, which is located on chromosome 2q32.1, has a polyglutamine (polyQ) stretch within its primary amino acid sequence. An expansion of this polyglutamine stretch have been implicated in various neurodegenerative diseases such as Huntington's Disease. Bioinformatics has helped us understand much more about this protein. FAM171B is likely expressed in the nervous system and contains a putative signal sequence and a single transmembrane domain. This data could suggest that the normal function of this protein is within the endomembrane system of neurons and mutations in the polyQ stretch could lead to implications in an uncharacterized neurodegenerative disease. In this experiment we set to find out the normal cellular function of FAM171B by finding where it localizes in the cell and to assay the degree of polymorphism in it's polyQ stretch to understand the mutation potential. By using immunofluorescence we found that FAM171B displays a punctuate vesicular-like staining pattern within the cytoplasm of COS-7, HEla, and HEK cells, which is what our bioinformatics predicted. Our lab also used DNA genotyping assays to find that the polyQ tract within FAM171B is decently stable within the human population with 96.5% homogeneity. This suggests that FAM171B may not be a solid candidate for causing a neurodegenerative disease. With these initial findings from localization and polymorphism studies, we found that FAM171B is a stable cytoplasmic proteins localizing to vesicular organelles.

8. HOW INTRA-CLONAL DENSITY-MEDIATED COMPETITION AMONG RHIZOMES AFFECTS THE DISTRIBUTION OF RAMETS IN THREE TYPHA SPECIES
Joseph Bottoms & Breeanna Bateman
Bradley Cook, Faculty Mentor (Department of Biological Sciences)

Wetlands are an important ecosystem in southern Minnesota. Cattails (Typha spp.) are a common wetland species, and two of the three taxa found here are considered invasive. To better understand how these species become invasive, we sought to understand the architecture of clonal growth. Cattails reproduce clonally via rhizomes. We hypothesized that as a mechanism to reduce intra-clonal competition for resources, rhizomes would grow away from the parent plant 180° from each other. Sending clones in opposite directions of one another maximizes the space between them, reducing the degree of competition for resources. We collected 20 samples of each species (T. latifolia, T. angustifolia, T. x glauca) individually potted them in 40/70 grit silica sand, and placed them in a grid in a greenhouse. Samples were randomized weekly, fertilized bi-monthly, watered every other day, and treated with algaecide as needed. Samples were grown for 22 weeks and then harvested. We measured the angles of the rhizomes, plant height, leaf number, and biomass. We will perform an ANOVA to determine any statistical significance. Preliminary observations appear to agree with our hypothesis. Plants that successfully grew clones appear to have done so at near 180° from each other. In the coming weeks we will harvest and analyze our data. Our findings will help to better understand the architecture that individual plants utilize when dispersing across the landscape. When making efforts to combat invasiveness, understanding the mechanisms with which species invade is crucial.
9. EFFECTS OF DEVELOPMENTAL HYPOTHYROIDISM ON COCHLEAR HAIR CELLS IN MICE
Molly Haack & Steven Piroso
David Sharlin, Faculty Mentor (Department of Biological Sciences)

Insufficient thyroid hormone during development results in deafness, but the molecular and structural defects responsible for this deafness are largely unknown. Therefore, we investigated the effects of developmental hypothyroidism on cochlear hair cells of juvenile mice. We first established three separate groups of mice: hypothyroid, control, and a hypothyroid plus thyroid hormone replacement (rescue) group. By doing so, we will be able to compare structural differences in the interior of the cochlea. We then harvested the cochlea of mouse pups on postnatal days 16 and 21. After fixing the extracted cochlea and decalcifying we exposed the apical sensory epithelium to image the stereocillia with a scanning electron microscope. We hypothesize that several structural differences between the hypothyroid and non-hypothyroid mice will be observed; including growth retardation and disorganization of hair stereocilium bundles. Disorganization of the stereocilia is associated with sensory deafness in mice and humans. Therefore, by studying these cochlear defects we will gain a better understanding of sensory deafness and the importance of sufficient thyroid hormone levels to cochlear development. Moreover, by gaining a better understanding of the structural differences between normally developing and hypothyroid mice, we will be contributing to the development of treatments aimed at eliminating cochlear defects in humans.

10. THE ABUNDANCE AND DIVERSITY OF INTESTINAL PARASITES COLLECTED FROM BLUE-WINGED TEAL AND RING NECKED DUCKS INHABITING LAKE WINNIBIGOSHISH, MINNESOTA
Omolayo Ogunnowo
Robert Sorensen, Faculty Mentor (Department of Biological Sciences)

The blue winged teal, Anas discors, is one of the more common ducks in North America being found in lakes, streams, and ponds. The ring-necked duck, Aythya collaris, is known mainly for habituating in freshwater ponds or lakes. At Lake Winnibigoshish, the blue winged teal and ring-necked ducks have been noted to have a record number of parasites within their respective gastrointestinal (GI) tracts. To fill the gap in our knowledge of these ducks found in Lake Winnibigoshish, this study sought to investigate the abundance and diversity of parasites residing in the respective GI systems of the ducks. The ducks utilized in this study were collected in the fall of 2012, at Lake Winnibigoshish, in northern Minnesota, as part of an undergoing large study. To manage volume of inhabiting parasites, the small intestines of each duck was divided into 15cm segments. For this research, I obtained data containing the number of parasites in the 15cm segments of each duck. The segment in each duck observed to contain the most abundant parasites, was considered for data analysis. In order to identify and classify the parasites, they were stained with Semichon Acetic Carmine, destained with 70% alcohol, dehydrated with 100% alcohol, cleared with Xylene and mounted using Kleermount. I found that in most first segments of the ducks’ GI tract, there was a vast amount of parasites that inhabited them. The hypothesis is supported, which indicates that there is an abundance and diversity of parasites inhabiting the GI tracts of the ducks.
11. COMPARISON OF ESCHERICHIA COLI 0157:H7 WITH A LABORATORY STRAIN ON THEIR ABILITY TO COLONIZE PRODUCE
Karenzha Huwae
*Dorothy Wrigley, Faculty Mentor (Department of Biological Sciences)*

Foodborne outbreaks associated to the contamination of fresh produce by Escherichia coli (EHEC) O157:H7 are a growing concern. Leafy-green vegetables such as spinach and lettuce are vulnerable to contamination through irrigation water, storage practices, and food processing via cross contamination. I hypothesized that EHEC would adhere to lettuce better than a laboratory strain of E. coli (Ecls). Survival and adherence of E. coli was determined by inoculating known numbers of the different strains onto pieces of washed lettuce, then storing the lettuce at 4°C for 24 hours. After washing to remove non adhered bacteria, the number of adherent bacteria on the lettuce was determined by a plate count. The results did not support the hypothesis. While both strains exhibit concentration dependent adherence, more Ecls adhered than EHEC. 30 to 100 % of the Ecls was recovered at 24 hr while less than 20% of the EHEC was recovered. A greater percentage of low concentration inocula adhered than higher concentrations. Thus, EHEC will adhere to lettuce in a refrigerator but it does not do as well as laboratory strains. This difference may help in the development of washing procedures to ensure that this pathogenic bacterium is removed from lettuce prior to sale to consumers.

12. STEATOSIS INDUCED BY A HIGH FAT DIET IN MALE MICE LIVERS
Rachael Yates Swedberg
*Steven Mercurio, Faculty Mentor (Department of Biology)*
*Courtney Kupser, Graduate Student Mentor (Department of Biology)*

It is well known that chronic alcohol use can reduce the function of the liver in ways of scarring and reducing its ability to rid itself of lipids- leading to a fatty liver also known as the condition steatosis. It is less know that a high fat diet can cause the same effects. With the prevalence of high fat diets with availability of fast food and the rise in obesity the effects of a fatty liver have become relevant. To display this two groups of male mice were compared in a sub-acute study, one with a normal diet of 4% fat, and the other with a high fat diet of 11%. Densities of the liver, the ratio of mass of liver to overall body mass, color or visual lipid content were compared. Although the livers of the normal diet had a high variation of different colors marbling was seen only in the high fat livers supporting the hypothesis. The ratios of comparing the overall liver mass and body mass show have shown that the livers in the high fat diet are actually smaller than that compared to those of the normal diet but its densities had a lower p-value showing a high significance in difference. These two considerations of a smaller, denser liver could be due to hyperplasia and, if done in a chronic study, may show cancer.
13. IDENTIFICATION OF PROTEINS IN THE PIGMENT DISPERSION FACTOR PATHWAY (PDF) FOR GENETIC BEHAVIOR IN FRUIT FLIES (DROSOPHILA MELANOGASTER)
Laura Boon & Nilsu Demirci
Daniel Toma, Faculty Mentor (Department of Biology)
Adam Voss, Graduate Student Mentor (Department of Biology)

Fifty years ago, Dr. Jerry Hirsch discovered there is a genetic basis for complex behavior of fruit flies using flies selected for an extreme response to gravity (geotaxis). Geotactically positive fruit flies will tend to go toward the direction of gravity (Lo), and negative individuals will travel against gravity (Hi)- through a vertical (T-choice) maze. These flies were subsequently used as models for the genetic basis of complex behavior. Toma et al. found a significant effect of the Pdf protein in the response to geotaxis. Flies unable to make this protein are geotactically high (negative). We identified several proteins in the literature that interact with Pdf and obtained fly lines mutant (unable to make) these proteins. These are each being bred into a geotactically neutral laboratory line (CS) to test the effect of these proteins on geotaxis. We ran the CS through the maze as a control, and we have begun to run the CS with the individual mutations through. From the direction chosen by the flies, we hope to establish a relationship between the particular proteins affecting geotaxis behavior.

14. INTRACELLULAR LOCALIZATION OF THE NOVEL POLYGLUTAMINE PROTEIN FAM171B – SEARCHING FOR LOCALIZATION USING A RECENTLY AVAILABLE ANTIBODY
Bradly Pape & Allison Helget
Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)

FAM171B contains a polyglutamine (polyQ) region within its primary amino acid sequence. Proteins containing polyglutamine mutations have been linked to numerous severe neurodegenerative disorders. In such polyQ disorders, the glutamine sequence extends beyond normal range leading to specific cell loss within the brain and consequent disease. Whether the newly identified polyQ protein FAM171B will ever be linked to a disease is unknown; however, because of their common role in neurodegenerative disease polyQ proteins in general are fascinating. Furthermore, discovering the function of a novel human protein from its localization will advance the field of cellular biology. In this study, we are interested in characterizing the functional role FAM171B plays in cells. This lab has attempted to find the localization of FAM171B in two previous attempts. In the first experiment, we constructed a FAM171B-GFP fusion protein and performed fluorescent microscopy studies to identify its intracellular localization within tissue culture cells. We found that FAM171B-GFP displays a vesicular staining pattern throughout the cytoplasm of cells. However, in an effort to verify this localization using a different standard biological technique, called immunofluorescence, our results showed a strong localization to structures in the nuclei that appear to be the nucleoli, as well as potential co-localization with mitochondria. To definitively determine the intracellular localization of FAM171B, we will employ a standard cell biological assay called immunofluorescence using a newly available antibody. At the conclusion of these experiments, we should have high quality data regarding where our unknown protein, FAM171B, localizes to within cells.
15. EFFECT OF REDUCED NITRIC OXIDE ON KIDNEY SODIUM HANDLING IN FEMALE RATS
Kaleb Short
Penny Knoblich, Faculty Mentor (Department of Biological Sciences)

Nearly 1 billion people suffer from hypertension, or high blood pressure. An estimated fifty percent of postmenopausal women experience moderate to severe hypertension and hypertension is one of the most common complicating medical conditions in pregnancy, which makes it of particular importance in women. Decreased sodium excretion, or pressure natriuresis, is observed in all instances of hypertension. Pressure natriuresis refers to the elimination of sodium by the kidneys in response to a rise in blood pressure. Failure to eliminate sodium promotes increased blood volume and blood pressure. Endothelial dysfunction, which refers to a diseased endothelium (the innermost lining of the blood vessels), has been found in many forms of hypertension, including both postmenopausal and pregnancy hypertension. Nitric oxide (NO), a vasodilator which lowers blood pressure, is released by a healthy endothelium, but impaired in dysfunction. This study seeks to investigate the relationship between endothelial dysfunction, pressure natriuresis, and hypertension, particularly in females. This will be accomplished through monitoring acute changes in urinary sodium excretion in response to a rise in blood pressure in 10 WKY strain female rats, produced by either artery ligations (tying off arteries), or by the administration of L-NAME a compound that inhibits the production of nitric oxide. This study should provide data that yields insight into the nature of hypertension in female subjects. Data collection and analysis will continue through the end of March. Thus far, mean arterial pressure in resting WKY rats has been found to be 100 mmHg, increasing to 125 mmHg with vessel ligation. A comparable rise in blood pressure will be produced by L-NAME infusion, and the resulting sodium excretion will be compared between the two groups.

16. EFFECTS OF ULTRAVIOLET RADIATION ON THE BROWN MIDRIB MUTATION IN SORGHUM BICOLOR AND ZEA MAYS
Maegan Cross
Christopher Ruhland, Faculty Mentor (Department of Biological Sciences)

Identification of feedstock for cellulosic ethanol is important if the Federal Biofuels Mandate for displacing 30% of petroleum consumption by 2030 is to be met. Ideally, feedstock should contain high amounts of structural carbohydrates while maintaining low concentrations of lignin in the cell walls of plants. The Brown Midrib (BMR) mutation in Sorghum bicolor (sorghum) and Zea mays (corn) have been proffered as potential candidates because they have lowered expression of cinnamyl alcohol dehydrogenase and caffeic O-methyl transferase enzymes involved in lignin production. However, the precursors of lignin are important in absorbing potentially-damaging ultraviolet (UV) radiation in the epidermis of plants. We examined how UV influenced production of UV-screening compounds, chlorophyll fluorescence, growth and cell wall constituents in BMR-corn and -sorghum. Plants were grown in a UV-transparent greenhouse under filters that either attenuate (mylar) or transmit (aclar) ambient UV. Over the course of 57 days we examined epidermal screening of UV with a pulse-amplitude modulated fluorometer and the quantum yield of photosystem II (PSII) electron transfer (ΦPSII) and the ratio of the variable to maximal fluorescence (Fv/Fm) with a chlorophyll fluorometer. Corn growing under mylar had 17, 12 and 9% greater epidermal UV-transmittance, ΦPSII and Fv/Fm values, respectively, than those under aclar. Sorghum growing under mylar had 21 and 10% greater epidermal UV-transmittance and ΦPSII values, respectively than those under aclar. In addition, these plants were >15% taller. It appears that the BMR mutation may potentially compromise the UV-screening ability of these plants and could potentially impact theoretical ethanol yield.
In the bacterial genus Photorhabdus, there is a gene, lip1, which encodes the expression of a lipase. A similar gene found in Salmonella is regulated by phosphate limitation. The Lip1 promoter is also found in E. coli and regulated by growth phase of the bacteria. However, it is not known what regulates the lip1 gene in the genus Photorhabdus. The importance of the research is to further our understanding of how the Lip1 promoter works. In my research, I grew the bacteria Photorhabdus with a plasmid for the Lip1 promoter that contained regions for beta-galactosidase expression and Kanamycin resistance. Attempts to move this plasmid into a wild-type background failed so another strain was used which already contained the plasmid. I utilized the beta-galactosidase expression to run simple chromogenic assays of the plasmid under different conditions. The conditions I used were variations in growth phase, glucose and phosphate limitation, and rich versus minimal media. I found that there was no effect of glucose or phosphate limitation on Lip1 expression. There was some indication of a growth phase effect and notable differences in some media used. Lip1 expression was reduced in certain rich media, such as Tryptic Soy Broth, LB Broth, and Brain Heart Infusion Broth.

The North American plant genus Packera is a member of the Asteraceae (Sunflower Family). Most of the approximately 70 Packera species are morphologically distinct and occur in different geographic areas or microhabitats. However populations of the widespread, P. paupercula complex are variable in morphology, chromosome number, and ecological requirements. One undescribed group of tetraploid populations currently recognized in P. paupercula occurs in the Upper Midwest and Canada, including northern Minnesota. These “Northern Tetraploids” may merit recognition at the species or varietal level. Northern Tetraploids are very similar in morphology to other diploid members of the P. paupercula complex in our region (varieties paupercula, savannarum, and pseudomentosa) and to P. plattensis a tetraploid prairie species found in western Minnesota. As part of a larger study that seeks to describe and classify the Northern Tetraploids, I measured 13 characters on 82 herbarium specimens that include these six Packera taxa. I used one way Analysis of Variance (ANOVA) to determine which characters best differentiate the taxa. While no one character will differentiate among all taxa, mean flowering date, involucre length, ray length, and ratios derived from basal leaf measurements were significantly different in some pairwise comparisons. Used in combination, these characters will provide useful information for biologists attempting to identify these taxa in the field. Furthermore, naming a new species or variety requires valid publication that includes a thorough morphological description and a key to related species. My work provides a foundation for this component of the publication process.
19. BLACK CRAPPIE POPULATION DEMOGRAPHICS IN RELATION TO CONNECTIVITY IN MINNESOTA RIVER BACKWATERS
Michael Wolf
Shannon Fischer, Faculty Mentor (Department of Biological Sciences)
Brett Nelson, Graduate Student Mentor (Department of Biological Sciences)

Population dynamics of black crappie Pomoxis nigromaculatus are influenced by various abiotic factors. Black crappie recruitment is variable, making the management of populations difficult. Connectivity to backwater and floodplain habitat is thought to impact black crappie river populations. In the Minnesota River Basin, channel incision and floodplain development continue to threaten connectivity to backwaters. The objective of this study was to assess black crappie population demographics in three backwaters of the Minnesota River (Anderson, St. Peter, and Harris), each with differing connectivity. Black crappie (N=200) were captured from backwaters using trap nets during the summer of 2012. Black crappie population demographics will be evaluated against multiple hydrological variables produced by the Indicators of Hydrologic Alteration program. Linear regression models will allow for inferences on the impacts of varying degrees of connectivity with the main channel. As a result, this study could be used to identify relationships between black crappie demographics and hydrology in the Minnesota River. This will facilitate insight on management of black crappie populations in Minnesota River backwaters.

20. INTRACELLULAR LOCALIZATION OF FAM171B-GFP USING DIFFERENT FIXING TECHNIQUES
Brian Gilbert & Steven Gilbert
Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)

The main focus of our research is on the protein FAM171B. This protein was recently coded in a huge effort by the human genome project that coded the entire human genome. The little amount of information that is actually known about this protein is what makes it so interesting. It has a repeating protein sequence known as a polyQ region similar to neurodegenerative diseases such as Huntington’s. We have no information on the cellular presence of the protein, but finding the intracellular location of an unknown protein will help describe the function it has within the cell. Using the vector FAM171B-GFP we transferred it into cultured cells by using a standard cell biological technique called transfection. We used three different fixing agents’ paraformaldehyde, methanol, and acetone to see where the fusion protein localized within the cell. From past experiments in our laboratory we have found a cytoplasmic vesicular staining pattern after fixing with methanol. We are comparing the results of the different fixing agents to see where the protein localizes within the cell, but due to inconclusive results thus far more testing is needed. Using the future results we will be able to conclude with certainty where the protein is expressed inside the cell.
21. DOES KIAA1946 MISLOCALIZE TO POLYGLUTAMINE DISEASE INCLUSION BODIES?
James Gilbert
Geoffrey Goellner, Faculty Mentor (Department of Biological Sciences)

We are interested in the protein KIAA1946 for a couple of reasons. First it’s novel protein that was recently translated from our genome. This means that there is new information available as far as how this protein is involved in our cellular function. Secondly, the protein contains a region known as a polyQ region. Some of the proteins that contain a region such as this are associated with neurodegenerative diseases, such as Huntington’s and Spinocerebellar Ataxia. This polyQ region can expand beyond normal lengths leading to the disease state. So KIAA1946 could be associated with a neurodegenerative disease. Spinocerebellar Ataxia is caused by the diseased protein sca7, which has longer than normal polyQ region. In its diseased state sca7 forms inclusion bodies that mislocalize inside the cell. We are interested if our protein of interest KIAA1946, in the presence of sca7 will also mislocalize to these inclusion bodies. We used a process known as immunofluorescent microscopy to observe where the proteins localized. This involves tagging the proteins with an antibody that contains a region that fluoresces when exposed to a certain wavelength of light. We were then able to photograph and observe where the proteins are located. The data has suggested that our protein of interest KIAA1946 does not mislocalize to sca7 inclusion bodies. Our results show that our protein of interest does not cause a disease state in the way sca7 does.

22. FUNCTION OF NEPHRIDIAL BACTERIA
Mabin Sainju
Dorothy Wrigley, Faculty Mentor (Department of Biological Sciences)

Function of Nephridial bacteria Abstract The osmoregulatory organs in earthworms, the nephridia, contain symbiotic bacteria, Verminephrobacter sp. The bacteria could be aiding the worms survive stressful environmental conditions like increased salts and nitrogen compounds. The hypothesis of the project is that the symbionts help the earthworms cope with extreme conditions. Adult earthworms were treated with antibiotics to cure them of their nephridial symbiont. The success of the treatment was assessed by staining the nephridia with a non-specific acridine orange stain and a Verminephrobacter specific fluorescent in situ hybridization (FISH) stain. Once the procedure for curing was found, earthworms were treated and allowed to recover from the treatment. Then, treated and untreated worms were placed in increasing concentrations of NaCl solutions or NH4Cl solutions. Antibiotic treatment for 4 hours per day for 4 days was able to cure the worms of the symbiont as determined by both the acridine orange stain and the FISH stain. Treated earthworms tried to escape the 3% NaCl solution, while the untreated worms stayed in contact with the liquid. Tests with increased NH4Cl are on-going. The few worms tested do not allow firm conclusions. But, they may indicate that earthworms find stressful conditions less difficult if the symbiont is present.
23. BONE MICROVASCULATURE OF MALE MICE WITH REDUCED TESTOSTERONE LEVELS
Katie Sonnabend & Nick Jobeun
Michael Bentley, Faculty Mentor (Department of Biological Sciences)

Bone is a highly vascular structure that is dependent on local blood supply for its proliferation, tissue remodeling capability and hence its sustainability. Bone growth was reduced in research involving ovariectomized mice with deficient estrogen levels. This reduction is correlated with a loss of vital blood supply and further supports previously established physiological relationships between estrogen deficiency and the onset of osteoporosis. While the link between osteoporosis and estrogen has been extensively studied, less research has been conducted on the correlation between osteoporosis and testosterone suppression. Since the structure of testosterone is very similar to that of estrogen, it is also believed to play a role in maintaining vasculature tissues. As a result, it is probable that testosterone suppression influences osteoporosis. Dissolving skeletal fragments in KOH and isolating the subsequent casts of plastic (Mercox resin) infused bone microvasculature from normal type mice has allowed us to establish a standard density and configuration of these tissues. Microscopy reveals notable vascular density and branching as well as maintenance of compact bone. The structure and integrity of these tissues suggest their ability to thrive under normal conditions. By obtaining and isolating bone microvasculature in castrated male mice with testosterone deficiencies we will be able to make comparisons to normal tissue and explore the possibility of a link between testosterone and vascular maintenance. Ultimately, we hope to provide further evidence for or against the link between testosterone suppression and osteoporosis.

24. EXAMINING THE INTERACTIONS OF DECANAL AND TRANS-2-DECENAL WITH VARIOUS NUCLEOTIDE BASES
Neil Ranals
Danae Quirk Dorr, Faculty Mentor (Department of Chemistry and Geology)

Chemical reactions from biological and synthetic factors often form adducts with DNA. According to K.A. Naidu, decanal and trans-2-decenal have been touted to potentially possess anti-cancer properties. The purpose of this research was to explore whether either of these aldehydes lead to the formation of adducts with DNA. These aldehydes were dissolved in deuterated dimethyl sulfoxide (d6-DMSO) with and without the presence of arginine and treated with the nucleotide bases 2’-deoxyadenosine and 2-deoxyguanosine. After heating, precipitate was removed by filtration and reaction mixtures were analyzed using 1HNMHR and HPLC. Decanal and trans-2-decenal were also allowed to treat calf thymus DNA. This reaction was heated at 50°C. Following acid hydrolysis, the reaction mixture was also analyzed by HPLC. Identifying and further characterizing adducts that form will ultimately allow further research into the chemo preventive or carcinogenic properties of these aldehydes.
25. THE EXPRESSION OF AT1R IN HYPERTENSIVE MALE AND FEMALE RAT KIDNEYS
Sonika Sainju  
Theresa Salerno, Faculty Mentor (Department of Chemistry and Geology)

Hypertension is a risk factor for heart attacks and end stage kidney failure. Angiotensin II (AII) is a protein, which participates in the reabsorption of the filtered sodium from the lumen so it helps control Blood pressure. Its physiological function is mediated by binding, Angiotensin II receptor 1 (AT1R). The blocking of AT1R lowers blood pressure and its expression can be controlled at both the mRNA and protein levels. Preliminary studies suggested that the expression of a microRNA, miR-155, negatively correlates with blood pressure and could control the expression of AT1R. A Real Time Quantitative Polymerase Chain Reaction (qPCR) method was developed to measure mRNA expression of AT1R in spontaneously hypertensive (SHR) male rats versus SHR female rats. Total RNA was isolated from rat kidney and its quality and quantity was assessed. Reverse transcription was performed to obtain cDNA from the RNA samples. The reverse primers, forward primers and probes for the targets; β-actin and AT1R were designed, and relative quantitation was measured using the ΔΔCt method. Preliminary data suggested differences in the relative expression of AT1R in the female vs. male SHR kidneys. A reverse transcription/ qPCR method was successfully developed to measure miR-155 in kidney tissues. Future work will test whether differences in miR-155 expression correlate with AT1R protein expression using the Western Blot technique.

26. EFFECTS OF MECHANICAL WOUNDING ON THE EXPRESSION OF PEA LEAF LIPOXYGENASE ISOFORMS
Briana Frolov  
Theresa Salerno, Faculty Mentor (Department of Chemistry and Geology)

Lipoxygenases (LOX) are enzymes that catalyze the addition of oxygen to polyunsaturated fatty acids. In plants, the hydroperoxides contribute to defense against foreign pathogens. Previous work has implicated the role of the LOX enzyme. Genetic studies have shown several pea LOX isoforms exist, but only LOX N2 has been implicated in the pathogenesis response. A better understanding of LOX isoforms that are induced in these responses would be valuable in providing pesticide alternatives. This research was to examine how wounding affected the expression of LOX1: PS1, LOX1:PS7 and LOX g. Three sets of pea plants were grown in a controlled growth chamber at 22 degrees with 12 hours of light. Four leaves on seventeen day-old plants were wounded with a hemostat and then were frozen in liquid nitrogen 0, 3, 6, 12 and 24 hours after wounding. Controls (non-wounded leaves) were also collected and frozen for each time point. RNA was isolated from the frozen leaves using RNeasy Plant Mini Kit (Qiagen). The quality and quantity of each RNA sample was assessed spectrophotometrically. The RNA samples were then converted to cDNA in reverse transcription using High Capacity cDNA RT Kit (Life Technologies). The subsequent cDNAs were then used for qPCR. The delta delta Ct method was used to assess relative expression using EF-1alpha as the endogenous control. The experiment was repeated twice. The data was compiled to give averages and standard deviations. All the isoforms tested were significantly induced with wounding with maximal expression twelve hours after wounding.
27. PHOTOPRODUCED REACTIVE SPECIES IN NATURAL WATERS: INFLUENCE OF CHROMOPHORIC DISSOLVED ORGANIC MATTER PROPERTIES
Kurtis Malecha
John Thoemke, Faculty Mentor (Department of Chemistry and Geology)

Chromophoric Dissolved Organic Matter (CDOM) is prevalent in natural waters and is the byproduct of natural decay processes. Prior work shows that CDOM properties depend on the sources, and in many cases, two main types of CDOM exist, which are microbial and terrestrial. The former comes from biological activity of microscopic organisms in the water, while the latter is from decayed terrestrial plant material. When CDOM absorbs sunlight, it has the capability to produce several different species, which are highly reactive. Molecular singlet oxygen and the excited triplet state of CDOM were the reactive species studied in this project. Each of these potentially provides a “pathway” for the decomposition of pollutants, which can lead to byproducts that are potentially more benign or more toxic; depending on the specific reaction mechanisms. Prior evidence suggests a correlation between the CDOM source properties and the relative amounts of the different reactive species produced. Knowledge of the specific reactive species that will be produced in a natural water sample will allow more accurate predictions about the decomposition products of specific pollutants. For this project, correlations between optical characteristics of the CDOM (using UV-Visible absorbance and excitation-emission spectra) and the relative amounts of reactive species that are produced by a CDOM sample were performed. Preliminary results are consistent with previous work and suggest that terrestrially-dominated waterways produce lower yields of these reactive species, compared to waterways dominated by microbial CDOM.

28. EFFECT OF DROUGHT ON THE EXPRESSION OF LIPOXGENASE ISOFORMS IN PEA LEAVES AND ROOTS
Farjana Siddika
Theresa Salerno, Faculty Mentor (Department of Chemistry and Geology)

In the agricultural field, plant productivity has been threatened by drought stress. Previous research studies have shown some stress responsive genes involve in the jasmonic acid signaling pathway. Lipoxygenase (LOX) was found to be a key enzyme involved in the jasmonic acid biosynthesis pathway. It catalyzes the hyperoxidation of polyunsaturated fatty acid with a cis, cis-1,4 pentadiene structure. Then the products of hyperoxidation reaction are converted to different oxylipins. LOX activity changes with stress but limited research has been done with specific LOX isoforms. The expression of one chickpea LOX isoenzyme was upregulated in simulated drought conditions. The aim of this study was to find out whether three of the pea lipoyxgenase isoforms are induced by drought in pea roots and leaves. Sixteen days old pea seedlings with an average of eight-ten leaves were exposed to drought stress for five days. After that, leaves and roots were harvested from five different pea plants and quickly frozen in liquid nitrogen at -80oC. RNAs were purified from stressed (drought) and non-stressed (control) pea (Pisum sativum) roots and leaves using RNeasy mini kit (Qiagen). The total RNA molecules were reverse transcribed using the cDNA (Applied Biosystems). The expression of LOX N2, LOX N3, and Ps7 were determined by qPCR analysis using EF1α as the house keeping gene. It is expected that one or more of these pea LOX isoforms will be induced by the drought treatment.
29. **QUANTIFYING HYDROXYL RADICAL IN NATURAL WATERS: AN IMPORTANT PATHWAY FOR POLLUTANT DEGRADATION**

Andria Sellner  
*John Thoemke, Faculty Mentor (Department of Chemistry and Geology)*

In recent years the increased use of pharmaceuticals, pesticides, and other chemicals has become a concern for the future of natural waters. Specifically, there is growing concern over the interaction of chemicals with reactive oxygen species. Reactive oxygen species are highly reactive short-lived molecules that include oxygen. One type, the hydroxyl radical, was the focus of this study. The presence of hydroxyl radical in natural waters has been determined but its high reactivity makes it difficult to isolate and quantify. Its role in the degradation of certain chemicals has resulted in byproducts that can be more toxic than the original compound. In natural waters, the hydroxyl radical is formed through the action of sunlight on nitrate or dissolved organic matter. In this study, the hydroxyl radical was created in controlled experiments exposing nitrate to ultraviolet light. Terephthalic acid was used as a probe to detect the hydroxyl radical. When combined with the hydroxyl radical, the terephthalic acid forms 2-hydroxyterephthalic acid, which can be measured using high performance liquid chromatography with fluorescence detection. This was quantified using high performance liquid chromatography with fluorescence detection. The amount of 2-hydroxyterephthalic acid was directly related to the amount of hydroxyl radical. With a successful way to quantify the hydroxyl radical, it will be possible in future studies to determine, in more detail, the role of hydroxyl in the degradation of specific pharmaceuticals in natural waters.

30. **REACTIONS OF SINGLET OXYGEN WITH FREE AMINO ACIDS**

Danielle Hron  
*John Thoemke, Faculty Mentor (Department of Chemistry and Geology)*

Molecular singlet oxygen is important to many biological processes including cell death. Some of these processes are caused by changes in protein structure and function that can be induced by reaction with singlet oxygen. To study aspects of this process, reactions between singlet oxygen and amino acids are being examined. Under visible light irradiation, Rose Bengal (RB) is used as the source of singlet oxygen and furfuryl alcohol (FFA) is used as a molecular probe to measure singlet oxygen concentration. First, a solution is made of RB and FFA. It is then exposed to visible light to initiate the production of singlet oxygen. From this solution, samples are taken at various times to measure the concentration of FFA using high performance liquid chromatography. As irradiation proceeds, the concentration of FFA diminishes due to the reaction with singlet oxygen. When added to the irradiated solution, an amino acid that reacts with singlet oxygen will compete with FFA, and the rate of FFA consumption will be slower. This was found to be true when histidine was added to the solution. Histidine was predicted to be reactive with singlet oxygen; the elevated concentration of FFA remaining in solution supports this prediction. Through analysis of the reaction kinetics, rate constants for the reactions between amino acids and singlet oxygen were determined. In future studies, reactions between singlet oxygen and specific proteins will be examined to determine if differences in protein structure affect reactivity.
31. COMPLETE SUBSTITUTION OF CALCIUM BY LANTHANUM (III) IN SYNTHETIC CALCIUM VANADATE APATITE
Hilary Deragisch & Nicole Stenzel
Lyudmyla Stackpool, Faculty Mentor (Department of Chemistry and Geology)

Apatites form a large group of solid isomorphs with the general formula $M_5(EO_4)\_3X$ where $M$ was univalent to trivalent cations (Ca, Sr, Ba, Cd, Eu, La, Na, K, and others); $E$ was tetravalent to hexavalent cations (P, V, As, Si, Ge, S, Cr, and others); and $X$ represented anions (OH, F, Cl, Br, I, and $O^{2-}$). Apatite compounds are widely studied due to the possibility of their use as biomaterials [1], catalysts [2], luminescent materials [3], and ionic conductors [4]. Calcium oxovanadate apatite $Ca_{10-x}La_x(VO_4)\_6\_F\_1-x/2O_{1+x/2}$ modified by lanthanum is the only one whose electrical properties are described in literature. As shown in [5] oxygen vacancies make oxide-ion conductivity possible along the c axis of the hexagonal matrix. The electric conductivity of lanthanum hydroxovanadates $Ca_{5-x}La_x(VO_4)\_3(OH)_{1-x}O_x$ modified by REE (rare earth elements) has not been studied yet. However, it was shown in [6] that the electrical conductivity may grow more than an order of magnitude due to heterovalent substitutions in the apatite structure. In this work we have studied the isomorphic substitution of $La^{3+}$ for $Ca^{2+}$ in hydroxovanadate with apatite structure under the scheme: $Ca^{2+} + OH^{-} \rightarrow La^{3+} + O^{2-}$ in order to refine the limits of isomorphic substitutions which were reported earlier [7] as $0<x<0.65$. Isomorphic substitutions in system $Ca_{5-x}La_x(VO_4)\_3(OH)_{1-x}O_x$, were studied by X-ray powder diffraction analysis. Samples were prepared by nitric-tartaric solutions method and calcined at final temperature of 750°C. In the system $Ca_{5-x}La_x(VO_4)\_3(OH)_{1-x}O_x$ complete solubility was found ($0<x<1.0$). This result is in a good agreement with relative size factor (less than 8% for complete solid solutions). The difference in atomic radii of two ions $Ca^{2+}$ and $La^{3+}$ is 3.2%.

32. DO ALDOSTERONE LEVELS AFFECT THE EXPRESSION OF MR IN RAT KIDNEYS?
Alec Ganske & Clayton Miller
Theresa Salerno, Faculty Mentor (Department of Chemistry and Geology)

Aldosterone release can be triggered by increased angiotensin II concentration in blood, low blood osmolality and low blood pressure. Aldosterone exerts its effects through binding to mineralocorticoid receptors (MR). The binding of aldosterone to MR causes a shift in ion flow in the distal convoluted tubule of the nephron, a net gain of sodium ($Na^+$) ions and a net loss of potassium ($K^+$) ions. The net gain of $Na^+$ causes water to be absorbed via osmosis, which, in turn, leads to higher blood volume and blood pressure. Recently, microRNAs (miRNAs) have been implicated in regulation at the post-transcriptional level. The project objective was to see if the expression of the kidney MR mRNA and/or protein were altered in both female and male SHR rats with different aldosterone levels and to see if this correlated with changes in the expression of microRNA 135a. MicroRNA-135a has already been linked to MR regulation in cell culture. After isolation, the RNA samples were quantified, analyzed by gel electrophoresis, and the RNAs were reversed transcribed. The relative expressions were determined using qPCR and analyzed by the delta delta Ct method. MR protein expression was quantified by developing a two-dye Western Blotting method. The results of the initial RT-qPCR of MR and miR-135a are inconclusive; however, there is a trend toward lowered MR expression in the female SHR rat kidneys with lowered aldosterone. It is expected that differences seen in miR-135a expression will correlate with MR protein differences.
33. RE(VII) REDUCTION IN THE PRESENCE OF SORBED Fe(II): PLAUSIBLE REMOVAL PATHWAY IN SUBOXIC POREWATERS

Clayton Wagner, Paul Yanez, & Megan Maloney
Trenton Vorliecek, Faculty Mentor (Department of Chemistry and Geology)

Re deposition is generally thought to involve reduction. Unfortunately, the pathway to Re removal remains unclear. Authors purport Re sequestration begins in suboxic (absence of oxygen and sulfide) environments; others produce evidence supporting removal under anoxic (presence of sulfide) conditions. This research aims to clarify such issues by positing a plausible to Re fixation in suboxic sediments. While reduction of Tc(VII) is known to be strongly favored in the presence of alumina-sorbed Fe(II), analogous behavior for Re(VII) has not been established. Preliminary glovebox experiments involve reacting 10 µM ReO₄⁻ at pH=7.0 in the presence of 100 µM Fe(II), hydrated δ-alumina, or hydrated δ-alumina previously exposed to 100 µM Fe(II). At various times, aliquots of test solutions are filtered (0.45 µm) and ReO₄⁻ quantified using reverse phase ion pair chromatography with suppressed conductivity detection. For comparison similar experiments involving Mo(VI) (MoO₄²⁻) will also be performed and presented.

34. PREPARATION OF ARYL DIETHYL PHOSPHATE ESTERS

Selam Mebratu
Michael Lusch, Faculty Mentor (Department of Chemistry and Geology)

When reducing simple phenols to a desired aromatic hydrocarbon in synthetic chemistry, the 2-step Kenner and Williams method was a reliable method. Step one of this method converts the phenol to an aryl diethyl phosphate ester. This step however uses the banned, ozone depleting, Carbon Tetrachloride. So an alternative chlorinating reagent must be found. N-Chlorosuccnimide (NCS) is the examined substitute, which is shown to work in previous studies in the laboratory of Dr. Michael J. Lusch. The concern for this experiment is that previous articles cited within the Kenner and Williams method attempted to reduce methyl salicylate and received only 20% yield. The phenol used for this researched experiment was phenyl salicylate, which is a similar molecule except replacing a methyl group with an aromatic ring. So my experiment attempted to convert phenyl salicylate to an aryl diethyl phosphate ester using the NCS method. After going through the reaction and going through the purification, such as rotary evaporator and flash chromatography, the sample is put in a NMR. The crude yield was95%, and using the both H-NMR and C13-NMR, it was determined that the desired 2-(carbo phenoxy) phenyl diethyl phosphate was present and fairly pure. Although the desired compound was made successfully, that was only step one of the Kenner and Williams method and these results cannot be compared until we complete step 2. Further experimenting to find an alternative to step 2 is needed to complete this method and finish the comparison, but the results look promising.
35. X-RAY DIFFRACTION AND SCANNING ELECTRON MICROSCOPE FINGERPRINTING OF REGIONAL FINE SEDIMENT SOURCES
Ryan Bonney
Chad Wittkop, Faculty Mentor (Department of Chemistry and Geology)

Blue Earth Clay (BEC) is a bluish green siltstone sediment layer found locally and contained within the lower Cambrian-Ordovician boundary of geologic time. This siltstone plays a large part in the namesake of Blue Earth County. Historical outcrops have since eroded away and BEC exposures are now only known to be in a confined area west of Mankato, near South Bend, MN. Using the X-ray Diffractometer (XRD), local sediment sources have been sampled and analyzed for comparison with known BEC samples. The XRD produces a unique mineral structure fingerprint that can be used to assess relationships between fine sediment samples. These data are used to define possible BEC sediment sources and to explain the apparent regional restriction of this locally isolated sediment layer. Thus far, the BEC samples have been compared with samples from a local Cambro-Ordovician dolostone exposure. Removing the carbonate component of the dolostone before analysis allowed the XRD to detect finer sediment components. This was done to determine if the dolostone is a likely source material for the formation of regional siltstones including the BEC. Fine sediment layers found near the base of this dolostone exposure have also been analyzed with the XRD and have been compared to the mineral signatures found in the BEC. Preliminary data suggests similarities between BEC samples and dolostone-associated fine sediment suggesting common sources for the two independent sediment layers.

36. EFFECT OF METHYL JASMONATE ON THE EXPRESSION OF LIPOXYGENASE 5 IN SOYBEAN LEAVES
Sharmin Hossain
James Rife, Faculty Mentor (Department of Chemistry and Geology)

Lipoxygenases (LOX) are enzymes that catalyze the peroxidation of polyunsaturated fatty acids. Multiple LOX isoenzymes are present in plants. They function in growth and development, senescence, defense against pathogens and pests. Each isoenzyme plays a definite role within the plant at different stages of development. Plants produce jasmonic acid (JA) and methyl jasmonate (MJ), in response to stress such as wounding. The jasmonates play a role in the plant’s response to wounding by stimulating the synthesis of toxins which serve as mediators in defense mechanism. Studies have shown that wounding or treatment with MJ affects the expression of some LOX isoforms. This study investigated the effect of wounding and MJ on the expression of LOX 5 in soybean plants. Soybean plants were grown in a growth chamber. When plants reached the biofoliate stage, leaves in one set of plants were wounded with a hemostat, one set was exposed to MJ, one set was wounded and exposed to MJ and a control set was not treated. Leaves were harvested at 0, 3, 7 and 24 hours after treatment. RNA was isolated using the RNeasy Plant Minikit from Qiagen. Quality and quantity of the RNA was assessed by measuring the absorbance at 260 nm and 280 nm. DNA copies of the isolated mRNA were made by reverse transcription using High-Capacity cDNA Reverse Transcription Kit from Applied Biosystems. The relative quantities of LOX 5 DNAs in the samples were determined using Q-PCR. SYBR green was used to detect the PCR products.
37. INVESTIGATING THE REACTIVITY OF CITRAL AND OCTANAL TOWARD DNA
Brittany Leeder
Danae Quirk Dorr, Faculty Mentor (Department of Chemistry and Geology)

Citral and octanal are compounds found in citrus fruits, grasses and perfumes. It has been found that aldehyde groups can react with the nucleotides of DNA and form covalent linkages. Since citral and octanal are aldehydes, they were allowed to react with DNA. This project has been localized around exploring the potential products that form when DNA and its nucleosides 2’-deoxyguanosine and 2’-deoxyadenosine react independently with octanal and citral. The reaction mixtures were analyzed by HPLC and NMR.

38. THE STUDY OF THE EFFECTS OF P-ANISALDEHYDE AND 3,4-DIMETHOXYBENZALDEHYDE ON 2’-DEOXYADENOSINE AND 2’-DEOXYGUANOSINE
Jenna Bowman
Danae Quirk Dorr, Faculty Mentor (Department of Chemistry and Geology)

Normal cells in the human body grow, divide, and then die very uniformly. If the normal cell’s DNA is damaged, the cell will either repair it or die. Aldehydes have been shown to induce the cell’s ability to repair damaged DNA. The analysis of p-anisaldehyde and 3,4-dimethoxybenzaldehyde’s ability to induce this repair is the goal of this research. The focus of this project was to synthesize possible products of these aldehydes with 2’-deoxyguanosine and 2’-deoxyadenosine. p-Anisaldehyde was allowed to react independently with 2’-deoxyguanosine and 2’-deoxyadenosine in dimethyl sulfoxide at 50OC for 24 hours. 3,4-Dimethoxybenzaldehyde was also allowed to react independently with 2’-deoxyguanosine and 2’-deoxyadenosine under the same conditions. Following the initial reaction 1H NMR spectra were analyzed and the reactions were repeated at 70OC for 48 hours. In addition, a DNA dissolved in Tris buffer was also allowed to be treated with each aldehyde at 40OC for 48 hours. After acid hydrolysis, all reaction mixtures were analyzed by HPLC.
39. TWO-DIMENSIONAL GEL ELECTROPHORESIS ANALYSIS OF SOYBEAN LEAF PROTEINS
Paurakh Subedi

James Rife, Faculty Mentor (Department of Chemistry and Geology)

Lipoxygenase (LOX) enzymes play a significant role in plant defense mechanisms along with growth, development, nitrogen storage and senescence. These enzymes catalyze the oxygenation of polyunsaturated fatty acids. Soybeans have numerous different LOX enzymes. When plants are wounded, the octadecanoid pathway is stimulated and thus higher expression of some LOX isoenzymes are seen. Methyl jasmonate (MeJA), a volatile wound signal in plants, has been shown to increase the expression of some LOX isoenzymes. This study investigated LOX isoenzyme levels in soybean leaves at the bifoliate stage in response to mechanical wounding and (MeJA) treatment using two-dimensional gel electrophoresis. Soybeans were grown in an environmental chamber. Plants were treated at the bifoliate stage. Wounded plants had one leaf crimped with a hemostat. The other unwounded leaf was treated as a systemic leaf. MeJA treated plants were exposed to MeJA vapor in a sealed aquarium. After 24 hours i) wounded leaves, ii) systemic leaves, iii) methyl jasmonate treated leaves and iv) leaves from control plants were collected. Proteins were extracted using a procedure adapted from Natarajan et. al (Analytical Biochemistry 2005, 342, 214-220). Samples were electrofocused in a Bio-Rad Protean IEF cell using IPG ready strips for separation by isoelectric points. Then the strips were embedded on top of a SDS-PAGE gel for separation according to protein size. The LOX isoenzyme expression on the sample leaves were compared to the control leafs, which were left untreated and unwounded using a gel scanner.

40. ANTIMICROBIAL PROPERTIES OF LIPOXYGENASES ENZYMES IN WOUND INDUCED SOYBEAN LEAVES
Keean Rustad

James Rife, Faculty Mentor (Department of Chemistry and Geology)

Soybean leaf lipoxygenases (LOX) are involved with several important physiological processes including a defense mechanism. LOX is used as part of the soybean’s mechanism for controlling pathogen growth. This study was done to determine if wound-induced LOX had antimicrobial properties, and whether LOX acts directly on the pathogen’s cell membrane or if it acts indirectly by converting free fatty acids into fatty acid hydroperoxides that are toxic to the pathogens. It also allowed us to determine if the LOX defense system is more effective against Gram negative or Gram positive bacteria. LOX enzymes were extracted from soybean leaves. After extraction and purification, the activity of LOX was analyzed for both wound-induced and control plants. Different concentrations of LOX were added to Escherichia coli, Bacillus cereus and Pseudomonas fluorescens. The lowest concentration of LOX enzyme that inhibited growth was the minimum inhibitory concentration. The samples that contained no growth were plated on nutrient agar. In plates that did not contain any growth after incubation, the LOX enzyme had killed the bacteria. The lowest concentration of enzyme that was needed to kill the bacterial was the minimum bactericidal concentration. This process was repeated with hydroperoxides formed by the reaction of LOX with linoleic acid. Different concentrations of the hydroperoxides were incubated with the bacteria. Again, minimum inhibitory and minimum bactericidal concentrations were determined.
41. MODELING BIO-FUEL PRODUCTION THROUGH ALGAL GROWTH: GROWTH KINETICS
Steven Muir
Stephen Druschel, Faculty Mentor (Department of Civil Engineering)

It is known that greenhouse gas (GHG) emissions have the potential to alter earth's climate for the foreseeable future and many of Earth's natural resources such as water and phosphorus will also become scarce in the coming years as economically viable sources of these materials run out. A viable alternative to GHG emissions has not yet been conceived and could take many years to implement once found. While these alternatives are being explored it will be necessary to reduce GHG emissions as much as possible while still being able to have necessities such as electricity and transportation. The production of bio-fuel from micro-algae can address this concern. Oil production from high lipid content algae can be used with little to no modification to the energy infrastructure of the United States. Methane can also be harnessed through anaerobic digestion after oil extraction to further enhance the production of bio-fuels from algae. This work proposes to analyze growth characteristics using algal samples from southern Minnesota and comment on the feasibility of constructing large scale bio-reactor plants centered around bio-fuel production.

42. ANALYSIS OF IT PROJECT FAILURES FROM A MULTI-CULTURAL PERSPECTIVE
Zainab Hamza
Susan Schilling, Faculty Mentor (Department of Computer Information Science)

This project will focus on the importance of project management as a fundamental base for the success Information Technology projects, with the relation to multicultural aspects. Information and Communication technology has a high ratio in project management failure; this ratio is for all IT projects around the world. By that it is important to understand the reasons behind IT project success and failure, as well as spotting the light on the specific countries in order to understand the metamorphosis of cross-cultural IT views. This project will discuss reasons behind Information Technology project failure, in relation with the demographic of the IT projects. Even though, within the similarities and global standards in the IT field, still many projects vary and fail in regards of the relation with demographics. Different countries are having different approaches, in order to fulfill the cultural restrictions or the countries rules and regulation. This research emphasis on the project management methodologies in IT firms and organization, and will contain detailed causes and factors of having unsuccessful projects in different countries and international IT organizations. In order to understand the IT projects, in this research the majority of data is collected through research papers or scholarly articles. In addition, to have the full comparison of different countries, the focus of the research is on IT companies CEOs and IT manager in Middle Eastern countries. The basic statistics and graphs are referred to researches that touch the IT projects aspects. The anticipated results of this research are the focus on the IT projects with the use of global standards and case studies to implement a successful IT project. Also some of the expected results are to reach to the main causes that lead IT projects to be incomplete, over budget, or need extension.
43. DATABASE UTILIZATION FOR THE HONORS PROGRAM
Ryan Colakovic
_Cyrus Azarbod, Faculty Mentor (Department of Computer Information Science)_

Databases can be used in analyzing academic programs and monitoring progress of students. The Honors Program at Minnesota State University is a 23-credit program aimed at developing undergraduate abilities in leadership, research, and global citizenship. A database for the Honors Program is a useful resource. In the fall of 2012, while enrolled in the Honors seminar class HONR 401: Data Modeling and Mining, there was an optional project to create a database. The database created was for the Honors program since the database had to still be useful after the class. While it contains accurate information concerning the students in the Honors Program, it does not contain as much information as it could due to a small sample size of Honors students and more confidential information being withheld, such as GPA and ethnicity. While the database is in progress, it is a useful resource to help improve the program in the future. Additional characteristics for the database are ethnicity, first-generation, date of birth which can be used to calculate age, GPA, and total credits completed. Eventually with this database, Honors students can be tracked to evaluate how effective the program was for them. This database will be an effective tool for assessing the Honors Program.

44. C.A.D.S. (COMPRESSED AIR DELIVERY SYSTEM)
Kali O’Brien & Danielle Goebel
_Ronald Ulseth, Faculty Mentor (Department of Integrated Engineering)_

PolyMet Mining Corporation is working on opening a non-ferrous mining operation in Hoyt Lakes, MN. They are planning on using an old taconite processing plant. The plant is 56 years old and has been shut down for twelve years. PolyMet has asked the group to evaluate their plant air system (compressed air) as part of a design class at Iron Range Engineering, a program through University of Minnesota, Mankato. If PolyMet starts operations, they will be the first non-ferrous mining company in Minnesota and will bring millions of dollars to the local economy. The group can see from this work the impact of smaller design project on a system as a whole. Our deliverables for the client consist of an evaluation of the current system, recommended updates for existing equipment, a final recommendation including new and or old equipment, overview and preliminary drawings, and a risk and economic analysis of the final design. The team is using a time budget and a Gantt chart to complete the project. Tasks were broken down and assigned to a team member for completion by a certain date. Contact with the client is a key role in completing the project. The team uses the client to receive any relevant information about the previous plant system. Methods to achieve results include researching compressed air systems, studying plant drawings and case studies, as well as completing AutoCad drawings of the current and future system.
45. IMPLEMENTING A GENETIC NEURAL NETWORK
Joseph Kolhoff
Dean Kelley, Faculty Mentor (Department of Integrated Engineering)

This paper presents my work on an implementation of an Artificial Neural Network trained with a Genetic Algorithm. The project involved initially randomly generated weights to a neural network which were optimized via the combination of three methods, selection, crossover and mutation, in the goal of imitating genetic evolution. Experiments were done comparing random selection and fitness level probability selection in their efficiency for pairing networks through the generations. Four methods of crossover were designed and tested against each other in transferring weights efficiently. Multiple methods of mutation were created using random number generation, and these methods were tested against each other. The results of the design and trials are a close look at the effects of each method in genetic algorithms.

46. WATER FILTER PROJECT
Katie Olafson, Justin Magnusen, & Kody Kamunen
Ronald Ulseth, Faculty Mentor (Department of Integrated Engineering)

The scope of the Water Filtration project is to design an electrically powered portable water filter capable of running without relying on a power grid. This filter could be used in remote areas, such as cabins, or even in areas that experience frequent power outages. The project will consist of the design and construction of the physical system as well as the design and implementation of the electrical system. The physical system will be able to function as desired with proper care and maintenance. The electrical system will have safety features such as a battery overcharge protector which will lengthen the life of the battery. The methods to reach this goal included the study of fluid dynamics, circuits, and electronics. It was also necessary to conduct research on filtration methods, solar panels, and product design. Our biggest accomplishments so far have been building a successful prototype, and reaching every deadline toward having a working product by the end of the semester.

47. THERMAL EXPANSION EXPERIMENT DESIGN & ANALYSIS
Allie Jurvelin
Ronald Ulseth, Faculty Mentor (Department of Integrated Engineering)

When heated, metals expand. If they are not given space to expand, an internal force and thus stress is caused. This project is the design of a physical experiment demonstrating this interface of the fundamental principles of heat transfer and mechanics of materials. The principle in heat transfer is the concept of thermal expansion which states that expansion (or contraction) is directly related to initial length, type of material, and temperature change. The principle in mechanics of materials is the concept of axial stress and how it is caused by axial strain. The poster will show the physical set up of the student designed experiment, the mathematical verification of the physical principles, and a statistical analysis of the data.
AN AUCTION-BASED PRICING MODEL FOR START-UP COST MINIMIZATION FOR RESTAURANTS

Beka Yahya

*Queen Booker, Faculty Mentor (Department of Management)*

According to the Business Week reporter Kerry Miller (2007), 60% of restaurants fail within the first year. Restaurants fail because of both “macroeconomic” and “microeconomic” factors. Macroeconomic factors are conditions or events not under the restaurant owner’s control, such as the economy, political and legal factors such as taxes, regulations. Microeconomic factors are things the owner can control, such as capital, location, commitment, prior experience, and costs. Because cost is one of the microeconomic factors a prospective restaurant owner can control, the owner can potentially reduce start-up costs for items like equipment through auction bidding (Yaipai’ roj and Harmantzis, 2006). The purpose of this research study is to develop a mathematical model specifically for restaurants to minimize startup costs by modeling comparisons of auction costs to non-auction costs such as retail or wholesale costs of equipment. Ten online auction and four non-auction price data will be collected for standard restaurant start-up equipment. Using the final prices, transportation costs, and measure of quality for each item, a regression model and the Yaipai’ roj and Harmantzis model will be developed using eight of the online auction prices and two of the non-auction prices to determine which is better for suggesting whether it is better to purchase retail or wholesale, or try to purchase the particular item at the online auction. The items will be tested using the remaining two of the wholesalers/retailers and two of the auctions. Preliminary results will be presented at the conference.

THE IMPACT OF UNAUTHORIZED AND FAKE SOCIAL MEDIA PROFILES ON THE FINANCIAL PERFORMANCE OF TOP US-BASED AND INTERNATIONAL COMPANIES

Jeffrey Nestrud

*Queen Booker, Faculty Mentor (Department of Management)*

Facebook, Twitter, Google+, and Instagram are all popular social media networking sites. Companies use these sites to communicate with existing and potential customers to increase brand awareness and positively impact their image. So when unauthorized pages for companies are created, “these pages can make it difficult for consumers to find the official brand page, damage the brands, and even create liability for the brand owner.” (PR Newswire, 2011). Despite the knowledge that these fake pages can harm companies, no research was found that measures the actual financial impact of these fake sites on companies. This exploratory study is a step towards measuring that impact. The study uses four independent binary variables: US-based (1) versus international (0), airline industry (1) versus other (0), whether there was a hoax (1) or not (0), and if the hoax was on a major social media site, such as Facebook and Twitter (1) versus minor social media site, such as Instagram and Google+ (0) with major versus minor defined by the number of active users. The dependent variable tested will be the financial performance of the company for the prior year compared to the current year as normalized by the S&P performance and measured if the performance is higher or the same than the previous year (0) or lower (1). The expected outcome is that while the impact may not be large, there should be a measurable decline in financial performance.
50. PARAMETRIC MODELING OF THE SCHLEMM’S CANAL USING FUSED DEPOSITION
Mallory Westphal
Winston Sealy, Faculty Mentor (Department of Manufacturing Engineering Technology)
Michael Bentley, Faculty Mentor (Department of Biological Sciences)

The purpose of the research is to produce a model of Schlemm’s Canal using Fused Deposition Modeling (FDM). Current research being conducted at the Mayo Clinic in conjunction with Dr. Bentley, Biology Sciences department, Minnesota State, Mankato, requires modeling the eye’s Schlemm’s Canal. This research is being performed to explore relationships between Glaucoma and clogging of the Schlemm’s Canal. Glaucoma is an eye condition that can lead to permanent nerve damage in the eye resulting in blindness if it is untreated. Producing a model of a cross section of the eye, emphasizing the Schlemm’s Canal will further aid researchers in better visualizing the effects on the Schlemm’s Canal. Therefore, FDM, an additive manufacturing process will be utilized for modeling and prototyping. As a result of the layering process of FDM, a 3-Dimensional (3D) cross section model of the Schlemm’s Canal will be created. Images of the Schlemm’s Canal tissue generated by Microscopic Computed-Tomography (Micro-CT) will be translated into a Stereolithography (STL) file format for modeling. The STL format converts geometries into tessellated meshes. The FDM process begins by slicing the tessellated model. A thermoplastic polymer is then extruded to construct the model layer by layer. The printed model is treated to remove support and residual material. The finished model will then be inspected to determine if there are any changes or improvements that need to be made to the STL file for a better cross section model.

51. IS THE AMERICAN DREAM DEAD AMONG COLLEGE STUDENTS?
Kathryn Olson
Kristin Scott, Faculty Mentor (Department of Marketing and International Business)

Is the American Dream Dead among College Students? Significance of the Research Project One of the key components of the American Dream is that success and happiness in life is dependent on procuring monetary wealth. This Dream has created a materialistic society where having the big house, nice car, and home appliances are more important than social issues. However, values might be changing due to economic, environmental, and humanistic reasons (poverty, fair trade, etc). To become a more sustainable society, significant changes need to be made. Are these changes already taking place among college students? Method Data was collected at a Midwestern University through an online survey administered by Survey Monkey. Participants were recruited through two different methods to ensure a variety of majors and classification. A total of 487 students completed the survey. The survey consisted of both open-ended and closed-ended questions. Frugality, environmental concern, and materialism scales were created to measure the extent to which these students saw their American Dream as being similar to the traditional Dream. Findings/ Conclusion The results of this study suggest that the American Dream is not dead among college students. Instead it is a fluent concept that allows for multiple interpretations. Certain aspects of the traditional American Dream, such as being better off than the previous generation, may not be as relevant to younger generations. Importantly, the younger generation believes that although the Dream is not outdated, it should include aspects such as family, happiness and personal fulfillment and sustainability goals.
52. MATHEMATICAL MODELING AND SIMULATION OF FATIGUE MUSCLE FIBER MECHANISM  
Sanghee Moon, Sobuk Son, & Taeyeung Hong  
Namyong Lee, Faculty Mentor (Department of Mathematics and Statistics)

It is a common experience that we feel muscle pain after physical activities. A number of studies related to muscle fatigue had been conducted, but they mainly focused on biological and chemical mechanisms. In this study, we approached the fatigue muscle fiber mechanism by mathematical modeling and simulation on existing biological and chemical understanding. The aim of the research was to explain the process of generating muscle fatigue in a mathematical method. To generate an adequate mathematical muscle fatigue fiber model, we combined two mathematical models: muscle fiber and muscle fatigue models. The modified Huxley equation was mainly used in this study, which mathematically described the behavior of the muscle fiber mechanism. Then, we validated the generated mathematical model by data from previously performed by others in scientific researches. As a result, we found an integrated model that explained both muscle fiber mechanism and muscle fatigue action. The model was applied in computer simulation, and this model was in agreement with experimental data in scientific articles. The new muscle fatigue model was able to efficiently explain the muscle fatigue mechanism in muscle fiber.

53. STATISTICAL MODELING IN RENEWABLE ENERGY SECTOR OF THE US
Bijaya Silwal  
Deepak Sanjel, Faculty Mentor (Department of Mathematics and Statistics)

We developed a time series model to analyze the trend of consumption of renewable energy based on the historical statistics published by the US Energy Information Administration in August 2012. R statistical package was used to perform statistical analysis and generate graphs. We observed that there is not any significant difference in the pattern of production and consumption of the renewable energy in the US. The consumption is in skyrocketing trend. HoltWinters filtering and exponential smoothing of the data, point estimates, interval estimates, confidence band and prediction band were generated and analyzed. We also established a multiple regression model that best estimates the parameters for the creation of number of jobs in ethanol industry of Minnesota as per the statistics released by MN Department of Agriculture and National Renewable Energy Laboratory. We found that the number of jobs in ethanol industry is best estimated as the multiple regression function of the total number of ethanol stations in operation and the output impact due to the ethanol production. These models allow us to analyze and predict the trend of the renewable energy by different sectors in future. These works on energy modeling will help the energy planners, researchers and policy makers to better understand the numerical data and the future trend in renewable energy sector. The usual assumptions of normal distribution and constant error variance were followed during the research. Researchers can further make data analysis with non-parametric smoothing and bootstrap methods to come up with different findings.
Art

GELLY: AN EXPLORATION OF ACRYLIC GEL MEDIUM SCULPTURES  
Megan Moriarty  
*James Johnson, Faculty Mentor (Department of Art)*  
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

"SHIFT" ANIMATED SHORT  
Brady Johnson  
*David Rogers, Faculty Mentor (Department of Art)*  
*Matthew Willemsen, Faculty Mentor (Department of Art)*  
URC SUPPLY GRANT RECIPIENT

FROM THE EYE OF THE LGBT COMMUNITY AT MNSU  
Joshua Schutz  
*Alisa Eimen, Faculty Mentor (Department of Art)*  
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

MELDING MEDIUMS, FUSING METAL AND GLASS  
Dustin Swiers  
*Leslie Laidlaw, Faculty Mentor (Department of Art)*  
URC SUPPLY GRANT RECIPIENT
GELLY: AN EXPLORATION OF ACRYLIC GEL MEDIUM SCULPTURES
Megan Moriarty
James Johnson, Faculty Mentor (Department of Art)

Acrylic gel medium is typically used as an additive material for two-dimensional works of art. My work focuses on acrylic gel medium’s potential to be used three-dimensionally. This plastic polymer can be shaped while still in its liquid form and dry solid in its manipulated form. My projects include several different types of gel medium which I apply to molds, lay out to dry as sheets, or pour over objects. I manipulate the gel into naturalistic forms that can hang, stand alone or be mounted on a wall. Some works include a light from within the object to emphasize texture, while others twist in a way that resembles ceramics. No matter how they are displayed, each objects shares some level of transparency, a result of the oxidation process. The oxidation process of the gel has also been an exciting challenge because, based on how the gel dries, it can be sticky, solid, opaque, clear, stretchy or rigid. Any additives to the gel, for example salt or copper, are therefore affected by oxidation. My experimentations have yielded many successes, but each work creates another question. Because there is little documented experimentation of gel medium being used sculpturally, I look to the methods of past artists dealing with the same lack of information as myself. Their exploration exhibit clues for my own project and guides me to understand failed pieces as successes. The Gelly project continues to spark new ideas and methods, which demand to be explored.

"SHIFT" ANIMATED SHORT
Brady Johnson
David Rogers, Faculty Mentor (Department of Art)
Matthew Willemsen, Faculty Mentor (Department of Art)

What I’m looking to accomplish with creating a short animated movie is to explore the software and tools I have available to me to transform my characters, story ideas and sketches into a short narrative. I will be doing extensive research about the process of classic animation, studying story-telling techniques, illustrations, and how to composite all the necessary design elements with computer software. With the grant provided I will be able conduct this research by reading the 16 requested books. From there I will be able to apply what I have learned from that research and apply it to my own creative project. I hope my passion for animation shows through during presentations of my short movie and that the audience will find their own interpretations and message in the final product. I believe I will be able to create a concept for the short film that will be something thought provoking and new to people.
FROM THE EYE OF THE LGBT COMMUNITY AT MNSU
Joshua Schutz
Alisa Eimen, Faculty Mentor (Department of Art)

Through documentary photography emphasizing collaboration and multiple perspectives, my study focuses on identity within the lesbian, gay, bisexual, and transgender community at Minnesota State University, Mankato. The concept comes at a time when LGBT Americans have entered a broad, political discussion regarding marriage equality, bullying in schools, and whether identifying as LGBT is derived from nature versus nurture. Considering the political discourse happening across the country and more specifically, in Minnesota, questions that may be overlooked are: Do LGBT students feel politicized or threatened by the larger conversation happening across the state? To what extent do LGBT students identify with common stereotypes affecting their own community? And, finally, where do students generally see themselves in terms of their identity and, specifically, as a member of a much larger institution? Little published material exists directly concerning LGBT students at MNSU, but from journal articles, past student’s research, and broad sources that approach LGBT issues; I’ve found that one solution to give this marginalized community a voice is with the use of anonymous photography. Through the photo representations of how LGBT students see their identity within the MNSU community, I will be able to visually capture some elements of how students identify with their prescribed sexual orientation and gender. With my creative, interactive documentary photography project, I strive to find some answers to these broad questions as well as start a much larger discussion as to the needs of lesbian, gay, bisexual, and transgender individuals at Minnesota State University, Mankato.

MELDING MEDIUMS, FUSING METAL AND GLASS
Dustin Swiers
Leslie Laidlaw, Faculty Mentor (Department of Art)

My research focused on the possibilities of combining metal and glass to create a series of sculptural works. This was accomplished literally by way of the experiments I conducted with glass and copper. The interaction of two very different mediums and the juxtaposition of hard and soft elements, create an aesthetic that is reflective of the processes and material. Process is a primary motivator within my work as a sculptor. The unique quality of the materials provided an interesting combination of working procedures and intuitive actions. The multitude of results I have received surprised me and expresses there is still much to learn. I have thus far made forty seven mockups and three finished works that will be presented through a series of photographs. My work and experimenting is ongoing. The variety of color, shape and pattern of the copper alone, inside the glass, was the most surprising and enlightening. If my research shows anything, it is the multitude of variables within the creation process. Though there are similarities, many anomalies still occasionally present themselves. This opportunity granted me further extensive development of my knowledge of the materials. Despite having used both materials (metal and glass) separately in the past, I have expanded the rage of possibilities within my ideas of process and overall sculpture.
THE DISAPPEARING WOMEN OF JUAREZ AND CHIHUAHUA, MÉXICO: FEMICIDE, AND THE STRUGGLE FOR WOMEN’S RIGHTS
LaShae Lambert
Marlene Medrano, Faculty Mentor (Department of History)

"WOMEN CAN LIKE PORN, TOO!" THE IMPACT OF HEGEMONIC GENDER NORMS ON WOMEN WHO USE PORNOGRAPHY
Rachel Verde
Emily Boyd, Faculty Mentor (Department of Sociology)

SEXUAL IDENTITY TRANSFORMATION OF GENDER AND WOMEN’S STUDIES STUDENTS
Brooklyn Vetter
Emily Boyd, Faculty Mentor (Department of Sociology)

Yaro Sadek Tahirou
Abdalla Battah, Faculty Mentor (Department of Government)
THE DISAPPEARING WOMEN OF JUAREZ AND CHIHUAHUA, MÉXICO: FEMICIDE, AND THE STRUGGLE FOR WOMEN'S RIGHTS
LaShae Lambert
Marlene Medrano, Faculty Mentor (Department of History)

Abstract: In the past twenty years over 400 women in Juarez and Chihuahua Mexico have been murdered, and a countless number missing. These women were raped, beaten and then tossed on the side of the road, or in mass graves. The bodies were at times dismembered and or unrecognizable. I will argue that the Mexican government has failed to adequately investigate these crimes, and bring justice to the families of these women. Many organizations have been formed by family members of these victims and have brought national attention to the human rights violations that are taking place in Mexico. I have consulted the Historical Abstracts database to gather research about the prevalence of femicide in Mexico. In addition the documentary Missing Young Women, the NACLA Report On the Americas journal, CIP Americas online archives, and several books used as secondary sources, have all supported my argument. Government documents have revealed that laws that have been put into place to protect women, but legislation has not been enforced by the local police or military officials. The way in which the organized groups searching for their family members are treated has been an appalling discovery. Sometimes these individuals go missing themselves for bringing too much attention to the disappearances and murders. The Mexican government is taking extreme measures to allow these murders to continue without holding anyone accountable. The families of the victims will not give up until femicide in Mexico is put to an end.

"WOMEN CAN LIKE PORN, TOO!" THE IMPACT OF HEGEMONIC GENDER NORMS ON WOMEN WHO USE PORNOGRAPHY
Rachel Verde
Emily Boyd, Faculty Mentor (Department of Sociology)

Many Americans feel that sexuality is not a polite topic; rather, it is private and even something to be ashamed of. In particular, pornography is both a source of pleasure and a taboo discussion topic. Women are arguably more embarrassed about pornography than men, even though it is estimated that one in three porn consumers are female. My research seeks to explore the lived experiences of women who enjoy pornographic materials, including their reasons for liking porn, what they dislike about pornography, and experiences with stigma associated with enjoying pornography. I conducted ten in-depth interviews with adult women at a mid-sized state university in the Midwest. Respondents were recruited through undergraduate sociology and women’s studies courses. Interviews were transcribed, coded, and analyzed using grounded theory. I found that women use pornography to explore their sexualities alone, with a partner, or through sexual fantasies. In addition, the varied emotional experiences that women manage surrounding pornography and sexuality are shaped by larger social structural rules surrounding gender and sexuality. Finally, formal or informal education may reduce women’s stigma about sexuality and pornography. It is clear that women must negotiate their use and enjoyment of pornography in the context of hegemonic gender norms which dictate that women are passive recipients of active male sexual desire, that women do not—or should not—enjoy pornography, and that women who are active participants in their own sexuality are perceived as promiscuous. Lastly, my research has implications for the pornographic industry itself.
SEXUAL IDENTITY TRANSFORMATION OF GENDER AND WOMEN’S STUDIES STUDENTS
Brooklyn Vetter
Emily Boyd, Faculty Mentor (Department of Sociology)

It is a common stereotype that Gender and Women’s Studies (GWS) shifts women’s sexual orientation away from heterosexuality. This myth is commonly used to keep women from calling themselves feminists or joining the GWS major. It is important to understand where this myth comes from and how or if the sexuality of women is affected by feminism or GWS courses. Through in-depth, semi-structured interviews of women in upper level GWS courses, the data was collected and analyzed. The most important finding was that women in the major were more comfortable in their sexuality and were able to communicate more efficiently with their partners and others. Women also began to recognize their ability to say no and not succumb to sexual acts solely because their partners wanted to. Through this research it can be recognized that GWS may play a role in supporting women’s sexual maturity and comfort with their sexuality. While it is a stereotype avoided by feminists that women’s sexuality is affected, perhaps it should be reexamined and seen as a positive aspect of theorizing about gender and sexuality. When women theorize about these topics in class they begin to relate the knowledge discussed in class to their own lives. Instead of seeing women’s shifting sexuality as a bad aspect, the impact that GWS has on women’s sexuality should be embraced and utilized throughout the courses.

Yaro Sadek Tahirou
Abdalla Battah, Faculty Mentor (Department of Government)

During the last decades, several financial crises such as the East Asian financial Crisis of 1997, the Latin American debt crisis of 1994-95, the Russian crisis of 1998, and the Brazilian crisis of 1998-99 have occurred in the world economy. The International Monetary Funds (IMF) has been involved during these crises and known as a crisis manager. But during the East Asian Financial crisis in particular, the IMF has been criticized of promoting international cooperation because of the supervised enforcement of its rules. The purpose of this research is to find out how the IMF responded to the East Asian debt crisis, whether or not its response was the best response possible to this crisis, and what should be the future role of the IMF. To conduct this research, I analyzed 5 scholarly journals on the financial crisis in East Asia, 3 scholarly articles on the role of IMF in the East Asia financial crisis, and 1 novel called POLITICS IN SOUTHEAST ASIA DEMOCRACY OR LESS by William Case. Through my research, I talked about the causes of the East Asian financial crisis, the role of the IMF in the international monetary system, and if the IMF responses to Thailand, South Korea and Indonesia were helpful or not. After analyzing the IMF responses in this crisis, I found that the IMF policies need to be reformed in order to monitor crises spill-over effects at the global and regional levels, and prevent future financial crises.
EXPLORATION OF MUSIC THEORY USING MATHEMATICAL MODELING TECHNIQUES
Sarah Painter & Leah Lumley
*Jeffrey Ford, Faculty Mentor (Department of Mathematics and Statistics)*

A PHOTOMETRY OF THE YOUNG CLUSTER BERKELEY 87
Abolaji Akinyemi
*Paul Eskridge, Faculty Mentor (Department of Physics and Astronomy)*

TARGET DEVELOPMENT TO OPTIMIZE 13N EXTRACTION FROM GRAPHITE
Lucas Swanson, Udit Kapur, Nathan Gretz, & James Faraday
*Andrew Roberts, Faculty Mentor (Department of Physics and Astronomy)*
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

SILICA REMOBILIZATION IN THE MESABI IRON RANGE: MINE ORE-WASTE CUTOFF PREDICTION
Ryan Rague
*Steven Losh, Faculty Mentor (Department of Chemistry and Geology)*
MINNESOTA STATE FOUNDATION GRANT RECIPIENT
EXPLORATION OF MUSIC THEORY USING MATHEMATICAL MODELING TECHNIQUES
Sarah Painter & Leah Lumley
Jeffrey Ford, Faculty Mentor (Department of Mathematics and Statistics)

There is a deep connection between mathematics and music. The music was created first, however, and the math behind it is still being discovered – from counting beats to abstract algebraic models. We are looking for mathematical representations for two specific aspects of the relationship. One aspect relates multiple musical notes. All of the current research on this topic uses the frequency of the notes in the equal temperament method of tuning. This is the tuning like that of a piano. Bands and orchestras do not use the equal temperament method of tuning, when tuning chords, however. They use a method of tuning called just intonation. We hypothesize that using just intonation creates less sporadic sound waves, causing our ears to perceive them as less dissonant. We can look at the sound wave graphs of chords using the two tuning methods to compare and contrast. Another aspect of the relationship considers not just the sounds but the compositions. We will be using a specific type of music, change-ringing, the art of ringing a set of tuned bells in mathematical patterns without attempting to produce a melody. We will attempt to create models of the change-ringing composition process. Our exploration will use previously developed modeling techniques, as well as, their application to our key topics of tuning methods and change-ringing composition.

A PHOTOMETRY OF THE YOUNG CLUSTER BERKELEY 87
Abolaji Akinyemi
Paul Eskridge, Faculty Mentor (Department of Physics and Astronomy)

We obtained images of a field in the star cluster Berkeley 87 through a set of filters that extend from the near ultraviolet to the near infrared. The Images are taken in the U band (wavelength ~ 360nm), B band (~420nm), V band (~520nm), R band (~640nm), and I band (~800nm). From these images, we measured the brightness of ~ 180 stars in the cluster. Such measurement is called photometry. The photometry of our images is then calibrated using published photometry of a subset of the stars in our field of view. The calibrated photometry is presented in a set of Color-Magnitude, and Color-Color diagrams. The magnitude system is an inverse logarithmic scale that ranks stars in order of brightness. The difference in the magnitude of the star in two different band passes gives the color of the star. As a result, colors are logarithms of flux ratios. The Color-Magnitude diagrams of the cluster are constructed using the measured magnitudes of the stars in the cluster. The Color -Magnitude and Color-Color diagram are used to derive estimates for the distance, age, and foreground reddening of our cluster target. Studies of Berkeley 87 tell us about recent star formation as it is a very young cluster (a few million years old).
TARGET DEVELOPMENT TO OPTIMIZE 13N EXTRACTION FROM GRAPHITE
Lucas Swanson, Udit Kapur, Nathan Gretz, & James Faraday
Andrew Roberts, Faculty Mentor (Department of Physics and Astronomy)

A target system has been developed for producing and extracting 13N (t1/2 ~10 minutes) using the 400 keV Van de Graaff accelerator in the Minnesota State University Applied Nuclear Science Lab in Mankato. Radiolabeled 13N compounds are commonly used for physiological imaging using Positron Emission Tomography (PET), a quantitative nuclear technique. 13N is produced in the 12C(d,n)13N reaction by irradiating our custom graphite target with a 400 keV deuteron beam. The carbon target is then heated by an electric current to release the nitrogen isotope while simultaneously passing a suitable reaction gas though the target apparatus to extract the 13N from the carbon matrix. Our research this year has aimed to discover the impact that the deposition depth has on the extraction of the 13N. The proposed method to accomplish this was to change the angle of beam incidence. Although the amount produced is insufficient for imaging work, the theory and procedure may be applied at higher energy laboratories, capable of a greater yield reaction such as 13C(p,n)13N.

SILICA REMOBILIZATION IN THE MESABI IRON RANGE: MINE ORE-WASTE CUTOFF PREDICTION
Ryan Rague
Steven Losh, Faculty Mentor (Department of Chemistry and Geology)

Oxidation of iron formation in the Mesabi Iron Range, Minnesota, has negatively impacted recovery of the main ore mineral, magnetite, by two mechanisms. First, magnetite has been partially or completely oxidized to hematite (martite), which is not magnetically separable. Second, silica has been remobilized during the oxidation process, and comprises a higher percentage of the ore concentrate than is desirable due to its altered grain size, making it difficult to grind sufficiently. Fluid inclusion data showed that fault-channeled, diagenesis-stage fluids (mean T homog = 154° C; mean salinity = 9.5 wt% NaCl equivalent) were responsible for early oxidation of iron formation: this event is distinct from later, widespread, shallow-level supergene (lateritic) oxidation. Petrographic and SEM examination of rocks from early-oxidized zones show rims of recrystallized quartz around variably-oxidized magnetite in samples in which Fe-talc and/or minnesotaite have been oxidized to goethite, indicating silica redistribution during oxidation. No such rims have been noted in later (supergene)-oxidized iron formation, implying they may have formed only under diagenetic conditions. Additionally, fractures in magnetite grains, created by faulting, have been filled with silica, resulting in quartz micro veins that pose serious economic concerns. This study focuses on the cause and effect of silica remobilization with an eye to enabling prediction of the ore-waste cutoff in a mine from visual inspection of variably oxidized iron formation.
Psychology & Ethnic Studies

THE ARAB –AFRICAN MINORITY IN EAST AFRICA ISSUES OF IDENTITY, INTEGRATION AND ASSIMILATION
Ahmed Ahmed Bani
Kebba Darboe, Faculty Mentor (Department of Ethnic Studies)
URC SUPPLY GRANT RECIPIENT

THE EFFECTS OF A MONTESSORI-BASED ACTIVITY ON AFFECT AND ENGAGEMENT IN PERSONS WITH DEMENTIA
Amber Hindt, Jill Sohre, & Jill Morris
Jeffrey Buchanan, Faculty (Department of Psychology)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

MULTI-CULTURAL EXPERIENCES AND UNDERSTANDING
Lamont Scaife
Kevin Filter, Faculty Mentor (Department of Psychology)

NEED FOR HIGHER REGULATION OF OFF-LABEL ANTIPSYCHOTIC PRESCRIBING IN THE ELDERLY
Caitlyn Cardetti
Dawn Albertson, Faculty Mentor (Department of Psychology)
THE ARAB –AFRICAN MINORITY IN EAST AFRICA ISSUES OF IDENTITY, INTEGRATION AND ASSIMILATION
Ahmed Ahmed Bani
Kebba Darboe, Faculty Mentor (Department of Ethnic Studies)

The Dialogue between cultures was and remains the main road for the development of human civilization. Through the reciprocal understanding and interpretation of cultures over the centuries and millennia, those cultures have been mutually enriched, and so have made up the unique mosaic of human civilization. The movement of Arabs {Omanis and Yemenis} across the globe since the Islamic era, and the development of those communities will continue to interest policymakers and scholars for decades to come. The ethnic Arabs remain potential targets of xenophobic tendencies and violence. Such incidents have occurred not only in countries with existing ethnic tensions, like Sudan.

Motivation/problem statement. The Historical back ground of the migration pattern, and to appraise the impact of the religion or culture of Islam on the Afro-Arab cultures, and its contribution to the promotion of the culture of peace and tolerance . The main focus is to identify some of the current challenges facing the Arab-African People {issues of identity, social integration and Assimilation.}

Results/findings/products: The most significant findings to describe is to understand the dialogue between cultures which can and must be the answer to the growing danger of various manifestations of intolerance and violence today or in the first decade of the twenty-first century. Conclusion/implications: There is gap of understanding each other, much of what is written about the relationship between the Arabs and the African continent arises from the West, and usually describes the relationship along a crude paradigm of “Arabs” versus “black Africans. But there is gap of understanding each other.

THE EFFECTS OF A MONTESSORI-BASED ACTIVITY ON AFFECT AND ENGAGEMENT IN PERSONS WITH DEMENTIA
Amber Hindt, Jill Sohre, & Jill Morris
Jeffrey Buchanan, Faculty (Department of Psychology)

Activities for persons with dementia can provide many benefits such as cognitive and social stimulation and reduced agitation. Montessori-based activities are designed with specific principles in mind such as building on existing skills, repetition, and making tasks that are self-correcting. The purpose of this study was to compare the effects of a Montessori-based group activity to typically-offered activities in terms of the amount of active engagement and positive affect displayed. Eight individuals diagnosed with dementia and who lived in a memory care unit participated in the study. The study used an A-B-A-B experimental design where baseline (A) involved observing activities typically offered in the facility and the intervention (B) involved participants playing a Montessori-based activity called “Memory Bingo”. Memory Bingo consists of four cards containing a picture and word linking to corresponding cards that are called out. If participants have the matching card, they flip it over. The game continues until someone flips over all their cards. During both phases, participant’s affect and engagement were recorded through direct observation. Data collection is 90% complete. Thus far, the Montessori-based activity appears to yield greater levels of active engagement compared to typically-offered activities. Positive affect, however, has remained relatively steady throughout all phases. There is a need for new activity programs that are interesting and engaging to individuals with dementia. Montessori-based activities, such as Memory Bingo, may offer a promising alternative approach to activity programming that may result in increased enjoyment and participation in activities for persons with dementia.
MULTI-CULTURAL EXPERIENCES AND UNDERSTANDING
Lamont Scaife
Kevin Filter, Faculty Mentor (Department of Psychology)

The primary goal of my research project is to understand cultural understanding among college students at MSU. My research relates to “the contact hypothesis”, developed by American psychologist Gordon Willard Allport. The contact hypothesis briefly describes what situations are necessary for cultural understanding amongst two different types of groups to occur. This is important because this will help us understand relationships, and connections formed within college. The information from this research could be used by event planners’ that focus on creating diversity events that educated students’ about different types of people and cultures. My research design is an online survey that consists of two questionnaires, one of which has six questions and the other of which has 10 questions. My survey asks questions to find answers to my hypothesis, which is that in order for someone to gain true cultural understanding of a culture different from her/his own, she/he not only has to have some type of interaction or connection with someone from a different background, but she/he must have actively sought out the connection (as compared to if the interaction was somehow required or was an accident). I hope to find a connection between seeking out a cultural experience and developing cultural understanding. I will also present some ideas on how to improve cultural understanding and how to increase the number of students actively seeking an interaction with ethnic and culture groups different from their own.

NEED FOR HIGHER REGULATION OF OFF-LABEL ANTIPSYCHOTIC PRESCRIBING IN THE ELDERLY
Caitlyn Cardetti
Dawn Albertson, Faculty Mentor (Department of Psychology)

This review focused on the appropriateness of off-label use of second generation antipsychotics (SGA) as the treatment in the elderly for psychological and behavioral symptoms of dementia (BPSD) such as agitation. Currently, Beers Criteria by the American Geriatrics Society is the only reference for determining whether a prescription medication is a potentially inappropriate medication (PIM) for use in older adults. After reviewing Beers Criteria, the results indicated a specific need for further research into antipsychotics as PIMs. One major need identified was to differentiate between first-generation (FGA) and second-generation antipsychotics based on the large difference in their pharmacokinetic (PK) and pharmacodynamics (PD) properties. The articles reviewed focused on SGAs only; specifically olanzapine, risperidone, and aripiprazole. These drugs were selected because they have been observed to have small but statistically significant benefits in the off-label treatment of behavioral symptoms associated with dementia in elderly patients. Other articles reviewed, further identified areas that support the need for higher regulation of the prescribing rates beyond Beers Criteria. Specific areas of interest were articles on studies indicating an altered PK/PD model due to the decrease in drug metabolism, increased likelihood of polypharmacy, and increased comorbidity of diseases associated with age. The discussion emphasized the importance of these results and how they could be better indicated in Beers Criteria along with areas that need further exploration.
World Languages and Cultures & Communication Studies

UNFAIR CAMPAIGN COMMUNICATION ANALYSIS
Nicole Hudak
Leah White, Faculty Mentor (Department of Communication Studies)

CHILE UNDER PINOCHET
Samantha Meyer
Adriana Gordillo, Faculty Mentor (Department of World Languages and Cultures)

THE LITERATURE OF THE LATIN AMERICAN DICTATORSHIPS AND THE UNITED STATES
Desiree Gobey
Adriana Gordillo, Faculty Mentor (Department of World Languages and Cultures)

REDISCOVERING THE ANCESTRY OF SKIING IN SCANDINAVIA: A HANDS-ON APPROACH—FROM TREE TO SKI
Nathanael Rhody
Rennesa Jessup, Faculty Mentor (Department of World Languages and Cultures)
UNFAIR CAMPAIGN COMMUNICATION ANALYSIS
Nicole Hudak
Leah White, Faculty Mentor (Department of Communication Studies)

The Unfair Campaign was a campaign in Duluth Minnesota that raised awareness of white privilege. The reason why it was important to analyze was because Duluth is one of the whitest cities in the United States and the Unfair Campaign took a new and creative approach. I used a journal article that analyzed a different public service announcement campaign and applied those same critiques to this campaign. What I discovered was that because the campaign did not present any solutions, the Unfair Campaign was not successful with their billboard and poster aspect of the campaign. The conclusion I found through this critical analysis was because the community was so offended by this campaign, it seems that if viewers are offended by a public service announcement, they might not only be turned off to that PSA but the message that they are presenting.

CHILE UNDER PINOCHET
Samantha Meyer
Adriana Gordillo, Faculty Mentor (Department of World Languages and Cultures)

From 1973 to 1990 Chile was ruled by Augusto Pinochet. Pinochet seized power and ruled for 18 years. Many Chileans accused of being communists disappeared and were killed by Pinochet’s secret police. Those who survived describe unending torture in prison. Censorship was rampant and elections were rigged to keep Pinochet in power. Most Americans are not aware of the social ills countries like Chile suffered throughout the late 20th century. It is important for us to understand the history of our neighbors because we trade goods creating millions of dollars of revenue for both countries. In order to really appreciate the culture in Chile one should first understand the history of it. Most of these social wars and actions were kept secret and denied by the government. This study began by reading two books, A Nation of Enemies: Chile under Pinochet by Pamela Constable and Arturo Valenzuela and Pinochet the Politics of Power by Genaro Arriagada. These texts also include social and cultural descriptions and information on the economy. A critical analysis of literary representations of torture and censorship within Chile was also done. It is important people become educated on the dictatorships in South America because our country has a deep history of attempting to thwart communism internationally. The idea of communism or dictatorships invading the western hemisphere is the exact thing Presidents like James Monroe, John F. Kennedy and Harry Truman fought against. Today, dictatorships and anti- democratic governments affect our trade and foreign relations in the US.
THE LITERATURE OF THE LATIN AMERICAN DICTATORSHIPS AND THE UNITED STATES
Desiree Gobey
Adriana Gordillo, Faculty Mentor (Department of World Languages and Cultures)

This study is important because the world is still under repressive regimes despite the spread of Democracy lately. This research has the goals to show how literature had an important role in politics of repressive regimes in Latin America. Certainly, through its denunciative character, this revolutionary literature showed that the promotion of egalitarian societies is only effective when the population Cooperates freely and this is very important to know. To perform my study, I used academic sources such as documentaries, articles and books in order to understand the context at stake, as well as literary criticism that I discussed through close reading and critical analysis techniques. For example, novels and poems like Diamelia Eltit: El Padre Mio, Gionconda Belli: Hasta que seamos libres, Tomas Harris: Cipango. Based on these sources I learned that the Latin American dictatorships had an impact on the literature of this region. Among those ideas, literature presented the United States as the significant actor in these dictatorships. As a result, I concluded that the United States, via those dictatorships, did not only control this region politically but also, in doing so, lead to a revolutionary literature, which helped during this time to understand the foreign policy of the United Sates.

REDISCOVERING THE ANCESTRY OF SKIING IN SCANDINAVIA: A HANDS-ON APPROACH—FROM TREE TO SKI
Nathanael Rhody
Rennesa Jessup, Faculty Mentor (Department of World Languages and Cultures)

Though skiing is now an extremely popular winter pastime, there are very few who actually know how far skis go back in human history—to say nothing of how the design, techniques and use has evolved over the ages. The purpose of this research project was to gain a more intimate knowledge of the technological innovations associated with skiing in the Scandinavian lands from the Stone Age up through the Mediaeval Period. Predominantly, this included the use of a single long ski-pole instead of two, and the sewing of animal furs on the bottoms of the skis. The use of furs gave a smooth surface when moving forward, yet simultaneously gave traction when going up-hill—thus enabling the skier to access rough and wild terrain. In order to gain information on this topic, books and articles especially written concerning archaeological finds of skis in Scandinavia were consulted, as well as some ethnographic comparison with traditional skis in other parts of the world. Finally, the purpose of this project was to construct a pair of skis of the ancient design with hand tools. This was to give the opportunity to try out such innovations as animal furs and the single-pole, in order to be able test out their effectiveness first-hand. The end product was extremely successful in displaying the ingenuity and practicality of such technology that supplied ancient Scandinavians with an effective means of winter transport.
Elementary and Early Childhood Education

COMPARISON OF INTER-CULTURAL COMPETENCY BETWEEN AMERICAN AND RUSSIAN UNDERGRADUATE STUDENTS
Elizabeth Lohrenz, Olga Pestereva, & Audrey Kalugin
Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)
URC SUPPLY GRANT RECIPIENT

SCHOOL VIOLENCE IN RUSSIAN FEDERATION
Olga Pestereva
Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)

ADAPTIVE SWIMMING AS A FORM OF SOCIAL WORK WITH CHILDREN WITH DISABILITIES
Andrew Kalugin
Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)

PREPARING UNDERGRADUATE STUDENTS FOR CULTURALLY RESPONSIVE TEACHING
Emily Molenaar, Michelle Burke, Sadie Leidall, Pathy Xiong, & Patrick McCann
Lori Piowlski, Faculty Mentor (Department of Elementary and Early Childhood Education)
URC SUPPLY GRANT RECIPIENT
COMPARISON OF INTER-CULTURAL COMPETENCY BETWEEN AMERICAN AND RUSSIAN UNDERGRADUATE STUDENTS
Elizabeth Lohrenz, Olga Pestereva, & Audrey Kalugin
Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)

The purpose of this study was to compare the American undergraduate students' cultural competency to that of Russian university students. The analysis of the cultural competency of Russian students acted as a comparison variable in the continued research of cultural competency in the classroom among American undergraduate university students. This research was based on the Developmental Model of Intercultural Sensitivity, developed by Bennett (1986). The DMIS described six stages of cultural competence: (a) Denial or Unaware; (b) Polarization or Defense; (c) Minimization; (d) Acceptance; (e) Adaptation; and (f) Integration. Based on the DMIS, Hammer and Bennett (1998, 2001) developed the Intercultural Development Inventory (IDI). Subjects for this study included 26 persons, 18 to 30 years old, who were enrolled in the North-Eastern State University, Magadan, and 26 persons, 18 to 30 years old, who were enrolled in Minnesota State University, Mankato. This study assessed cultural competency with the IDI (Hammer & Bennett, 1998, 2001). The IDI consisted of fifty, Likert-type items that can be answered in 20 to 30 minutes. All students completed the IDI on-line in their first language. The investigators used the group mean scores on developmental scales to evaluate whether any significant indicators of change were observed in these areas of intercultural development. Results indicated statistically significant differences in orientation to cultural diversity between Russian and American undergraduate students.

SCHOOL VIOLENCE IN RUSSIAN FEDERATION
Olga Pestereva
Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)

The problem of violence and aggression within the schools has attracted the attention of North Americans for many years. However, recent reports appear to indicate that such violence is even more prevalent and severe than in the past. An analysis of psychological and pedagogical literature showed that school bullying is considered in the modern world as a serious social and pedagogical problem. Violence at school includes bullying, physical or psychological terror, aiming to cause another fear and thereby control [Kon, 2006]. Ozhieva [2013] has divided school violence into physical school bullying (intentional kicks, punches, blows and other bodily injuries, etc.) and psychological school bullying (related violence, effect on the psyche, and psychological trauma). The consequences of violence in school, according to Pronina [2008] include: (1) loss of self-esteem and feeling intimidated; (2) neurotic disorders, depression, disturbance of sleep and appetite; and (3) thoughts about suicide. Despite the serious consequences of bullying, the scientific literature and research in Russia has focused very little on school-based violence in Russia. This research will report on a survey of recent graduates of School Number 29, Magadan, Russia. Results indicated that local students were very aggressive towards each other, and rated high on scales of verbal aggression, physical aggression, and negativism. Data analysis revealed that adolescents often have to deal with violence directed toward self and directed towards other people. Almost all respondents expressed their understanding that violence is unacceptable and causes negative consequences. However, the teenagers reported that they felt unprotected and unsure where to seek help.
ADAPTIVE SWIMMING AS A FORM OF SOCIAL WORK WITH CHILDREN WITH DISABILITIES
Andrew Kalugin
Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)

In Russia, “social pedagogy” combines education with social work. Social pedagogy with disabled children has been found to be more and more effective when combined with active physical training. Adaptive physical education (APE) is one approach that is being used for individuals with congenital disabilities as well as those with disabilities due to injury or illness. APE has been implemented for rehabilitation and adaptation so that people with disabilities can overcome physical and psychological barriers. Such special exercises support children with disabilities to develop their skills and to build on their strengths. In Magadan, Russia, adaptive swimming is part of an APE program. This case study describes adaptive swimming as a form of social work with disabled children during 2012 – 2013. The report presents the goals, objectives, and methods used by coaches and teachers to implement the program.

PREPARING UNDERGRADUATE STUDENTS FOR CULTURALLY RESPONSIVE TEACHING
Emily Molenaar, Michelle Burke, Sadie Leidall, Pathy Xiong, & Patrick McCann
Lori Piowlski, Faculty Mentor (Department of Elementary and Early Childhood Education)

This is a qualitative and quantitative study investigating the procedure of preparing undergraduate teacher candidates for culturally responsive teaching in the elementary classroom. The hypothesis for this study is that intentional experiences and collaborative discussion activities will increase students’ knowledge of implementation of culturally responsive teaching. “Culturally responsive teachers not only know their students well, they use what they know about their students to give them access to learning” (Lucas and Villegas). This project is significant because classrooms in the United States are rapidly growing in diversity. According to Lucas and Villegas, teachers must move beyond the superficial notion of diversity that is prevalent classrooms today and gain a fresh vision of teaching and learning in a diverse setting to intentionally guide their curriculum (Lucas and Villegas, 2002). Undergraduate students will participate in a four-week field experience in a Midwestern school district working with kindergarten through second grade students. Teacher candidates will complete a survey administered by researchers after the field experience, which will be analyzed for cultural competence in the classroom. Students will also be asked to take the Intercultural Developmental Inventory (IDI) developed by Milton and Bennett. The population is thirty-two undergraduate students in the first phase of professional education. Ages range from nineteen to thirty-five. Researchers predict that students will demonstrate a higher understanding of culturally responsive teaching due to intentional instruction through the field experience placement in the elementary school.
Gender and Women’s Studies

THE POLITICS OF BLACK WOMEN’S HAIR
Dieynaba Niabaly & Vanessa King
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

EMOTIONAL ABUSERS AND THEIR EFFECTS ON CUSTODIAL ARRANGEMENTS POST-DIVORCE
Heidi Sampson
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

THE DISNEY ‘PRINCESS’ MODEL AND ITS IMPACT ON TOYS
Natasha Frank
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

PORTRAYALS OF FATHERHOOD IN MTV’S TEEN MOM
Brittany Echstrand
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)
THE POLITICS OF BLACK WOMEN'S HAIR
Dieynaba Niabaly & Vanessa King
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

Historically, Black women’s image has been subjected to high scrutiny that rendered every choice they made for their body and hair important. Black women have undergone many pressures that shaped their hair choices in various ways. However, there is a general tendency in the literature to homogenize all Black women’s experiences and disregard their ethnic diversity. In this study, we explored both African and African-American college women’s feelings about the motivations to straighten (relax) or wear their hair without chemical treatment (natural). For this qualitative approach, we utilized a cross-cultural approach and interviewed 12 African and African American college women with relaxed (chemically treated) or natural (chemically untreated) to understand the motivations for their various hair choices. Findings reveal that African and African American women with relaxed hair are influenced by different factors; African women with relaxed hair reported being influenced by community and media while African American women reported family as the most influential factor regarding their hair decisions. Both African and African American women with natural hair viewed their hair as a personal choice rather than a political statement. In general, African American women reported more exposure to natural hair than African women who, for the most part, discovered it when they came to the United States. Although, Black women seem to have similar experiences about their hair cross-culturally, there are relevant particularities in each group’s experiences that are worth taking into account for a more precise knowledge of these groups.

EMOTIONAL ABUSERS AND THEIR EFFECTS ON CUSTODIAL ARRANGEMENTS POST-DIVORCE
Heidi Sampson
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

Women often believe the misconception that once a divorce is finalized, the emotional abuse will stop. Society often does not realize or acknowledge the extreme difficulty that arises in negotiating some kind of a parenting partnership with an emotional abuser even after divorce. In this research study, I conducted semi-structured in-depth interviews with women who were in the process of navigating a custodial relationship or had negotiated a custodial relationship with their emotional abuser post-divorce. Feminist research methods were applied to explore their individual experiences, allowing for their stories to be told without restriction or feelings of being silenced. Preliminary findings suggest that participants shared several experiences; such as, continued emotional abuse post-divorce, a sense of silencing by the abuser and/or society, feeling alone in their struggles, frustration with the family court system, and finally, having to resort to different strategies to ensure their own safety. These findings have implications for understanding women’s experience after divorce, as emotional abuse may continue. This means society must acknowledge its existence within the family court system. It is credible and worthy of the effort required to find new ways in which to ensure safer co-parenting practices, as well as to establish programs that validate a victim of emotional abuse’s experience within our society.
THE DISNEY ‘PRINCESS’ MODEL AND ITS IMPACT ON TOYS
Natasha Frank
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

The Walt Disney Company has a major impact on children’s development, especially girls. Created in 2000, the Disney Princess Brand that features ten princesses, Ariel, Aurora, Belle, Cinderella, Jasmine, Mulan, Pocahontas, Rapunzel, Snow White and Tiana, has brought a whole new arena of products to Disney. Existing research examines Disney’s impact on toys but has not specifically focused on the Disney Princess Brand of toys. For this research study, I conducted a visual content analysis of 275 Disney Princess toys at national retail stores, Target and Wal-Mart located in Mankato, Minnesota. I coded the primary function on the toy, the intended age range of the toy, and the Princess or Princesses featured on the toy. My results show the top uses of toys by Disney Princess are for dress up and doll play. The top Princesses featured on toys were Cinderella, Belle, and Ariel. Study findings suggest that most toys featured under the Disney Princess Brand enforce stereotypical gender roles for women such as caring for children and caring about looking like a respectable and put together woman. Toys produced under the Disney Princess Brand impact how girls are taught to be women and we, as a society, need to hold the Walt Disney Company responsible for reinforcing these norms and pressure them to change.

PORTRAYALS OF FATHERHOOD IN MTV’S TEEN MOM
Brittany Eckstrand
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

There are many harmful stereotypes about single parents. Custody laws often favor mothers, based partially on the idea that fathers are less likely to be able to “mother” children. Our society is immersed in television, and it is important to analyze this media outlet in order to see the types of messages viewers receive about single fathers. For this research study, I conducted a visual content analysis of the representations of fatherhood in the first three seasons (2009-2011) of the MTV reality television show Teen Mom. I analyzed the father figures for any potential stigmas and stereotypes, and the following items were considered: fathers’ job, arguments with mothers’ of children, how fathers were treated by maternal grandparents, adjectives given to describe fathers, co-parenting, and the fathers’ overall presence in the life events of the child. Research findings reveal that fathers were often given negative adjectives to describe them and were not the primary caregivers. These findings suggest that the MTV’S portrayal of fatherhood is overwhelmingly negative and perpetuate larger social stereotypes showing that father’s are not suitable as single parents. I believe after this study that we need more representation of fathers in the media.
Automotive Engineering Technology

SMART FORTWO HYBRID VEHICLE DEVELOPMENT
Daniel Varevice & Kyle Anderson
Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)
URC SUPPLY GRANT RECIPIENT

SIMULATE MULTI-PULSE DIESEL INJECTION BY USE OF COMPUTATIONAL FLUID DYNAMICS (CFD)
Sasanka Andawatta Kankanamge
Jeffrey Doom, Faculty Mentor (Department of Automotive Engineering Technology)
URC SUPPLY GRANT RECIPIENT

RACK AND PINION STEERING SYSTEM FOR AN FSAE COMPETITION CAR
Chelsea Mann
Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)
URC SUPPLY GRANT RECIPIENT

PARTICULATE EMISSIONS OF DIESEL METHANE
Paul Hill
Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)
NORTH STAR STEM ALLIANCE GRANT RECIPIENT
The purpose of this project was to increase the usability of a hybrid Smart ForTwo vehicle. In recent years, an electric motor was added to the front of the vehicle and made to drive the front two wheels. The original diesel engine remained driving the two rear wheels. Making the diesel engine and electric motor work together left three main usability issues. Cooling support was required for the diesel engine and electric motor so that they would maintain the proper temperatures. Next, battery pack installation limited access to the diesel engine creating maintenance issues. Finally, making the diesel engine and electric motor work together required designing a program and adding a computer into the vehicle to allow communication between them. To solve these problems, proper radiator size and structure was found by measuring engine coolant intake and output temperatures as well as flow rates. This resulted in both the electric motor and diesel engine remaining at constant temperature, therefore maintaining efficient operation. A rack was constructed to safely hold batteries in place as well as to allow access to the diesel engine. Road testing was done to prove design safety and security. This allowed the engine to be properly accessed without removing 400 pounds of batteries. Finally, adding a CompactRio computer system automated the switch between diesel power and electric power. This resulted in a vehicle that would smoothly transition between diesel and electric power while driving down the road.

The modern society is based on converting energy into many different forms from transportation to electric power. Diesel, gasoline or naturally gas are fuels used by the internal combustion engine to produce different forms of energy. The purpose of this research is to compare different form of Diesel injections that are used in an internal combustion engines. Internal geometry of an injector will be created and computational fluid dynamics modeling process will be used on Star CCM+ software to simulate two different injection methods. The simulation will be compared against single injection and multi-phase injection. Significant reduction of Oxides of nitrogen and soot will be produced in multi-phase injection compared to direct injection.
RACK AND PINION STEERING SYSTEM FOR AN FSAE COMPETITION CAR
Chelsea Mann
Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)

The Automotive Engineering Technology department at MSU, Mankato has been participating in the national Formula SAE competition for over two decades. The event not only implements research, fabrication and testing skills, but is a great lesson of leadership and teamwork. FSAE provides a strict set of rules that must be followed by the entire team. The steering system will need to allow the driver to comfortably navigate the car through all types of driving terrains and withstand handling at high speeds and velocities with minimal resistance at the steering wheel. Previous teams on this project had binding in the steering system which affected the driver’s ability to “feel the road.” This major flaw was eliminated by removing friction on contact points and joints, and correcting the geometry of the steering and suspension systems on the front wheel line. The tie-rods were aligned to a front steer design to keep forces on the front outer wheel through cornering, and to allow for tight and quick handling. The steering wheel was aligned away from the driver for comfort while eliminating binding in angles for the universal joints in the steering shaft. The best testing for this system was driving the vehicle while collecting data via data acquisition system and getting feedback from the driver. The data acquisition gave finite data that was used to make final adjustments on the physical mockup of the system. The research from this year will assist future teams in optimizing a successful car for FSAE competition.

PARTICULATE EMISSIONS OF DIESEL METHANE
Paul Hill
Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)

Particulate emissions are created through the burning of diesel fuel in an engine and are seen as the black smoke emitted when load is applied to a diesel engine. These particulates can cause a variety of health effects, the biggest one being cancer. To reduce the amount of particulates being produced less fuel needs to be burned or combustion needs to happen more efficiently. In order to do this, methane injection has been incorporated into the test diesel engine so that it burns a mixture of both fuels. Methane burns cleaner therefore has less particulate emissions and costs much less to produce than diesel. However, diesel must be kept for idle states and to produce more torque Previous research suggests that a decrease in emissions will come with a cost to power because methane produces less power per weight. Baseline tests were performed to record particulate emissions, fuel economy, and engine power. This was done on a stock engine and with diesel fuel only; no methane was added at this time. Methane is then added in increments to record the effects on each of the previously mentioned categories. A decrease in particulate emissions with an increase in fuel economy and engine power is what the desired data would look like. Currently the research is incomplete and needs further testing to finalize the results. Conclusive data will be obtained in the next few months that may confirm previous research.
DESIGN AND IMPLEMENTATION OF A LED FAÇADE WITH BEAT DETECTION CAPABILITY
Brian Stephenson, Bill Tycer, & Eric Taintor
Mohammad Habibi, Faculty Mentor (Department of Electrical Engineering)

POLARIZATION RECOVERY IN MIMO OPTICAL RECEIVERS USING BLIND EQUALIZATION IN SIGNAL PROCESSING II
Bushara Dosa
Qun (Vincent) Zhang, Faculty Mentor (Department of Electrical Engineering)
Craig Huang, Graduate Student Mentor (Department of Electrical Engineering)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

LOW-COST INTEGRATION OF CAMERA AND MOTION CAPTURE FOR USE IN PEDIATRIC NEUROMOTOR THERAPY OPTIONS
Eric Taintor, Eric Diep, & Melissa Hoppe
Mohammad Habibi, Faculty Mentor (Department of Electrical Engineering)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

PHASE ERROR PERFORMANCE IN HIGH SPEED OPTICAL COHERENT TRANSCEIVERS
Martin Tato
Qun (Vincent) Zhang, Faculty Mentor (Department of Electrical Engineering)
URC SUPPLY GRANT RECIPIENT
DESIGN AND IMPLEMENTATION OF A LED FAÇADE WITH BEAT DETECTION CAPABILITY
Brian Stephenson, Bill Tycer, & Eric Taintor
Mohammad Habibi, Faculty Mentor (Department of Electrical Engineering)

The LED Façade is a trifold panel device placed at the front edge on a DJ's table. It contains strips of individually controlled red, green, and blue light emitting diodes (LEDs). This product was created as a part of an engineering design project in the Spring of 2012 to create a set of low cost and feature rich devices for use by a DJ at events. Existing façades are not synchronized by a music beat or they are expensive (over $7000). This cost-effective equipment will help fill the gap in the market. At the start of this semester, the LED Façade’s structure, lighting, and diffusion elements were already designed and built, but the controlling software and beat synchronization capability was still in a rudimentary form. This semester (Spring 2013) we designed a LED Façade controller which synchronizes the lights with the music for approximately $100.00. The project consists of several components: • Beat extraction hardware and software algorithms for use on a live audio feed. • Audio visualization effects for display on the façade. • A user interface for the façade that gives the end user options to customize the behavior of the display. • A user manual that describes the procedures for all operations of the façade. Beat detection has numerous applications in medical, automation, and audio processing. Developing a highly accurate beat detection algorithms is still under active research areas. We learned signal processing and advanced topics in electrical engineering by doing this project.

POLARIZATION RECOVERY IN MIMO OPTICAL RECEIVERS USING BLIND EQUALIZATION IN SIGNAL PROCESSING II
Bushara Dosa
Qun (Vincent) Zhang, Faculty Mentor (Department of Electrical Engineering)
Craig Huang, Graduate Student Mentor (Department of Electrical Engineering)

Adaptive filters are smart signal processing devices that can learn from their concerned system environment, and configure themselves accordingly to perform desired functions. Furthermore, adaptive filters have the capability to adapt to environmental change and continuously update themselves to deliver designed performance. In this regards, adaptive filters are true artificial intelligent machines. Here we study the performance of an adaptive filter with blind equalization (i.e., without firstly giving the filter any training) in optical receivers, for a multiple input multiple output (MIMO) communication channel. In this research, two signals with orthogonal polarizations can be used to carry different information, so that the capacity of the system doubles compared to using only one signal with a single polarization. During signal propagation, the two input polarizations will be mixed together by the optical fiber channel and cannot be separated by a simple receiver. To recover the polarization and separate the received signal into the original transmitted signals, a polarization diversity receiver is used to convert the received signal to multiple outputs for use by an adaptive filter using one kind of blind equalization method i.e., the constant modulus method (CMA). After a brief introduction to simulation system setup for a realistic dual polarization optical fiber communication channel, we present the performance of the adaptive filter on the filter startup state, filter updating step-size, and gradient noise.
LOW-COST INTEGRATION OF CAMERA AND MOTION CAPTURE FOR USE IN PEDIATRIC NEUROMOTOR THERAPY OPTIONS
Eric Taintor, Eric Diep, & Melissa Hoppe
Mohammad Habibi, Faculty Mentor (Department of Electrical Engineering)

Obtaining quantifiable data on pediatric walking patterns has numerous applications in the biomedical field, including diagnosis, treatment planning, and developing physical therapy options. Motion capture (or mocap) and video capture are two commonly used tools for recording these data. The purpose of the proposed project was to develop a low-cost system to: I) synchronize video data from multiple perspectives; II) record mocap data without attaching markers to the child; and III) integrate EMG, mocap and video recording in one user interface. The intended use for this system is to assist in pediatric therapy options for children younger than 18 months with neuromuscular disorders. The project was divided into three phases. The requirement for Phase I was to record multiple videos from several perspectives. In fall 2012, we successfully implemented a solution via C# programming. Our solution is a program that allows the user to record videos from multiple webcams simultaneously and also analyze videos. To meet this end, we explored various aspects and options for Phase I via decision matrices. We also started to study the Phase II, which involves recording and analyzing the mocap data collected from multiple Microsoft Kinects. One future implication of this project is the availability of a low-cost, non-invasive biomechanics imaging system for physical therapists. Other applications include educational and automated diagnosis of gait disorders.

PHASE ERROR PERFORMANCE IN HIGH SPEED OPTICAL COHERENT TRANSCEIVERS
Martin Tato
Qun (Vincent) Zhang, Faculty Mentor (Department of Electrical Engineering)

The purpose of this research project is to assess characteristics of communication systems hardware at speeds that are currently viable in research settings. The specific characteristic that is studied is the error or miss-assessment of a unit of data. Two kinds of errors are considered: errors at the sending end of the system and errors at the receiving end of the system. This is consideration is based on current hardware limitations of the communication systems. The above mentioned errors are considered in two different communication systems Quadrature Phase Shift-Keying (QPSK) and Quadrature Amplitude Modulation 16-bit (QAM-16). QPSK is the current method of transmitting high speed data such as the home internet service provider. QAM-16 is not yet being used in the market but it is under intensive industry research. The scope of this project is to analyze the currently available theoretical data on the subject and create software simulations to assess the levels of the errors. The data is then compared against the error correction abilities currently available (Forward Error Correction FEC). Another comparison is to the acceptable level of noise also called interference, which is always present in any communication system. The comparisons determine the quality of the communication system while the simulations attempt to present a clear picture of the physical variables in a communication system.
Anthropology, Art, Communication Disorders, Communication Studies, Construction Management, Dental Hygiene, Elementary and Early Childhood Education, Family Consumer Science, Gender and Women’s Studies, Geography, Government, Human Performance, Psychology, Sociology, Urban and Regional Studies, & World Languages and Cultures

1. DESIGN BUILD, DOES IT LIMIT SMALLER COMPANIES (LESS THAN 30 MILLION) FROM USING IT?  
   Nicholas Jeurissen  
   Brian Wasserman, Faculty Mentor (Department of Construction Management)

2. EXPECTED CHALLENGES OF BUILDING INFORMATION MODELING INTEGRATION  
   Jacob Vietze & Jacob Blattner  
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3. CLOUD COMPUTING  
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4. LEED CERTIFIED AND THE EFFICIENT HOME  
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5. REVIT SOFTWARE  
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6. CONSTRUCTION MANAGEMENT PLANNING / SCHEDULING SOFTWARE: PRIMIVERA P6 VS. MICROSOFT PROJECT  
   Robin Haugh & Jason Larson  
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7. COST BENEFIT ANALYSIS OF SOLAR POWER IN COMMERCIAL CONSTRUCTION  
   Andrew Myre & Matt Dauk  
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8. NATIONAL ASSOCIATION HOME BUILDERS COMPETITION  
   Travis Heilig, Kyle Atchley, & Torey Golberg  
   Leah Roue, Faculty Mentor (Department of Construction Management)

9. BETTER PUBLIC PRIVATE PARTNERSHIP IMPLEMENTATION IN MN  
   Kyle Long  
   Brian Wasserman, Faculty Mentor (Department of Construction Management)
10. GREEN INFRASTRUCTURE – MSU, M PARKING LOT RECONSTRUCTION PROJECT
   Gregory Moulton & Dominic Digatono
   Matthew Durand, Faculty Mentor (Department of Construction Management)

11. DOING RESEARCH ON RESEARCH: ASSESSING FACTORS THAT MAY INFLUENCE
    STUDENT RESEARCH PARTICIPATION IN PSYCHOLOGY
   Stacy Anderson
   Karla Lassonde, Faculty Mentor (Department of Psychology)

12. EXAMINING THE USE OF EXTENDED TIME ACCOMMODATIONS AT A
    UNIVERSITY SETTING
   MaryBeth Armstrong & Daniel Spencer
   Carlos Panahon, Faculty Mentor (Department of Psychology)
   Melissa Stewart, Graduate Student Mentor (Department of Psychology)
   Marcia Sytsma, Graduate Student Mentor (Department of Psychology)
   URC SUPPLY GRANT RECIPIENT

13. DO GENDER DIFFERENCES IN MATHEMATICS EXIST IN MINNESOTA?
   Leslee Uhrich & Alex Bakardjiev
   Carlos Panahon, Faculty Mentor (Department of Psychology)
   Samantha Bergmann, Graduate Student Mentor (Department of Psychology)
   URC SUPPLY GRANT RECIPIENT

14. SOUTHERN MINNESOTA INITIATIVE FOUNDATION: PARENT AWARE
    STATISTICAL ANALYSIS
   Kristen Paulsen, Lauren Bach, Marin Beck, & Katie Westermayer
   Emily Stark, Faculty Mentor (Department of Psychology)
   URC SUPPLY GRANT RECIPIENT

15. WOMEN ON TOP: PREJUDICES AND ADVANTAGES OF THE FEMALE LEADER
    Lauren Bach
    Susan Anderson, Faculty Mentor (Department of Psychology)

16. PERCEIVED SEXUAL APPEAL AND SEXUAL ACTIVITY LEVELS OF PREGNANT
    WOMEN
    Nicole Gartner
    Eric Sprankle, Faculty Mentor (Department of Psychology)
    Keagan McPherson, Graduate Student Mentor (Department of Psychology)

17. SEXUALIZATION OF FEMALE ADOLESCENTS IN MUSIC VIDEOS
    Lauren Finley & Amber McHugh
    Eric Sprankle, Faculty Mentor (Department of Psychology)
    Shelby Afflerbach, Graduate Student Mentor (Department of Psychology)

18. INFLUENCES OF STUDENT MINDSET AND MOTIVATION ON STUDY HABITS AND
    LEARNING SKILLS
    Sarah Sieberg & Angela Graske
    Emily Stark, Faculty Mentor (Department of Psychology)
19. TEXTBOOK COST AND USAGE RELATIVE TO STUDENT LEARNING
   Mellisa Xiong
   Laura Riness, Faculty Mentor (College of Graduate Studies and Research)
   Melissa Lenz, Graduate Student Mentor (Department of Psychology)

20. FACTORS IN STUDENT LEARNING
   Yadira Salinas & Mellisa Xiong
   Daniel Houlihan, Faculty Mentor (Department of Psychology)
   Melissa Lenz, Graduate Student Mentor (Department of Psychology)
   URC SUPPLY GRANT RECIPIENT

21. COMMUNICATION BETWEEN LATINO PARENTS AND THEIR FIRST GENERATION COLLEGE STUDENTS
   Yadira Salinas
   Deepa Oommen, Faculty Mentor (Department of Communication Studies)

22. ALTERNATIVE APPROACHES TO PROBLEMS IN CONTEMPORARY PARENT–CHILD RELATIONSHIPS: RUSSIAN CONTEXT
   Anastasiya Gerasimova
   Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)

23. INNOVATIONS IN PRE-SCHOOL EDUCATION IN RUSSIA’S FAR EAST REGION
   Ekaterina Lepekha
   Elizabeth Sandell, Faculty Mentor (Department of Early Childhood Education)

24. ECUADOR’S INDIGENOUS GROUPS AND EMIGRATION
   Myra Colakovic
   Elizabeth Harsma, Faculty Mentor (Department of World Languages and Cultures)

25. WHAT DO YOU WANT?
   James Clayton
   Kristen Treinen, Faculty Mentor (Department of Communication Studies)
   URC SUPPLY GRANT RECIPIENT

26. PHOENIX: FEAR BURNING, HOPE RISING
   Katelyn Dick
   Elizabeth Miller, Faculty Mentor (Department of Art)
   Alisa Eimen, Faculty Mentor (Department of Art)
   URC SUPPLY GRANT RECIPIENT

27. SENSORY PERCEPTION
   Jasmine Greenwaldt
   Brian Frink, Faculty Mentor (Department of Art)
   URC SUPPLY GRANT RECIPIENT

28. INCREASING ANAEROBIC AND AEROBIC CAPACITY WITH THE HELP OF INDIVIDUALIZED INTERVAL TRAINING
   Brianne West, Cassie Weik, & Haley Petterson
   Robert Pettitt & Ida Clark, Faculty Mentor (Department of Human Performance)
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29. SELECTED LANGUAGE SKILLS OF INDIVIDUALS WITH ASPERGERS SYNDROME
   Kayla Mathiowetz
   Bonnie Lund, Faculty Mentor (Department of Communication Disorders)

30. SPECIFIC LANGUAGE SKILLS OF AN INDIVIDUAL WITH DOWN SYNDROME
   Kia Gronski
   Bonnie Lund, Faculty Mentor (Department of Communication Disorders)

31. SPEECH AND LANGUAGE OF A CHILD WITH DOWN SYNDROME
   Elizabeth Smith
   Bonnie Lund, Faculty Mentor (Department of Communication Disorders)

32. SELECTED LANGUAGE SKILLS OF A CHILD WITH COCHLEAR IMPLANTS
   Julia Omtvedt
   Bonnie Lund, Faculty Mentor (Department of Communication Disorders)

33. WHITENING PRODUCT EXPERIENCES AMONG COLLEGE STUDENTS
   Whitli Reimann & Megan Groebner
   Angela Monson, Faculty Mentor (Department of Dental Hygiene)

34. THE COMMUNITY’S AWARENESS OF THE CHILDREN’S MUSEUM OF SOUTHERN MINNESOTA
   Marcie Woitas & Amanda Hunstad
   Heather Von Bank, Faculty Mentor (Department of Family Consumer Science)

35. PARENTAL SATISFACTION WITH INVOLVEMENT AT CHILD CARE CENTER
   Amanda Hunstad & Marcie Woitas
   Heather Von Bank, Faculty Mentor (Department of Family Consumer Science)

36. COLLEGE STUDENT’S FAST-FOOD CHOICES AND THE INFLUENCE OF CALORIE LABELING
   Sarah Schellinger, Amanda Heffner, Katherine Mondry, Cody Rose, & Chelsea Cortez
   Susan Fredstrom, Faculty Mentor (Department of Family Consumer Science)
   MINNESOTA STATE FOUNDATION GRANT RECIPIENT

37. "CONNECTED" FAMILIES IN THE 21ST CENTURY
   Kelsey Becker
   Daniel Moen, Faculty Mentor (Department of Family Consumer Science)

38. ORAL TALES OF SOMALIA
   Terri Hanson
   Susan Schalge, Faculty Mentor (Department of Anthropology)
   Kellian Clink, Faculty Mentor (Library Services)
   MINNESOTA STATE FOUNDATION GRANT RECIPIENT

39. REPRESENTATIONS OF IDEAL BEAUTY: AN EXPLORATION OF PEOPLE MAGAZINE’S “MOST BEAUTIFUL PEOPLE"
   Tina Dlugopolski & Courtney Janssen
   Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)
40. FINANCIAL ACCESSIBILITY AND AVAILABILITY FOR INDIVIDUALS WITH EATING DISORDERS IN MINNESOTA
Abby Wedrickas & Sarah Marsh
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

41. APPLICATION OF GEOGRAPHIC INFORMATION SYSTEMS IN COLLEGIATE FOOTBALL RECRUITING
Matthew O’Neil
Rama Mohapatra, Faculty Mentor (Department of Geography)
URC SUPPLY GRANT RECIPIENT

42. THE EFFECTS OF EXPANDED NATURAL GAS RESOURCES IN YOUNGSTOWN, OHIO: THE POTENTIAL BENEFITS VS. THE POTENTIAL HARM
Matthew Lassonde
Martin Mitchell, Faculty Mentor (Department of Geography)
URC SUPPLY GRANT RECIPIENT

43. BREAKING THE SILENCE: PERCEPTIONS OF HIV/AIDS AMONG AFRICAN AMERICANS IN THE UNITED STATES
Thomas Vincent
Jacqueline Vieceli, Faculty Mentor (Department of Government)

44. CHANGE IN THE WORLD - THE SHIFT TO A GLOBAL SYSTEM
Kenean Tesfaye
Jacqueline Vieceli, Faculty Mentor (Department of Government)

45. MINNESOTA PROBLEMS, MINNESOTA SOLUTION TO BARRIERS AFRICAN AMERICAN STUDENTS FACE ATTENDING A PREDOMINANTLY WHITE INSTITUTION
Antonio Moore
Dennis Waskul, Faculty Mentor (Department of Sociology)

46. IMPACTS OF TOXIC WASTES ON SOMALI PEOPLE WHO LIVE ALONG THE COAST
Ahmed Shiiraar
Raymond Asomani, Faculty Mentor (Urban and Regional Studies Institute)

47. SURVEYING TEACHERS ABOUT THE USE OF STABILITY BALLS AS AN INTERVENTION
Nicole Kafka & RaeLynn Limberg
Carlos Panahon, Faculty Mentor (Department of Psychology)
Natasha Olson, Graduate Student Mentor (Department of Psychology)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

48. WEIGHT AND GENDER DISCRIMINATION AMONG JOB APPLICANTS
Jill Sohre & Jill Morris
Kristie Campana, Faculty Mentor (Department of Psychology)
49. EXAMINING THE ROLE OF INTUITION IN DECEPTION DETECTION
Chelsea Schmillen & Colette Baudoin
Emily Stark, Faculty Mentor (Department of Psychology)
URC SUPPLY GRANT RECIPIENT

50. SMALL BUSINESS SUCCESSION PLANNING IN SOUTHERN MINNESOTA
Alexander Mozey, Tatiana Soboleva, Nicholas Laxen, & Regan Knapp
Emily Stark, Faculty Mentor (Department of Psychology)

51. BODY IMAGE AND PERCEPTION
Heather Dittel
Kathy Bertsch, Faculty Mentor (Department of Psychology)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

52. LAPTOPS IN CLASSROOMS: EVALUATING POTENTIAL BENEFITS OF TECHNOLOGY AGAINST DISTRACTIONS PART 3
Maria Almoite & Felicia VandeNest
Karla Lassonde, Faculty Mentor (Department of Psychology)

53. GENITAL BODY IMAGE AND SATISFACTION
Richard Drenckhahn
Eric Sprankle, Faculty Mentor (Department of Psychology)
Andrew Ahrendt, Graduate Student Mentor (Department of Psychology)

54. BARRIERS TO IDEAL SEXUAL FREQUENCY
Allison Campbell & Kelly Miller
Eric Sprankle, Faculty Mentor (Department of Psychology)
Matthew Schumann, Graduate Student Mentor (Department of Psychology)

55. INVESTIGATING TEACHERS' PERCEPTIONS OF STUDENTS WITH EBDs
Cassandra Schreiber & Ashley Kuemper
Carlos Panahon, Faculty Mentor (Department of Psychology)
Dana Shea, Graduate Student Mentor (Department of Psychology)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT
1. DESIGN BUILD, DOES IT LIMIT SMALLER COMPANIES (LESS THAN 30 MILLION) FROM USING IT?
Nicholas Jeurissen
Brian Wasserman, Faculty Mentor (Department of Construction Management)

Design build is a project delivery method used in the construction field. It takes the whole scope of the project and puts it on one single entity called the design builder. After introducing what design build is to the reader and they understand, the study will explain what it takes to complete the design build process within the company. After much of the information is included, conclusions will be drawn on whether or not the design build process can be done by smaller companies and where the most issues arise. To find information on the topic, various types of reference materials will be used including: books, journals, online sites, as well as an interview with a construction firm that uses design build and completes less than 30 million dollars’ worth of work annually. By looking at these different types of reference materials and interview, the study should be able to effectively draw conclusions to answer the question.

2. EXPECTED CHALLENGES OF BUILDING INFORMATION MODELING INTEGRATION
Jacob Vietze & Jacob Blattner
Brian Wasserman, Faculty Mentor (Department of Construction Management)

Three dimensional building information modeling (BIM) is a technology becoming more popular in the construction industry. This technology is being used by more contractors every project. BIM is a concept of constructing a 3-D model along with information about the construction project. BIM is used to better understand the project and see potential issues before they arise. Because of BIM’s potential value, contractors in Minnesota may look into this technology, but like any new technology there are issues with implementation. Our goal is to discover what challenges a contractor can expect during the integration of BIM into their projects. Our research will consist of surveys directed to contractors that have already implemented BIM. Knowing the challenges contractors faced, we will be able to discover what contractors can expect while considering BIM.
3. CLOUD COMPUTING
Tyler LaMott, Andrew Osterheim, & Curtis Sell
Brian Wasserman, Faculty Mentor (Department of Construction Management)

Will it be more productive for field personnel to have increased involvement in the documentation of information? It is observed that the field personnel are not involved enough in the change order process pertaining to construction projects. Increased file sharing to field personnel pertaining to change orders will provide for quick implementation of the plan set changes. The lack of change order communication between the office and the field is detrimental to the advancement of the construction process. This research project will compare and contrast previous jobs that do not use modern communication technologies and or systems to expedite updated change order drawings and/or change order approval statuses. Implementing modern cloud based communication services will provide for reduction in rework durations and costs while reducing project duration due to the increased rate at which change orders are processed. The research is expected to reduce the amount of time the field personnel expend on waiting for change orders to be approved and communicated from the main office to the construction site.

4. LEED CERTIFIED AND THE EFFICIENT HOME
Ben Nelson & Ben Devine
Brian Wasserman, Faculty Mentor (Department of Construction Management)

The topic discussed will compare the costs of becoming LEED (Leadership in Energy and Environmental Design) certified in residential buildings specifically in Minnesota and the benefits of being certified. What is LEED and why should we care? LEED is a voluntary, market-driven program that provides third-party verification of green buildings. It is designed to lower operating costs, reduce waste, conserve energy and overall have a healthier home. The major focus of this research will be on factors that minimize the total cost of ownership and maximize the efficiency of the home. What combination of LEED credits are most beneficial to the home owner and will give them the most sustainable and economical home.

5. REVIT SOFTWARE
Michael Lindaman & Brian Barnett
Brian Wasserman, Faculty Mentor (Department of Construction Management)

Is the use of Revit on a construction project beneficial or not? The many effects Revit has during the construction phase can influence the project in a number of ways; including the use of time, the amount of money spent and the overall efficiency of the project work. The reason this research is important is because a project manager should know what the outcomes of a project are with and without the use of Revit. This will help determine if using the software is beneficial or not on a given project. The reader will first need to know and understand what Revit is and its basic functionalities in the construction industry. The approach to this research will be finding a case study of a commercial construction project that incorporated Revit, and studying the construction of that project in regards to money spent, time spent, errors incurred, etc. Then, find a second case study of a project of similar attributes that did not incorporate Revit and analyze that project and its outcomes as well. In doing this research the vital components of a construction project will be known in two different projects; one with the use of Revit, and one without the use. This will determine the general answer to if you should use Revit on a project or not, given the benefits and tradeoffs. The research will show how beneficial the use of Revit was or was not on the given project.
6. CONSTRUCTION MANAGEMENT PLANNING / SCHEDULING SOFTWARE: PRIMIVERA P6 VS. MICROSOFT PROJECT
Robin Haugh & Jason Larson
Brian Wasserman, Faculty Mentor (Department of Construction Management)

Construction planning software, such as Oracle Primivera P6 and Microsoft Office Project, have been used for many years by construction managers to organize their large projects. These software programs assist a project manager in developing a plan, assigning resources to tasks, tracking progress, managing the budget, and analyzing workloads. Often, clients require even small construction projects to incorporate such planning software in order to bid on the project - forcing more contractors to purchase and learn this software all the time. Deciding which software is best for the construction manager may include factors such as: cost of software, level of difficulty to learn, meeting the client's needs, and usability on a day-to-day basis. Surveys and interviews of contraction managers with experience using these two types of software regarding these factors are currently in process. By investigating the challenges and benefits of current software users, future users are better able to decide which software is best for their company's needs.

7. COST BENEFIT ANALYSIS OF SOLAR POWER IN COMMERCIAL CONSTRUCTION
Andrew Myre & Matt Dauk
Brian Wasserman, Faculty Mentor (Department of Construction Management)

This study is being conducted to discover the life-cycle financial benefits of installing solar power options on commercial construction projects. Electric solar power, a common method of green construction is an expensive upfront option. Through the study of the Alternative Energy Overview prepared for Toro and similar studies with electric solar power as an option, hope to discover that over the life-cycle of the projects there is a financial benefit to having these panels installed. Buildings studied will include buildings currently being designed and built, and buildings that are at the end of their life-cycle and ready for demolition. Total life-cycle cost must be accounted for to accurately measure the financial benefit of solar power in commercial buildings; the costs associated with conception and design, physical construction, regular maintenance, and future demolition and disposal. The study is conducted to determine if these panels are a worthwhile investment for every person and company, regardless of their feelings for the environment.
8. NATIONAL ASSOCIATION HOME BUILDERS COMPETITION
Travis Heilig, Kyle Atchley, & Torey Golberg
Leah Roue, Faculty Mentor (Department of Construction Management)

Each year the Construction Management Student Association (CMSA) participates in the National Association Home Builders nationwide competition. This competition is for institutions offering a four year bachelor’s degree in residential construction related majors. This competition requires CM students to research specific information that would be required by any industry professional looking to develop a parcel of land. This year’s competition problem statement included developing a 118 acre parcel of land located in Saratoga Springs, Utah into a residential development that we felt would best appeal to our determined target market. Our research included web based sources to determine the current site conditions/characteristics, and to complete market, financial, and risk analysis. This research was then used to determine the appropriate target market, our competition in the area, home designs, sales/marketing strategy, and startup cost. With the information obtained through our research and applied learning we designed and financed the 118 acre development, which included 192 lots with housing options ranging in price from $212,600 to 280,000 and three recreational parks. We also developed a five phase schedule including financial estimates, to predict a plan that would be presentable to investors in a real life situation.

9. BETTER PUBLIC PRIVATE PARTNERSHIP IMPLEMENTATION IN MN
Kyle Long
Brian Wasserman, Faculty Mentor (Department of Construction Management)

P3 (Public Private Partnership) is not commonly implemented in Minnesota due to several pitfalls the delivery method tends to have. This abstract expresses that P3 has strong potential to be one of the most if not the most cost effective delivery method (as opposed to the Design-Bid-Build method) for public projects because P3 hires public workers to do government jobs instead of more expensive union workers. By hiring from the public sector two very beneficial things can happen; the community in which the project takes place gets an economic boost from receiving jobs and the local government can save substantially on said project’s cost by not paying for the union mark-up. All too often this is not the case unfortunately. A major pitfall P3 tends to have is that without the assurance union labor brings, projects often go over schedule and over budget. Public project managers that are hired often do not have adequate experience or do not fully understand the scope of the project, which leads to poor quality of work and the project going over budget and past schedule. A peer reviewed journal article (Blake) suggests a simple solution. During the initial planning stage of a government project, before delivery method is chosen; do extensive research on public firms, and see if there is a project team available that is truly responsible, has had experience and a good track record with projects of similar scope and type.
10. GREEN INFRASTRUCTURE – MSU, M PARKING LOT RECONSTRUCTION PROJECT  
Gregory Moulton & Dominic Digatono  
Matthew Durand, Faculty Mentor (Department of Construction Management)  

In order for the MSU/Mankato Campus to prepare for the eventual designation and responsibility of becoming a Municipal Separate Storm Sewer System (MS4), construction management students developed and estimated green infrastructure projects to be implemented when two campus parking lots are reconstructed, improving the stormwater runoff from campus property. The green infrastructure projects will reduce pollutant and sediment discharges into the Minnesota River Basin, an impaired water by the Minnesota Pollution Control Agency. The green infrastructure projects include rain gardens, tree trenches and three tree-boxes. With the future adoption of MS4 designation looming, there is a future responsibility to improve stormwater quality before it is released into the Minnesota River Basin. Part of the responsibility of MS4 designation is acceptance of a Total Maximum Daily Load (TMDL) of sedimentation and pollution that can be legally discharged into State waters. By implementing green infrastructure practices the University can provide filtration of the current stormwater while removing pollution and sediments currently being discharged from campus property. Through the reduction of impervious areas on Campus, the University will reduce the volume of stormwater runoff, thereby, reducing downstream flooding loads. The research gained through this study will allow the University to review the total stormwater volume reduction, total phosphorus removal, total suspended solids removal and project costs for each of the green infrastructure practices. The knowledge gained will also allow the University to better understand benefits and site conditions needed to implement successful green infrastructure projects on Campus while reducing impacts to State Waters.

11. DOING RESEARCH ON RESEARCH: ASSESSING FACTORS THAT MAY INFLUENCE STUDENT RESEARCH PARTICIPATION IN PSYCHOLOGY  
Stacy Anderson  
Karla Lassonde, Faculty Mentor (Department of Psychology)  

Hundreds of college students participate in research every year. Although participation is voluntary, it is a critical part of research productivity. We examined archival data collected from the Fall of 2012 and Spring of 2013 using the Psychology Department’s research management system called SONA. Within this data, we were particularly interested in studies that had a high rate of ‘no-shows’. No-shows occur when a participant signs up for a study, but does not show up for either an excused or unexcused reason. A new policy was implemented for the spring 2013 in hopes to lower the high number of no-shows. We gained valuable insight into the utility of this new policy by comparing semesterly data and surveying faculty who rely on the system for research. One implication of a high rate of no-shows is that research is often conducted online vs. face-to-face. This and other insights from this archival analysis will be discussed.
12. EXAMINING THE USE OF EXTENDED TIME ACCOMMODATIONS AT A UNIVERSITY SETTING
MaryBeth Armstrong & Daniel Spencer
Carlos Panahon, Faculty Mentor (Department of Psychology)
Melissa Stewart, Graduate Student Mentor (Department of Psychology)
Marcia Sytsma, Graduate Student Mentor (Department of Psychology)

Test accommodations are commonly defined as a change in testing materials or procedures that enables students to participate in assessments in ways that reflect their skills and abilities as opposed to their disabilities. These accommodations commonly include changes in presentation, response, setting, and/or scheduling of the assessment. Examples of some common test accommodations are extended time, separate room, and test reader. To gain access to test accommodations, it is the student’s responsibility to provide documentation of the disability from a professional specialist. Once a student is approved for test accommodations, he or she must work directly with the university’s Office of Disability Services to utilize the test accommodations throughout the school year. Although extended time has been found to be a preferred accommodation for students with disabilities, little research has been conducted on the actual utilization of this accommodation. Therefore, the current study investigated the usage of the extended time test accommodation at a public university in the Midwestern United States by examining archival data obtained from the university’s Office of Disability Services. Descriptive analyses compared standard exam times with actual time spent completing exams by students with extended time accommodations. It is hypothesized that a majority of students who utilize this test accommodation do not require the additional. Rather, it is hypothesized that students use the extended time option to decrease test anxiety. Implications of these findings will be discussed.

13. DO GENDER DIFFERENCES IN MATHEMATICS EXIST IN MINNESOTA?
Leslee Uhrich & Alex Bakardjiev
Carlos Panahon, Faculty Mentor (Department of Psychology)
Samantha Bergmann, Graduate Student Mentor (Department of Psychology)

There has long been a social perception that males are inherently better at mathematics than females. This stereotype exists not only in the real world but in the classroom setting as well. Li (1999) reported that males are perceived by their teachers to be more dominant in mathematical ability and in turn are expected to perform better in the subject. The focus of our study is to examine whether or not these perceived gender differences in mathematical capability actually exist in Minnesota. This task will be accomplished by comparing Minnesota Comprehensive Assessment (MCA) test results between males and females. The Minnesota Comprehensive Assessment (MCA) is a set of standardized tests which Minnesota schools give each year to measure student performance on state standards (Minnesota Board of Education). Archival student data will be collected from the department of education. Three years worth of Minnesota Comprehensive Assessment (MCA) student scores will be reviewed for each of the following grades: third, fifth, eighth, and eleventh. Findings will provide a better understanding of the whether or not there is a difference in mathematical performances between males and females in Minnesota.
14. SOUTHERN MINNESOTA INITIATIVE FOUNDATION: PARENT AWARE 
STATISTICAL ANALYSIS
Kristen Paulsen, Lauren Bach, Marin Beck, & Katie Westermayer 
Emily Stark, Faculty Mentor (Department of Psychology)

Preschool programs in Minnesota currently do not have a required curriculum guaranteeing Kindergarten readiness. Parent Aware is a pilot program that has been introduced into the state. It will create a rating system that will inform parents about which preschools will prepare their children to be Kindergarten ready. Because this program is relatively new, many preschool programs are not aware or ready to make the change to a Parent Aware approved curriculum. For our project, we joined with the Southern Minnesota Initiative Foundation (SMIF), which has the resources to provide support, information, and grant money to these preschool programs. We developed a survey for local programs to better understand their familiarity with Parent Aware, and what resources they need to make necessary changes. The online survey was sent to over 100 preschool programs throughout Southern Minnesota. There were 39 respondents, four of which indicated that they were currently rated by Parent Aware and 20 of which were working towards being rated. Overall, concern was expressed regarding the value of a Parent Aware rating. A majority of respondents indicated that student learning would not be improved after being rated by Parent Aware. Our recommendations to SMIF include providing informational workshops and grant opportunities for preschools that are interested in the Parent Aware program. These findings will help Minnesota preschool programs provide a higher-quality education to children before Kindergarten, laying a solid foundation for academic success in grade school and beyond.

15. WOMEN ON TOP: PREJUDICES AND ADVANTAGES OF THE FEMALE LEADER
Lauren Bach 
Susan Anderson, Faculty Mentor (Department of Psychology)

According to the role congruity theory, female leaders encounter prejudice in seeking top-level leadership positions (e.g., corporate manager) because female gender roles are incongruent with valued leadership roles (Eagly & Karau, 2002). However, past research suggests that females at the highest leadership positions (e.g., female president) may not experience the same prejudice; rather, they are considered to be regarded favorably and as highly competent leaders (a finding that contrasts with role congruity theory; Rosette & Tost, 2010). The purpose of this study was to determine the effects of gender and leader position on perceptions of female leaders. Participants in this experiment (n=52) were asked to read an article about a leader in which the gender and leadership position (Division Manager vs. Senior Executive Vice President) were manipulated. Participants subsequently answered a short questionnaire, rating the leader on effectiveness, likeability, agentic and communal traits. The perceptions of leaders did not significantly differ between the conditions. Though these results fail to support a female leader advantage or prejudice, further research should be conducted to determine the implications of female leader perceptions.
16. PERCEIVED SEXUAL APPEAL AND SEXUAL ACTIVITY LEVELS OF PREGNANT WOMEN
Nicole Gartner
Eric Sprankle, Faculty Mentor (Department of Psychology)
Keagan McPherson, Graduate Student Mentor (Department of Psychology)

This study aims to better understand the belief that pregnant individuals are asexual in comparison to non-pregnant individuals. Specifically, researchers want to know if pregnant individuals are perceived as less sexually appealing and/or presumed to be less sexually active than those who are not pregnant. Variability in perceptions of sexual activity and appeal depending upon pregnancy trimester are clarified, as well as gestational period’s impact on attractiveness perception in comparison to assessment of facial features. This study utilizes a 2 (attractiveness) X 4 (gestational period) design. Participants thus far have been primarily Caucasian, female, and heterosexual. Subjects were randomly assigned to one of eight groups and each given the same survey measuring physical attractiveness and sexual activity level of a pictured woman. Preliminary findings reveal no significant differences between groups; however, mean trends indicate that, overall, those who were assigned to the condition with the stimulus (pictured woman) labeled as more attractive rated the woman to be more sexually appealing and active than individuals assigned to the “less attractive woman” condition. Broken down by gestational period, regardless of attractiveness condition, participants rated non-pregnant individuals as less sexually appealing than pregnant individuals. As stated, no significant differences between groups emerged, suggesting that gestational period does not affect outcomes as much as pregnancy status overall. However, additional data is needed to draw definitive conclusions and is subsequently still ongoing. Results of this study will help to understand perceptions of pregnant women with regards to their sexual appeal and sexual activity level.

17. SEXUALIZATION OF FEMALE ADOLESCENTS IN MUSIC VIDEOS
Lauren Finley & Amber McHugh
Eric Sprankle, Faculty Mentor (Department of Psychology)
Shelby Afflerbach, Graduate Student Mentor (Department of Psychology)

The sexualization of female adolescents has become a concern for media viewers in the last decade. Young girls in the media are being seen as sexual objects as opposed to being seen as independent people with defined characteristics. The current study presents a content analysis that analyzes participants’ (N=31) sexual ratings of six music videos featuring adolescent female artists. Preliminary statistical analysis found that five out of the six videos were not rated as sexualizing for the artists. However, one video was rated to be sexualizing on several levels including: solo dancing, clothing, body language, environment, and videography (e.g., camera angles). These findings were interesting as the video that was found to be sexualizing is the only video that could be categorized as a rap video and is the only video with an African American artist. The videos will continue to be rated throughout the semester in order to obtain a larger sample size.
18. INFLUENCES OF STUDENT MINDSET AND MOTIVATION ON STUDY HABITS AND LEARNING SKILLS
Sarah Sieberg & Angela Graske
*Emily Stark, Faculty Mentor (Department of Psychology)*

Mindset consists of how individuals perceive their own abilities (Dweck, 2006); meanwhile motivation involves the drive people have to perform an action (Gillet et. al., 2010). Individuals with a growth mindset are more likely to believe that they can improve their abilities through hard work compared to those with a fixed mindset, which could lead to improved performance. Similarly, intrinsic motivation, which connects to enjoying the activity itself, may lead to more persistence in learning than extrinsic motivation, where individuals are motivated only by external rewards. By examining the types of mindsets and motivations students have for studying and learning, we can gain a better understanding of how individuals face challenges and the effects that has on their performance (Dweck, 2006). In the current study, 172 participants completed measures of critical thinking skills, GPA, beliefs and attitudes toward school, superstition, logical thinking, the extent to which they are intrinsically motivated to do well in school, and the extent to which they believe intelligence can be developed with hard work (growth mindset). Results found that intrinsic motivation positively related to growth mindset ($r = .19, p < .02$). Additionally, these two concepts did relate to participants’ attitudes about school, but not their GPA or critical thinking skills. We discuss why it may be important for students to develop intrinsic motivation and a growth mindset, and how that can influence their success in college.

19. TEXTBOOK COST AND USAGE RELATIVE TO STUDENT LEARNING
Mellisa Xiong
*Laura Riness, Faculty Mentor (College of Graduate Studies and Research)*
*Melissa Lenz, Graduate Student Mentor (Department of Psychology)*

College is an investment that students tend to make after high school; yet with no financial stability or income, college can become very costly. Tuition alone is averaged to be $7,323 at Minnesota state universities. Last year, 71% of Minnesota graduates graduated with an average student debt of $29,800. This research focuses on Minnesota State University, Mankato students and on how much they spent on their textbooks as it is another supplement added onto student fees. Specifically, they were asked how much their class textbooks for the spring semester of 2013 cost and what resources they had to pay for it. The amount of cost is then compared to the usage of their textbook relative to how much they have learned from the materials found in the textbooks. Books are the main source of communicating information across instructors and students. Why must students pay for their books when instructors normally don’t have to worry about textbook fees? Examples of a survey question asks how many hours students tend to study a week verses how many hours students are expected to read from their instructors. Since surveys are not all collected yet, one significant hypothesis is that students tend to find textbooks as a financial burden verse a career investment when it comes to how much they absorbed, or learned, from their class materials. The overall data will be collected and correlated with national data to alert where MSU students stand after their degree completion.
20. FACTORS IN STUDENT LEARNING
Yadira Salinas & Mellisa Xiong
Daniel Houlihan, Faculty Mentor (Department of Psychology)
Melissa Lenz, Graduate Student Mentor (Department of Psychology)

Students and teachers look at learning differently. A 2008 study of college students and instructors found that students placed a great deal of importance on factors related to instructors. Instructors, however, placed importance on instructor and student related factors. Therefore, we attempted to determine if this is true for Minnesota State University, Mankato and Minnesota high schools by surveying their students and instructors. To our knowledge, no similar study has been conducted comparing attitudes at the college and high school levels. The survey includes items that address instructor personality, delivery of material, course related factors, student temperament, and setting. Surveys were given to undergraduates taking a psychology course, and instructors throughout the university. High school students were able to participate if 18 years old or if their parents provided consent. Final data analysis has not occurred, however, we predict that several important differences will be found between high school and college students, college instructors and high school teachers, and between students and their respective instructors/teachers. Quantifying differences in perspectives will help develop better transition programs for incoming college students, and may even provide insight to teacher burnout.

21. COMMUNICATION BETWEEN LATINO PARENTS AND THEIR FIRST GENERATION COLLEGE STUDENTS
Yadira Salinas
Deepa Oommen, Faculty Mentor (Department of Communication Studies)

Latino students are one of the minorities that attend higher education in the United States, especially in the Midwest region. A study released in 2007 stated that only 48% of Latinos ages 18 to 25 compared to 60% of all young adults say they plan to obtain minimum a Bachelor’s degree. Latino First Generation college students that currently attend Minnesota State University, Mankato are recruited to participate in this study. Each participant participated in face-to-face interviews. This project will look into themes of different communication styles each student had with their parents growing up and how it may have affected their higher education.

22. ALTERNATIVE APPROACHES TO PROBLEMS IN CONTEMPORARY PARENT–CHILD RELATIONSHIPS: RUSSIAN CONTEXT
Anastasiya Gerasimova
Elizabeth Sandell, Faculty Mentor (Department of Elementary and Early Childhood Education)

This research describes the problems of contemporary Russian families directly related to the nature of parent-child relationships. The study reviews the definition of "parent-child relationship" in psychological and educational literature, as well as methodological approaches used to explore parent – child relationships. Consideration is given to activities and ways of working with families that can strengthen parent – child relationships.
23. INNOVATIONS IN PRE-SCHOOL EDUCATION IN RUSSIA’S FAR EAST REGION
Ekaterina Lepekha
Elizabeth Sandell, Faculty Mentor (Department of Early Childhood Education)

The research report shares contemporary innovations in early childhood education in the Far East of the Russian Federation. Schools in the region have experienced innovations that parallel the changes in Russian society since the end of the Soviet period. Changes in society always involve transformation in pre-school educational institutions, known in Russia as “kindergartens.” Teachers are introducing innovations to develop new opportunities and to meet the needs of pre-school children and their families. Creative, professional, and educational activities are emerging to provide conditions to meet new requirements.

24. ECUADOR’S INDIGENOUS GROUPS AND EMIGRATION
Myra Colakovic
Elizabeth Harsma, Faculty Mentor (Department of World Languages and Cultures)

Indigenous groups in Ecuador and their traditions, cultures, values, and environments are greatly affected by the majority population. Many Ecuadorians emigrate every year to the United States and Spain for a variety of reasons. The purpose of my research is to investigate how Ecuador’s indigenous groups are affected by the majority population and why some Ecuadorians choose to migrate to other countries. I performed this study by researching a variety of sources on this topic, such as research books, peer-reviewed scientific articles, and reliable online resources to achieve my results. By better understanding the relationship between mainstream populations and indigenous groups, and studying how many groups do preserve their culture and often thrive, we can better learn how to ensure the well-being of these groups. Through this investigation, we learn the reasons and details of Ecuadorian emigration, which can have cultural, social, and economic effects in different countries.

25. WHAT DO YOU WANT?
James Clayton
Kristen Treinen, Faculty Mentor (Department of Communication Studies)

Hello, my name is James Clayton I am a senior here at Minnesota State University, Mankato. The project that I will be presenting is a book project that I have been working on for the past 6 months, “What do You Want?” This has been a very fun and exciting process, and I am excited to share my work and hope that people really enjoy all of the work and effort I put into accomplishing this creative project. I love the ability to come up with a creative idea, thinking about it, and then seeing that idea come to life. In this next portion I will explain what the process was for me to write this book, what the book is about, and other things that I am doing to get people engaged, and whether or not I think this is an effective way of operating.
26. PHOENIX: FEAR BURNING, HOPE RISING

Katelyn Dick

Elizabeth Miller, Faculty Mentor (Department of Art)
Alisa Eimen, Faculty Mentor (Department of Art)

My project is a sort of ceremony about letting go of fear. To do this I have created two acrylic paintings depicting a phoenix at different points of its life: death and rebirth. The intent is for the audience to interact with the pieces: I encourage them to participate by adding “parts of themselves” (their fears) to the canvas of the dying phoenix. This can be done using “leaves” I have prepared with canvas scrap, upon which an audience member may write a fear, worry, or phobia so that it can be attached to the canvas. This allows the participant to add what troubles them discreetly. Once the process of “adding oneself” to the canvas is complete, this older phoenix will be taken to an outdoor location. The leaves added to the canvas by audience members will be turned and read one by one, until all fears, phobias, and worries have been exposed. When this is completed the canvas, leaves and all, will be lit on fire and destroyed, leaving the livelier phoenix (and ashes of the elder) as all that remains of the set. In conducting this ceremony, my wish is for the audience to find relief in that fear is but a temporary burden that need not weigh them down, and that they, like the phoenix, can continue on. We are not our fears. Though these things are a part of us, they need not stop us from living our lives. Sometimes, It’s okay to let go.

27. SENSORY PERCEPTION

Jasmine Greenwaldt

Brian Frink, Faculty Mentor (Department of Art)

Within my work, I try to combine a mixture of gentleness and serenity with a contrast of boldness and activity. I attempt to simultaneously contrast harmony and the feeling of being broken. I do this by playing with color, light and form. I want myself and others to explore their senses and witness things they may never have felt before. Nature, emotions, and the objects around me are my inspirations. I don’t necessarily want to paint how nature looks, but I want to paint how it feels. I do this by layering paint, using globs, washes and drips. These techniques help me to achieve the contrast I want in my work, while making each painting feel whole. I don’t want people to take a glance at my work and immediately understand its meaning. I want there to me more than that; a depth that goes beyond surface level and pulls the viewer in, making them truly see what is there. I love the unexpected, which is the reason why I will often add such harsh strokes to something delicate, like a flower, or use unusual colors in nature that people wouldn’t truly see in reality, but would feel. I want to explore the depth of emotions that you can feel from color, texture, pattern and nature.
28. INCREASING ANAEROBIC AND AEROBIC CAPACITY WITH THE HELP OF INDIVIDUALIZED INTERVAL TRAINING
Brianne West, Cassie Weik, & Haley Petterson
Robert Pettitt, Faculty Mentor (Department of Human Performance)
Ida Clark, Faculty Mentor (Department of Human Performance)

The 3-min-all-out exercise test (3 MT) is a technique that estimates critical speed (CS) and anaerobic work capacity (D’). The critical speed (CS) model identifies an athlete’s CS, in relation to their max aerobic steady state, and their anaerobic capacity (D’). A velocity-time (V-t) relationship of the extreme exercise bout, in which D’ indicates the capacity of work above CS, is determined via the CS concept. In soccer, there is a need to sprint repetitively (D’) as well as have an aerobic base (CS). We adapted the 3 MT, devised to identify CS and D’, for indoor running using a digitized video on 17 female, collegiate soccer players in order to prescribe interval training programs for each athlete. The team was divided into two groups to either improve CS or D’, depending on their individual deficiencies. Each group completed eight intervals over a four week period at identical percentages of D’ depletions, but at different V-t durations. Therefore, the group working to improve their D’ or anaerobic capacity ran 400m intervals at high velocities, while the group improving their CS or aerobic capacity ran 600m intervals at low velocities. Heart rate (HR) was recorded and downloaded after every workout from each athlete. The HR data progressively got higher after each interval, indicating the individual is exercising above CS. Post assessment of the 3 MT will be evaluated as before to determine the efficacy of the programs prescribed. These results will be reported on the poster.

29. SELECTED LANGUAGE SKILLS OF INDIVIDUALS WITH ASPERGERS SYNDROME
Kayla Mathiowetz
Bonnie Lund, Faculty Mentor (Department of Communication Disorders)

Aspergers syndrome (AS) can have a huge impact on an individual’s speech and language development and skills. Understanding the difficulties that these individuals face can help us understand what we need to do to help them grow successfully in all areas of development. In my qualitative research, I interviewed the mother of an individual with AS, then compared what she told me to what literature says about AS. The interview sample was transcribed and coded using qualitative research methods. I found patterns in the data and made the following assertion: Active parental involvement, living in group homes, and partaking in therapy while growing up helped this individual with AS grow and continue to grow successfully in all areas of development, but especially with communication and social development. After completing my research, it was clear to me that individuals with AS can lead very successful lives and can make gains on proper social behaviors and communication with appropriate therapy and positive support systems.
30. SPECIFIC LANGUAGE SKILLS OF AN INDIVIDUAL WITH DOWN SYNDROME
Kia Gronski
Bonnie Lund, Faculty Mentor (Department of Communication Disorders)

The purpose of this qualitative research analysis is to explore the specific language skills of individuals with Down Syndrome (DS). This research is also formulated to assist with understanding these individual’s progression of speech and language development and to compare the results to proven data from research. This qualitative analysis will also explore the factors on how having DS can affect a child’s personal life, development, friendships, studies, and family relationships.

31. SPEECH AND LANGUAGE OF A CHILD WITH DOWN SYNDROME
Elizabeth Smith
Bonnie Lund, Faculty Mentor (Department of Communication Disorders)

a) The understanding of speech and language deficits that children with Down syndrome experience is important in facilitating growth and overall well-being of the child. I performed this qualitative research study to better understand the many components of Down syndrome itself, as well as better understand the experiences of a specific child who has the disorder. b) This qualitative research study included: review of existing literature pertaining to the disorder and an interview with a parent of a child who has Down syndrome. c) From the interview, I discovered many important things. Some of the most important include: support groups for children with the disorder, knowledge of the hardships that families will encounter, how to handle behavioral challenges, and methods to make life healthy and happy for individual's with Down syndrome. d) I learned of the importance of early intervention when it comes to development on various levels. (motor, literacy, language, etc) Also, incorporation of various types of therapy and building connections both professional and allies of the disorder.

32. SELECTED LANGUAGE SKILLS OF A CHILD WITH COCHLEAR IMPLANTS
Julia Omtvedt
Bonnie Lund, Faculty Mentor (Department of Communication Disorders)

A qualitative research study was conducted to gain a better understanding of a child with Cochlear Implants (CIs). A review of the literature described the developmental aspects of children with hearing loss and Cochlear Implants. The researcher performed a case study on a young boy with CIs and information was gathered through an interview of the boy’s father. The interview was audio recorded, transcribed, and coded using qualitative research methods. From this data, twelve patterns emerged. A conclusion was made that Cochlear Implants facilitate Speech and Language Development for children with hearing loss to the extent that it closely approximates the development of a child with normal hearing. In addition, a supportive family and educational system is necessary for maximal benefit.
33. WHITENING PRODUCT EXPERIENCES AMONG COLLEGE STUDENTS
Whitli Reimann & Megan Groebner

Angela Monson, Faculty Mentor (Department of Dental Hygiene)

Purpose. This study examined the popularity of whitening products among college students, along with the type of product used and overall experience. The study explored differences between types of whitening products and pain associated with it. Methods. Surveys were distributed to a convenience sample of two health science classes (N=112) at MSU, Mankato. Of those surveyed, 26 majors were represented, with 80.4% Caucasian and 85.7% between the ages of 18 and 22. Results. The majority (74.1%) of students in the sample have used whitening toothpastes and/or mouth rinses. More than half (61.1%) have used over-the-counter whitening strips (ie Crest white strips®), while only 10.7% reported using professional whitening systems (ie custom trays). Participants who used professional systems were significantly more satisfied with results than those who used only white strips (p=.015). Of those who used white strips, 53.9% have used them more than once, with 18.7% reporting using them seven times or more. There were no significant differences in reported pain levels associated with tooth or gum sensitivity between white strips and professional systems. Males reported liking the color of their teeth more than females (p=.001). Females were more likely to be influenced by the belief whitening does not work (p=.002). Conclusion. The findings in the study suggest there is an high demand for white teeth, especially among college age individuals. Although over-the-counter whitening products tend to be more popular, the satisfaction was greater when professional whitening systems were used. Further research with a larger random sample is needed.

34. THE COMMUNITY’S AWARENESS OF THE CHILDREN’S MUSEUM OF SOUTHERN MINNESOTA
Marcie Woitas & Amanda Hunstad

Heather Von Bank, Faculty Mentor (Department of Family Consumer Science)

Children’s museums play a vital role in the development of young people’s social, physical, and emotional development. But most of all, museums allow children to play. Play provides a foundation for exploration, observation, discovery, and experimentation in childhood. We know that children from low-income and racial minority groups often experience a disconnection from school and suffer academically. Because our community is becoming more ethnically and economically diverse, addressing the accessibility gap between affluent and disadvantaged families is something that should be addressed. The current research study examines findings from two surveys that were created in partnership with the Children’s Museum of Southern Minnesota. The survey addressed how accessible the children’s museum is to disadvantaged households and the level of awareness the community has about the museum working toward a permanent facility, various payment plans, and issues concerning transportation. A short survey was distributed to members of the community who are low-income during three community events. The results of the surveys will assist the Children’s Museum of Southern Minnesota to serve disadvantaged families and bring the benefits of play to all children in the community.
35. PARENTAL SATISFACTION WITH INVOLVEMENT AT CHILD CARE CENTER
Amanda Hunstad & Marcie Woitas
Heather Von Bank, Faculty Mentor (Department of Family Consumer Science)

The purpose of this research was to examine levels of parental involvement at a local childcare center. Specifically, we sought to understand the level of involvement that parents wanted to have, and how satisfied they were with a recent Parent’s Night event. Parents tend to have low levels of involvement at their children’s daycare centers due to busy schedules and lack of opportunity. However the role that parents play in their child’s education can have lasting effects on their academic and cognitive development. This study examines findings from two surveys. Results from the first survey, evaluating parent’s current and prospective levels of involvement, found that parents were eager to attend and participate in a parent’s night event. The second survey addressed parents’ satisfaction and evaluation of the parents’ night, in addition to discovering ways to improve attendance of future family events. The results from this study will provide the child care center with information about parent’s expectations for involvement and will address the feasibility of parents’ night programs in the future.

36. COLLEGE STUDENT'S FAST-FOOD CHOICES AND THE INFLUENCE OF CALORIE LABELING
Sarah Schellinger, Amanda Heffner, Katherine Mondry, Cody Rose, & Chelsea Cortez
Susan Fredstrom, Faculty Mentor (Department of Family Consumer Science)

Objective: The Affordable Care Act of 2010 require that food vendors with 20 or more outlets post calories on menus. Research was done to investigate how calorie labeling on menus influence college student’s food choices in fast food establishments. Variables used included gender, prior nutrition education level, and college within MSU-Mankato. Methods: Online survey of 117 respondents and focus groups were conducted, with 28 participants. Results: Online survey showed 64% of respondents look at the calorie labeling when making food choices, however, it only affects 50% of them. A statistical analysis of menu activity in focus groups determined that students from different colleges within MSU-Mankato (P = 0.875) and gender (P = 0.931) does not affect students’ food choices when calories are shown on menus. Focus group statements showed that calorie counting and nutritional consideration is too subjective and varies from person to person. Conclusions and Implications: Calorie labeling, although useful and affective for some, did not significantly affect the food choices made by MSU-Mankato students. In addition, these food choices were not statistically different between genders or colleges. Findings from focus group discussions show that the Health Care Act will only affect some individuals and further studies are needed to determine whether more nutrition education is necessary for the Affordable Care Act of 2010 to make an impact on students’ food choices.
37. "CONNECTED" FAMILIES IN THE 21ST CENTURY  
Kelsey Becker  
Daniel Moen, Faculty Mentor (Department of Family Consumer Science)

This poster reviews the progressive impact that technology has had on the family over the past four decades from a family system perspective (e.g., Bowen, 1966). The following research questions were covered: (1) How is technology affecting how the family unit communicates with each other? (2) Is the family unit as connected as they were decades ago when technology was not a huge factor? This study found that technology can serve as a distracting factor in families. For example, 95% of married adults with children have cell phone(s) in the household and 93% have computers (Kennedy, et al., 2008). This increase of technology use in households has led to a new form of family connectedness. This study employed a meta-analysis of four various peer-reviewed scholarly articles to find up-to-date statistics and qualitative themes. For example, Kennedy, et al., (2008, p. 1) found that in place of verbal exchanges which were more common before public use of the internet “Parents and spouses are using the internet and cell phones to create a “new connectedness” that builds on remote connections and shared internet experiences; while families are lacking in enjoying dinner as a family. Additionally, Nimkoff reports that, “New inventions in technology are highly valued and greatly encouraged, while hardly anyone would welcome a new model of the family each year” (1950, p.53).” This example illustrates how family interaction and connectedness has evolved with the invention and use of modern technologies.

38. ORAL TALES OF SOMALIA  
Terri Hanson  
Susan Schalge, Faculty Mentor (Department of Anthropology)  
Kellian Clink, Faculty Mentor (Library Services)

I started volunteering with the YWCA's Ready to Learn program, which places volunteers into homes with immigrant families and their children to make sure that the kids are ready and on track for kindergarten. This program places a huge emphasis on reading books to children to help with bonding, vocabulary, and improving Somali and English language skills. Part of the program recommends immigrant parents to read to their child for 15 minutes a day. I thought it would be interesting to see if I could acquire some Somali children's books for the families I was working with and I found that it was very difficult and that most of the books had to be interlibrary loaned and the ones available for purchase were very expensive. I viewed this as a problem and decided that I would apply for a grant to see if I could interview local Somali elders, collect their stories and have a Children's book illustrated and printed especially for the Mankato and surrounding communities. Each family in the program will receive a free copy (with English/Somali translations) and a copy will be donated to all Mankato elementary schools, libraries and universities. A copy will also be sent to other elementary schools with a significant immigrant population within a 100 mile radius. This book will help facilitate bonding, vocabulary and Somali/English language skills. This book is respectfully created and illustrated for the Somali children and families living in Minnesota.
39. REPRESENTATIONS OF IDEAL BEAUTY: AN EXPLORATION OF PEOPLE MAGAZINE’S “MOST BEAUTIFUL PEOPLE"
Tina Dlugopolski & Courtney Janssen
*Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)*

Prior research suggests that media is one of the largest influences of young women today. Most magazines target an audience by depicting certain physical features for women to idolize. People magazine has the largest audience of all American magazines with a targeting audience of 46.6 million people. In a longitudinal content analysis using visual images of women over a 15 year period analyzing People magazine’s “most beautiful people” of the year we used a unique analytical coding scheme to examined features, feminine touch, clothing, and descriptive text. Our findings indicated that People’s magazine ideal women were mostly Caucasian women with blonde hair and blue eyes. We indicated that the models were being portrayed in a sexual manner. Another significant finding when analyzing the descriptive texts was how Peoples Magazine described the qualifications that were needed to be seen as beautiful. People magazine representing only one type of model reaffirms the specific ideals of beauty, which in turn was broadcasted to its huge audience.

40. FINANCIAL ACCESSIBILITY AND AVAILABILITY FOR INDIVIDUALS WITH EATING DISORDERS IN MINNESOTA
Abby Wedrickas & Sarah Marsh
*Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)*

The prevalence of eating disorders is growing among all age groups and gender spectrums. In the western culture, 6 percent of women battle eating disorders and their eating disorder is highly comorbid with other mental disorders (Emily Program, 2009). In the present study, we conducted a textual content analysis of several Minnesota based insurance companies and eating disorder treatment centers to isolate the types of financial assistance that was offered for inpatient treatment of anorexia and bulimia. We examined written documents of explanations of financial assistance as well as information on services offered from eating disorder treatment centers. Special attention was given to the accessibility and display of the information and whether or not the organizations provided the necessary means to access it. Our research findings show that little to no information exist for potential patients interested in treatment for their eating disorder. Insurance coverage is available through contacting insurance agents, but there is not a significant amount of information online. Coverage for eating disorder treatment is minimal, and co-pay rates are high. Our findings have significant implications on the general databases of eating disorder information as well as the rights granted to eating disorder patients with or without substantial insurance coverage.
41. APPLICATION OF GEOGRAPHIC INFORMATION SYSTEMS IN COLLEGIATE FOOTBALL RECRUITING
Matthew O'Neil
Rama Mohapatra, Faculty Mentor (Department of Geography)

College football is a major industry that is expanding rapidly. A median of 13 million dollars is spent annually on college football programs, with an average of 300,000 dollars spent on recruiting. In 2011, 1.1 million boys played football at the high school level, so the right athlete for your program may be difficult to find. Using Arc GIS, we can spatially analyze locations of where starting athletes are coming from and find patterns in their locations. The reader does not need to know anything in detail to understand this study. Using box scores and game participation, I am collecting data on who started and how many games they started in the NSIC since 2008, with the exception of two teams. After we have that data, we can map out where they played high school football and find the patterns. The preliminary findings for this research are interesting. Each school may look for a different type of athlete. Some schools may have recruited their athletes from small towns and other schools concentrate on larger schools. With ongoing research, we will see if there is a correlation between top teams and the bottom teams of the conference and where they recruit their athletes. This research will open doors for GIS and how it can be used in recruiting and assist coaches in finding athletes of their caliber.

42. THE EFFECTS OF EXPANDED NATURAL GAS RESOURCES IN YOUNGSTOWN, OHIO: THE POTENTIAL BENEFITS VS. THE POTENTIAL HARM
Matthew Lassonde
Martin Mitchell, Faculty Mentor (Department of Geography)

Youngstown, Ohio is a distressed community formerly bustling with one of the largest steel manufacturing presences in U.S. history. A state of economic despair had fallen on Youngstown with the collapse of the major steel industries along with a weakening automotive industry. With Youngstown’s proximity over the Marcellus and Utica shale formations, the area has been overwhelmed by companies drilling for natural gas using such methods as hydraulic fracturing, or “fracking”, to release trapped gas otherwise inaccessible in the formations. Through field study, sides of the argument were viewed while gathering opinions from professionals, landowners and community members who have studied the issue or been directly affected by it. The study examined the many claims of environmental degradation and pinned them against the positive claims to identify the issues and assist in considering whether or not the US should continue allowing this method. It was observed that there have been direct and indirect adverse environmental effects due to fracking in Youngstown including induced earthquakes, strain on water resources and health risks from silica sand mining in other states that supply this resource for the process. There have also been several positives to fracking as it has created jobs and works toward an end to foreign dependence on natural gas resources. Results revealed a need for improvements to technologies in fracking implementation and greater restrictions placed on company’s practices but still considered that leaving the resource untouched could allow dependence shifts that would be detrimental for the U.S.
43. BREAKING THE SILENCE: PERCEPTIONS OF HIV/AIDS AMONG AFRICAN AMERICANS IN THE UNITED STATES
Thomas Vincent
Jacqueline Vieceli, Faculty Mentor (Department of Government)

Over the recent years, there has been an alarming increase in the population of individuals infected with the HIV virus in the U.S; however, it is infecting African Americans at a disproportionate rate as compared to other ethnic groups. Statistically, blacks make up about 14% of the US population but account for over 50% of all new cases of HIV, a rate that is 8 times greater than that of whites. This research is geared to uncover the reasons behind the alarming rates of infection by assessing the social, economical and behavioral determinants of health among African Americans living in the US. It also seeks to understand if underlying factors such as gender and sexuality have a significant role to play in one’s level of awareness. The research was conducted by reviewing the literature of two documentaries. These two sources were used to assess knowledge of HIV/AIDS among African Americans as it pertains to the individual and their community. The results of the research were very disconcerting and indicated that many African Americans were oblivious to the consequences that HIV/AIDS had within the Black community. Lack of education, stigma, a “down-low” lifestyle, high rates of incarceration, violence and the disempowerment of women were some to the themes that came up repeatedly. Being aware of one’s status, knowing the risk factors and having an open discourse about the impact of the disease were key steps that need to be taken in order to break the silence of this epidemic.

44. CHANGE IN THE WORLD - THE SHIFT TO A GLOBAL SYSTEM
Kenean Tesfaye
Jacqueline Vieceli, Faculty Mentor (Department of Government)

The United Nations created the Commission for Global Governance, documented on Jan 25, 2000. The foundation for global governance is the belief that the world is now ready to accept a global civic ethic based on a set of core values that can unite people of all cultural, political, economic, religious, or philosophical backgrounds. Additionally, governance should be reinforced by democracy at all levels and ultimately by the rule of enforceable law. Our Global Neighbourhood was released by the Global Governance commission which predicates a world court, a global tax, and global police force. The U.S. State Department Publication 7277 outlines a one world police force under the United Nations. So many prominent world leaders are calling for a one world government. The goal of this literature review is to target the reason behind the need to have a one world currency and removal of borderlines between countries. Governments of the free world have become slowly involved in people’s personal lives. This is exactly what socialism is. In Australia, farmers now require permission to farm the land they own. Liberty seems to be slowly slipping away. This literature review research concludes using countless newspapers and reported news from United Nations that this generation is in economic, political and religious shift. The concern lies in the high paced speed governments are taking that is rapidly transforming our society. Are people being informed in what is taking place? The people should have a voice in the decisions that are being made.
45. MINNESOTA PROBLEMS, MINNESOTA SOLUTION TO BARRIERS AFRICAN AMERICAN STUDENTS FACE ATTENDING A PREDOMINANTLY WHITE INSTITUTION

Antonio Moore

*Dennis Waskul, Faculty Mentor (Department of Sociology)*

African Americans graduate from Minnesota Colleges significantly less than other Minnesotans. Minnesota State University Mankato graduates significantly fewer African Americans than are admitted. Why? What barriers do African American students on Minnesota campuses experience? What support systems are in place and what do they aim to do. This study will look specifically at the problems African American students experience on this state’s college campuses, largely white, and see what factors are involved with trying to support these students to ensure their success.

46. IMPACTS OF TOXIC WASTES ON SOMALI PEOPLE WHO LIVE ALONG THE COAST

Ahmed Shiiraar

*Raymond Asomani, Faculty Mentor (Urban and Regional Studies Institute)*

The main principle of this research is to collect and report all available evidence of highly toxic wastes (HTW) dumped in Somalia to contribute a long term researches about toxics in Somalia. Since this case was a life-threatening case, I always had in my mind that I will one day conduct research about it. My passion has increased last year, when I did joint research project about “Rout causes of Somali piracy”. As the result that research has broadened my thinking and fortunately, last fall, I received McNair achievement program fund and I selected my research for this issue.

According to Greenpeace, many developing countries, especially African countries, have been victim of the adverse effects of highly toxic wastes (HTW) originated from the developed countries but the case of Somalia is particularly preoccupying. The country has been subjected to excessive illegal dumping operations of toxic and radioactive wastes for three decades. These wrong doing operations have taken place both along the coast and its adjacent land and had drastically effected on health, environment and the future prospect of sustainable development of the local population. This research is based on authoritative sources and careful analyzed facts done by UN, private institutions, international NGOs with the same conclusion of toxic wastes dumped in Somalia. The conclusion of this research highlights desperate need of field experts and capacity building in support of greater funding for the effects of toxic wastes research since Somalia doesn’t have the capability to conduct those types of research.
47. SURVEYING TEACHERS ABOUT THE USE OF STABILITY BALLS AS AN INTERVENTION
Nicole Kafka & RaeLynn Limberg
Carlos Panahon, Faculty Mentor (Department of Psychology)
Natasha Olson, Graduate Student Mentor (Department of Psychology)

Stability balls, which are commonly used for physical fitness, have become a recent interest among educators as a classroom intervention. Educators implement stability balls as an alternative to traditional classroom seating with the intent to improve inappropriate behavior and academic engagement. However, there is little empirical support for their use and effectiveness is lacking. For the purpose of this study, an 18-item questionnaire was administered to teachers in a Southern Minnesota school district that have and have not implemented stability balls as a classroom intervention. The intent of the questionnaire was to uncover motivations for implementation, perceptions regarding effectiveness, and estimate the prevalence of stability balls in classrooms. It is hypothesized that teachers are motivated to use stability balls based on individual students’ needs and are perceived as a beneficial intervention in lieu of experimental analysis supporting their efficacy.

48. WEIGHT AND GENDER DISCRIMINATION AMONG JOB APPLICANTS
Jill Sohre & Jill Morris
Kristie Campana, Faculty Mentor (Department of Psychology)

Recently, research has begun to focus on obesity and the workplace. Research suggests that individuals make assumptions about job applicants’ abilities based on weight; this is problematic because weight is typically not associated with performance. This study seeks to examine how gender and weight influence judgments about applicant characteristics. Currently, data collection for this study is 75% completed. In this study both the gender and the weight (i.e. normal weight versus overweight) were manipulated using an applicant photograph. Participants review the candidate’s resume, along with the applicant’s photograph. The participant then responds to a survey where they are asked to rate the applicant on reliability, self-discipline, supervision skills, and overall hire-ability. Although data collection is still underway, we do have some promising initial results. First, across most dependent variables, participants are demonstrating a preference for overweight individuals. The one exception is on self-discipline; here, we see that normal weight individuals are rated higher. There are also some interesting interactions; specifically, overweight females and normal weight males were rated as most hirable. We are continuing to collect data and the end results may change in our final analyses. The implications of this study can be seen in organizational, social, and school settings. When candidates are judged differently because of their weight, this can impact the validity of selection measures. In addition, judgments about weight can have important legal consequences for organizations.
49. EXAMINING THE ROLE OF INTUITION IN DECEPTION DETECTION
Chelsea Schmillen & Colette Baudoin
Emily Stark, Faculty Mentor (Department of Psychology)

Many people assume that logical thinking can help to detect deception; however, previous studies show that relying on intuition may be a better practice (Albrechtsen, Meissner, & Susa, 2009). The current research consists of two studies which examine the role of intuition in deception detection. The purpose of Study 1 was to find if participants are able to implicitly and explicitly distinguish between truths and lies. Student participants in this study watched 16 video clips featuring a person telling a true story or a lie. Our results show that participants were implicitly rating the truth-tellers significantly more likeable and more trustworthy than the liars (all \( p < .05 \)); but they were not able to accurately distinguish the lies from true videos. This suggests that their intuition helped them detect the lies, but did not improve their explicit judgments of deception. Study 2 presents participants with shorter video clips to see if this improves their intuitive ratings and accuracy. The current data for Study 2 shows that participants are still at chance levels for explicitly detecting deception. However, and contrary to previous research, these findings also reveal that participants no longer intuitively distinguish between true stories and lies. Participants may not have had enough time to make an intuitive judgment, which in turn led to difficulty in detecting lies. Our findings from both studies expand on previous research and may be beneficial to many professions including crime investigators and social workers as well as in jury deliberations and everyday social situations.

50. SMALL BUSINESS SUCCESSION PLANNING IN SOUTHERN MINNESOTA
Alexander Mozey, Tatiana Soboleva, Nicholas Laxen, & Regan Knapp
Emily Stark, Faculty Mentor (Department of Psychology)

The purpose of this research project was to look at succession planning in businesses in southern Minnesota. Through the Southern Minnesota Initiative Foundation (SMIF), businesses have received funds to help develop succession plans. We followed up with businesses that have received funds from SMIF to see if a) They have made any changes in their business practices in regards to succession planning, and b) How the funds were used and how they helped. We utilized Survey Monkey to collect our information. The survey was designed to determine the presence of defined goals regarding succession planning, the successes and challenges encountered when succession planning, and the possibility of generational transition for the family businesses. Twenty-one business owners responded to the survey, and the results show that there is a general agreement about a lack of succession planning in their companies. At the same time, the majority of owners emphasized that succession planning is very important for their businesses. SMIF had also provided the businesses information regarding several specific topics related to succession planning, and businesses as a whole found this information helpful in moving forward with their plans. We will use this data to better understand the successes and challenges of local businesses when engaging in succession planning, and we hope to find that the funds provided by SMIF have helped businesses in their overall succession planning. We will also develop and present a general framework for businesses to use in succession planning.
51. BODY IMAGE AND PERCEPTION
Heather Dittel
Kathy Bertsch, Faculty Mentor (Department of Psychology)

Negative self-image and low self-esteem are connected to body dissatisfaction and are significant predictors of the self-esteem and self-image in adolescence (Anderson & Kemp, 2012). This research examines the relationship between social situations and body-esteem. Subjects are surveyed to determine their body esteem and degree of body comparison in social situations. Subjects are randomly assigned to 1 of 2 conditions: positive social feedback or control. The degree to which positive social feedback influences body self-esteem is measured through body self-esteem ratings after the treatment/control conditions. This research will answer whether participants who receive the positive feedback treatment will have better body esteem than the control condition. It is also relevant with this study to answer how college students typically perceive themselves and how they perceive themselves compared to others. We will also answer questions specific to social aspects of body esteem such as discovering what social situations influence negative self-comparison or negative self-perception, if body esteem is significantly higher for high comparison groups compared to the control group and if high self comparison groups are more at risk for eating disorders, anxiety and depression. The current study aims to better understand how body self-image is dependent on the context in which it is viewed. With better understanding of body distortion, further prevention and treatment can be applied to individuals with eating disorders.

52. LAPTOPS IN CLASSROOMS: EVALUATING POTENTIAL BENEFITS OF TECHNOLOGY AGAINST DISTRACTIONS PART 3
Maria Almoite & Felicia VandeNest
Karla Lassonde, Faculty Mentor (Department of Psychology)

Laptop use in classrooms has sparked a debate in the teaching community about the advantages and disadvantages (e.g., distractions) of using laptops. To shed light on this debate, in a previous study we explored effects of different note-taking methods with either a pen and paper (handwriting condition) or a laptop (typing condition) on memory for text. We found that students in the handwriting condition did better on an assessment of the material compared to students who typed notes; results were approaching significance. The goal of the current study is to continue to evaluate the effectiveness of laptop use for note taking by asking participants to observe a video lecture. Participants will be assigned to either the typing condition (laptop) or the handwriting condition (pen and paper). They will be instructed to watch a non-psychology introductory video lecture (approx. 20 minutes), and will be asked to take notes on the lecture as if they are going to be tested on the material. After a short distracter task, participants’ memory for the lecture will be tested using a combination of multiple-choice and fill-in-the blank questions. A week later, participants will be given the same assessment test to determine if encoding method (laptop vs. handwritten) influences long-term retention. We hypothesize that participants in the handwriting condition will have a higher retention rate than those who are in the typing condition for both short and long-term retention. We hope that results will inform both students and teachers about best-practices in note taking.
53. GENITAL BODY IMAGE AND SATISFACTION
Richard Drenckhahn
Eric Sprankle, Faculty Mentor (Department of Psychology)
Andrew Ahrendt, Graduate Student Mentor (Department of Psychology)

Personal satisfaction with genital body image can affect an individual’s private, public and interpersonal life. The purpose of this study is to examine females’ satisfaction in relation to their genital body image. The reason we gathered this information is to determine if satisfaction with one’s genital body image is problematic. This information was gathered through an online survey, asking individuals how satisfied they are with their own genital body image. Within the survey women were asked how interested they were in pursuing different types of altering behaviors, such as surgery or cosmetics. Our results show that females typically have relatively neutral feelings about their genitals. The area that displayed the most concern to women was the appearance of pubic hair. It showed overall lower satisfaction ratings as compared to other areas of concern such as color and scent. This was also the area that the most women had used and continue to use methods to alter genital appearance. Interest in the potential of piercing or surgical methods to alter genital appearance was of little interest overall. In general, our study found that women are neither overly satisfied nor dissatisfied with their genital body image. Women displayed little interest in any sort of altering opportunities other than altering their pubic hair. The findings from this study suggest that while women generally have a neutral satisfaction level with the appearance of their genitals, they are not very interested in pursuing comparatively more drastic measures to alter it.

54. BARRIERS TO IDEAL SEXUAL FREQUENCY
Allison Campbell & Kelly Miller
Eric Sprankle, Faculty Mentor (Department of Psychology)
Matthew Schumann, Graduate Student Mentor (Department of Psychology)

The purpose of this study is to assess the general barriers of ideal sexual frequency. Current research focuses on specific barriers (i.e., body image, sexual functioning, and physical health) leading to a discrepancy among actual sexual frequency and ideal sexual frequency, and has not evaluated the occurrence of these barriers in concert. Therefore, this study focuses on occurrence and amount of distress caused by various barriers to ideal sexual frequency. Undergraduate student participants completed the Barriers to Ideal Sexual Frequency Survey through an online data collection system. Results indicate that relationship status, stress and fear of becoming pregnant are the most prevalent barriers to sexual frequency in our sample. The least prevalent barriers include sexual traumatic experience, mental health and physical mobility. Demographic differences in barriers to sexual frequency and the implication of these findings are discussed.
Teachers play an important role in the education of children with emotional and behavioral disorders (EBD). While parents and caretakers often are aware of their child’s difficulties, educators witness the child’s level of progress (VanGelder, Sitlington, & Morrison-Pugh, 2008). Teachers are these students’ first advocates within the academic setting. Unfortunately, a majority of teachers working with these students are planning on leaving their positions within the next five years (Adera & Bullock, 2010). Therefore, it is important to examine teachers’ perceptions regarding children with EBD in order to promote teacher satisfaction and lower stress. This study examined in-service teachers' perceptions of students with emotional-behavioral disorders as well as job satisfaction. Participants were general and special education teachers working in school districts throughout Southern Minnesota. Respondents completed an online survey with questions regarding professional interests, expected career paths, and reactions to stereotypical perceptions of students with EBD. Perceptions of in-service teachers were expected to vary among years spent teaching, percentage of time spent working directly with EBD students, and differing levels of coping abilities and methods. This study will reveal current perceptions in the teacher population, as well as where and when the perceptions arise. Results will be utilized to determine how to improve teachers' understanding of students with EBD and encourage better work environments for teachers who work with students with EBD. Implications of these findings will be discussed to increase professional support and career satisfaction.
Gender and Women’s Studies

THE UNDER-REPRESENTATION OF MINORITIES IN POLITICAL CAREERS
Chelsea Barr & Ina Pae
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

THE EFFECTS OF IDEAL BEAUTY IN MEDIA IMAGES ON WOMEN'S SELF-ESTEEM AND SELF-PERCEPTIONS
Jennifer Stander & Haley Nagel
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

REPRODUCTIVE AND SEXUAL HEALTH DISPARITIES AMONG COLLEGE-AGED BLACK WOMEN: AN EXAMINATION ON PERCEPTIONS AND CONSEQUENCES
Omolayo Oggunowo
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)
URC SUPPLY GRANT RECIPIENT

HIV/AIDS AMONG WOMEN: A POPULATION AT RISK
Amanda Anderson & Danielle Anderson
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)
THE UNDER-REPRESENTATION OF MINORITIES IN POLITICAL CAREERS
Chelsea Barr & Ina Pae
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

Numerous studies have found that people of color, women, and those with physical challenges are significantly under-represented in political careers due to societal barriers. For example, women’s participation in politics shows some improvement while women occupy only 12% of the political careers. To explore whether students and professors interested in political careers have experienced under-representation of minorities, a mixed-method approach with both surveys and interviews of Minnesota State University, Mankato, students and professors from the departments of Government and Gender and Women’s Studies were utilized. These students were selected because both fields study political institutions, and are likely to seek political careers. Research findings support the hypothesis that minorities experience obstacles in the process of obtaining political careers. In addition, professors who work in political careers described a lack of support to maintain their career. This study has implications for raising awareness about the obstacles that people of color, women, and those with physical challenges face obtaining and maintaining political careers. Building upon a wealth of research, our findings will challenge our society to lay prejudicial barriers to rest and provide greater equality for all those seeking political careers. If accepted to both conferences, both authors will have the opportunity to represent the research as first author.

THE EFFECTS OF IDEAL BEAUTY IN MEDIA IMAGES ON WOMEN'S SELF-ESTEEM AND SELF-PERCEPTIONS
Jennifer Stander & Haley Nagel
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

Women are constantly put under pressure to work towards the feminine ideal portrayed in daily media outlets. This has been proved to lead to negative effects in a woman’s mood, self-esteem, and perception of herself. Consistent exposure to unrealistic images only further damages the concept of real beauty in one’s mind. For this research study, 30 female college students at Minnesota State University, Mankato participated in an experimental based study. They were first administered the Body Esteem Scale, next they were exposed to images of women with idealized beauty and others viewed images of average women. Finally, participants retook the Body Esteem Scale. Our research findings indicate there was a significant change in women’s esteem after exposure to idealized beauty images; they reported decreased appreciation in the categories of “appearance of stomach,” “figure or physique,” and “thighs”. These research discoveries can help to further explain how detrimental society’s perception of beauty can be on women and lead to changes in media sources and the images displayed and projected towards the public.
Health disparities are a form of healthcare marginalization that exists currently in the United States healthcare system. Women’s health continues to gain attention; however, gender and racial marginalized black women continue to struggle to gain access to or utilize healthcare resources. Black women have been noted to have increased diagnosis of reproductive and sexual health diseases. College-aged black women may be at greater risk for poor health outcomes than other populations of black women because they are often busy with their education and may lose discernment of the importance of health. This research study examined the perceptions and consequences of health disparities amongst black women attending Minnesota State University, Mankato. Surveys questions obtained information on how college-aged black women perceived reproductive and sexual health as well as possible factors that may be influencing health disparities among them. A total of 75 responses were collected. Research findings reveal that most respondents have very little to no knowledge regarding reproductive health. This lack of perception leads to a detrimental consequence, thus contributing to health disparities. The implication, accordingly, is to push for more aggressive campaigns on the availability and utilization of healthcare resources, particularly for college-aged black women.

Worldwide, women represent half of all adults living with HIV/AIDS, and according to the Center for Disease Control (CDC) this proportion has increased over the past two decades. Prevention programs have become more aware of this populations increasing risk, and have developed programs that specifically target women. However, some researchers argue that these programs have yet to be thoroughly evaluated in terms of their effectiveness. For this research study, we conducted textual and visual content analysis on three different prevention program websites that had some to all HIV/AIDS awareness targeting women. Preliminary research findings focused on Project Hope, The Red Pump Project, and UNAIDS show all three websites to be user friendly in navigation. The information provided is effective in connecting internet users to other avenues of awareness. Our findings have greater implications for website effectiveness on providing awareness to the greater public and specifically women, in hopes of reducing new HIV infections in women.
THE IMPACTS AND RESULTS OF ONLINE PRESENCE FOR SMALL BUSINESSES
Emily Schmitt
Queen Booker, Faculty Mentor (Department of Management)

THE INDUSTRIAL RELATIONSHIPS IN TIME-VARYING BETA COEFFICIENTS IN US INDUSTRIES
Jongha Jung
Kwang-Woo (Ken) Park, Faculty Mentor (Department of Economics)
URC SUPPLY GRANT RECIPIENT
THE IMPACTS AND RESULTS OF ONLINE PRESENCE FOR SMALL BUSINESSES
Emily Schmitt
Queen Booker, Faculty Mentor (Department of Management)

During the years 2006 to 2010, small businesses looked for areas to gain a competitive advantage in a recession era. Some attempted to create an online presence for themselves through the use of a website or social media network. Primary research from one of my previous studies of the 2006-2010 period revealed that small businesses that had a website were 14 percent more likely to be profitable than those that didn’t. In the age of the “user”, prospect customers that only view a product or service online before going to the store, having an online presence is the only way to reach that target group. Other reasons to have an online presence include more accessibility, a greater audience, brand building, reviews, and overall easier marketing. This research project examines whether having website presence impacted profitability for three geographically, economically and ethnically different areas in the United States. The significance of this research is to determine if an online presence increased the probability of profitability for small businesses during the United States economic recession and subsequent recovery. The primary research methodology is observational research using convenience sample data from three regional small business development centers. The centers supplied data regarding number of employees, industry type, website presence, and net revenue from 2007-2010 for a 433 small businesses. Binary regression will be used to determine factors influencing profitability. I expect outcomes to show that companies with an online presence were significantly more likely to be profitable than companies that did not use any online resources.

THE INDUSTRIAL RELATIONSHIPS IN TIME-VARYING BETA COEFFICIENTS IN US INDUSTRIES
Jongha Jung
Kwang-Woo (Ken) Park, Faculty Mentor (Department of Economics)

This paper examines financial linkage of systematic risks for fourthy-night US industry portfolio returns to the US general economy. Time-varying beta coefficients of Capital Asset Pricing Model (CAPM) are estimated and Granger-causality tests are carried out for identifying the significance of the industrial lead and lags to the general economic cycles measured by US industrial production index. The empirical finding shows that the strength and the causality of international financial linkage vary depending on the types of industry and the shocks in the systematic risk. Some US industries including financing industries, iron and metal industries, service, textile, real estate, shipbuilding and railroad equipment, construction materials and wearing industries are relatively vulnerable to the US general market cycles.
Automotive Engineering Technology & Integrated Engineering

FORMULA SAE SHIFTING
Ethan Blomquist
Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)
URC SUPPLY GRANT RECIPIENT

ELECTRICAL CHARGING OUTPUT
Nicholas Kolhoff
Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

2013 FORMULA SAE CHASSIS AND SUSPENSION RESEARCH AND DEVELOPMENT
Scott Neil
Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)
URC SUPPLY GRANT RECIPIENT

WIRELESS MESH NETWORK AS A CATALYST FOR DEVELOPING COUNTRIES
Sushant Mainaly
Rebecca Bates, Faculty Mentor (Department of Integrated Engineering)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT
FORMULA SAE SHIFTING
Ethan Blomquist

Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)

The purpose of this project presented within was to research and develop a pneumatically controlled hydraulic clutch for the Formula SAE car. The problem with the shifting mechanism is that it is a hydraulically controlled clutch that requires a driver to use his hands and some of his concentration to effectively launch the vehicle. The switch to a pneumatic system would allow for a driver oriented, less complicated control system which includes launch control and would improve problems shifting when near redline. In order to achieve the goals of the project, calculations were done to solve the amount of force needed to move a hydraulic cylinder with a pneumatic one, sketches for mockup of a properly sized pneumatic piston, as well as the actual physical testing of the completed system. After testing, the system was mounted and the electronically controlled shifting system with launch control wired to the actual car. After mounting on the vehicle, the system was tested. The results are that the clutch should actuate every single time that the upshift or down shift buttons are pressed as well as being able to control a launch control system that will enable the drive to better launch the vehicle under hard acceleration. This solution will help the Formula SAE car achieve a better score in acceleration, as well as allowing the driver to focus more on the actual driving the vehicle during the races which in turn will make for faster times and better scores within the competition.

ELECTRICAL CHARGING OUTPUT
Nicholas Kolhoff

Bruce Jones, Faculty Mentor (Department of Automotive Engineering Technology)

It takes a substantial amount of power to run the entire electronic system in vehicles today. Automobiles are built to handle all these electronics, but not all small recreational vehicles can. When a small recreation engine is used for the Formula SAE event, electronics like fuel injection and data acquisition systems are added to the vehicle for performance and reliability. With these additions, the electronic power output of the charging system must be evaluated and upgraded if needed. Failure to have a proper charging system can result in a poorly running vehicle or a vehicle that does not run at all. After using an amp clamp and volt meter to measure the stock charging systems performance, a new upgraded system consisting of the stator and voltage regulator was researched and developed to test. The testing was done by putting maximum electrical load that the recreational KTM 525 motor would see, while making sure that the battery was still able to charge. The research paid off as the new charging system outputs about 35 percent more power than stock at 3,800 RPM. This is enough power for all of the electronics and charges the battery adequately. This research helped develop an understanding of charging systems and how to build one based on how much power is needed at a specific motor speed.
2013 FORMULA SAE CHASSIS AND SUSPENSION RESEARCH AND DEVELOPMENT
Scott Neil
Gary Mead, Faculty Mentor (Department of Automotive Engineering Technology)

The significance of the chassis and suspension team was to research and create a student designed formula car rolling chassis. It is very important to the automotive engineering department in particular because it brings together topics of our area of study and gives students a hands on approach, not only learning but also teaching others areas of importance in a vehicle. The chassis and suspension side is important because it is the area of safety in a vehicle; it protects and prohibits injury to a driver of a vehicle. Safety is a very important characteristic in any area of study and getting hands on learning experience has helped all involved in the project. There was research conducted all the way through this project not only through literature, but also through trial and error. Focusing on smaller goals just on the frame side of the project extensive research is spent on frame rigidity and structural strength to find the ideal design. Not only to protect the driver but to protect the vehicle from bending or twisting which would in turn, lose abilities of other systems applied to the chassis. Several computerized programs were used to test the simulated rigidity and resistance of the frame to twist and bend in a real life situation. the same programs were also used on the suspension and suspension components.

WIRELESS MESH NETWORK AS A CATALYST FOR DEVELOPING COUNTRIES
Sushant Mainaly
Rebecca Bates, Faculty Mentor (Department of Integrated Engineering)

Decentralized access to information is an important factor in solving global poverty. High quality access to information enables economic development through easy and fast access to price, data, weather conditions, credit facilities and market opportunities. Internet access can also enable transparency in government and administration. One potential way to provide low cost access is by using mesh networks, a combination of interconnected wireless ad hoc networks. However, the quality of the networks depends on a number of factors such as the type of protocol used, the devices used and the geographic terrain. In this research, various hardware and software combinations are studied to come up with suitable combinations for hilly terrains. In the initial phase, the research is focused on simulation data collected using Omnet++. In the later part of the research, the different hardware and software combinations are demonstrated and modified using Raspberry Pi and XBees. Different terrains are simulated using construction materials to assess the impact of different terrain on the configurations. Performance metrics include speed and bandwidth as well as the efficiency of data routing using the different protocols in different scenarios. The benchmarking result can be used to support the development of mesh networks in developing countries such as Nepal, where mountainous terrain makes wired and simple wireless networks difficult to implement. Specific outcomes are a cataloging of the efficiencies of different protocols and configurations under different conditions.
Economics

AN ANALYSIS OF LABOR AND INFRASTRUCTURE ISSUES BROUGHT BY THE NORTH DAKOTA OIL BOOM
Ozlem Barin
Ihsuan Li, Faculty Mentor (Department of Economics)
MINNESOTA STATE FOUNDATION GRANT RECIPIENT

AN ANALYSIS OF THE EFFECTIVENESS OF COLLABORATIVE LEARNING METHODOLOGY WITHIN HIGHER EDUCATION
Matthew Petersen
Ihsuan Li, Faculty Mentor (Department of Economics)

THE RELATIONSHIP BETWEEN STATE GOVERNMENT POLITICAL IDEOLOGY AND DEFICIT
Curtis Gruidl
Ihsuan Li, Faculty Mentor (Department of Economics)
URC STIPEND/SUPPLY GRANT RECIPIENT
AN ANALYSIS OF LABOR AND INFRASTRUCTURE ISSUES BROUGHT BY THE NORTH DAKOTA OIL BOOM
Ozlem Barin
Ihsuan Li, Faculty Mentor (Department of Economics)

This paper analyzes the major issues concerning labor force and city infrastructure as a result of the oil boom in North Dakota. While sudden increases in natural resources provide opportunities for economic growth it also creates challenges for residents and public administrators. Previous studies have examined the short and long term impacts of these sudden natural abundances and the results show that the impacts could be either positive or negative depending on the sufficiency of labor force and city infrastructure. This paper asks: 1) what will be the short and long term impact of growing immigration due to the oil boom and how will these sudden unexpected changes in population affect the labor force dynamics and existing infrastructure in North Dakota? 2) How to prevent from the negative effects of recourse booms so called “Dutch Disease”? 3) How can policy makers meet urgent needs of growing population with limited government financial resources? These issues are analyzed in lights of historical similarities and differences of oil booms in North Dakota and Texas which enjoyed the positive effects. To find the answer for these research questions, I collected historical annual data set from 1951-2011, for North Dakota, Texas and U.S. and the data is divided in 3 periods of according to the booms occurred during the history. I used t-test of mean and difference in mean, t-test of proportion and difference in proportion, and chi square test of independence to analyze the relationship between the variables by using the Stata software V.11.

AN ANALYSIS OF THE EFFECTIVENESS OF COLLABORATIVE LEARNING METHODOLOGY WITHIN HIGHER EDUCATION
Matthew Petersen
Ihsuan Li, Faculty Mentor (Department of Economics)

This project investigates the long-run educational impact of increased use of non-lecture-based teaching methodology on the quality of university graduates as assessed by post-graduation scores attained on certified public accountant examinations. The study provides quantitative evidence based on actual data, instead of survey results, on whether non-lecture-based learning methodologies improve information retention. The following research questions are asked: Has GPA of graduating seniors improved with the introduction of non-lecture based classroom pedagogy? And if so, did the improved GPA positively impact post-graduate performance on standardized certification exams? To answer these questions, I use actual student data from Minnesota State University, Mankato, as well as CPA exam data obtained from the NASBA. The sample includes the last 20 years of alumni of the Minnesota State University Mankato. In the data set, I include unique, anonymous, identifying numbers for each graduate, as well as their major, graduation year, GPA, and percentage scores on attempted post-graduation certification exams. Other socio-economic, institutional, and personal background data pieces are used as control variables. The analysis of the data is performed at three levels: simple summary statistics; tests of sample mean and differences in means; tests of sample proportion and differences in proportions; and lastly, multiple variable regression analysis (Ordinary Least Square method). The analysis is performed using Stata software V.11. While in-class benefits from non-lecture-based learning techniques have been documented in controlled studies, long run information retention may be compromised in the process.
The primary aim of this research seeks to discover whether the political ideology of our elected leaders will influence government spending and deficit. This study will also contribute to the extensive literature and research on the effects of political orientation and ideology. Particularly by analyzing a larger and more recent data set across the 50 states while focusing thoroughly on revenue and spending by state. State Government data from 2000-2010 was used to specify revenue and spending models. These models identify many important economic and political determinants. Elected officials are now under more scrutiny than ever to perform well, specifically dealing with the perpetual issues of spending and deficit. United States citizens have a constitutional right to elect the official they believe will govern the best. In most cases, voting isn’t directed toward personal aspects but instead towards the candidate’s political ideology. People vote differently because they subscribe to different political ideologies, depending on their norms and assumptions about the functioning of society (Bjornskov, 2004).
Gender and Women’s Studies

YOUNG COLLEGIATE WOMEN'S SEXUAL HEALTH AND KNOWLEDGE
Rachel Drazkowski, Brooklyn Vetter, & Adrianna Perez
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

PORTRAYALS OF WOMEN LAW ENFORCEMENT OFFICERS IN CRIME TELEVISION SHOWS
Megan Kadlec & Anne Katchmark
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

MSU STUDENT KNOWLEDGE OF GENDER DIVERSITY
Meghan Babcock, Nicole Gartner, & Anastasia Nereson
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)
YOUNG COLLEGIATE WOMEN'S SEXUAL HEALTH AND KNOWLEDGE
Rachel Drazkowski, Brooklyn Vetter, & Adrianna Perez
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

It is important for young women to know and understand their own bodies. With more knowledge comes higher self-esteem, healthier relationships, and an understanding of one’s own self. The source of young women’s knowledge and its accuracy is the first link in the chain to help young women. For this research study we conducted semi-structured in-depth interviews with MSU college women to explore where women received their body and sexual health knowledge as well as its affect on their lives. Preliminary findings indicate that those with more knowledge about their bodies generally had greater confidence and understanding about their sexual anatomical health. Within the United States, there exists a gap between educational experiences and personal awareness. This study has implications for strategies to advocate for increased and reliable information on college campuses and in relation to MSU, advocacy should be focused on Student Health Services and more opportunities throughout campus for women to learn about their bodies.

PORTRAYALS OF WOMEN LAW ENFORCEMENT OFFICERS IN CRIME TELEVISION SHOWS
Megan Kadlec & Anne Katchmark
Shannon Miller, Faculty Mentor (Department of Gender and Women’s Studies)

The field of law enforcement is hyper-masculinized. This often leaves women police officers in the margins as they experience pressures to conform to a specific image. These women may move on to encounter resistance unknown to their male counterparts. Television shows that feature police officers, both scripted and reality, become a means through which the general public derives their knowledge of women in law enforcement. This research study examined two crime television shows Dexter, a scripted show, and Police Women of Broward County, a reality show. We conducted a content analysis of the first season of both shows to explore the portrayals of women police officers, as well as their interactions with coworkers and the public. Regardless of whether they were dressed in uniform, women police officers wore makeup and jewelry on a regular basis, despite the strenuous nature of the job. In addition, women police officers in these shows frequently encountered comments that were sexist or derogatory in nature from fellow officers, administration, and the public. Though the comments made in Dexter were more blatant than in Police Women of Broward County, the sexist or derogatory comments were still problematic in the reality television program. Because the average American citizen bases most of their perceptions of law enforcement off television shows, it is important to look at these perceptions in order to change the way women law enforcement officers are viewed and treated in real life.
Knowledge and acceptance of gender-variant individuals is essential on college campuses in order to increase equality for all students. This inclusion begins by recognizing the presence of more than two genders – more than just male and female college students. For this research study, we examined Minnesota State University, Mankato students’ knowledge and awareness of gender diversity. Preliminary findings suggest that most respondents both believe there are only two genders as well as have a general concept of what transgender means. Only one respondent correctly defined cis-gender (someone whose self-perception of their own gender matches their birth biological sex). A small percentage of respondents used transphobic language in response to the questions. When asked about how to increase education and visibility of gender diversity topics on our campus, many participants suggested more awareness, posters, classes, activities, clubs, campaigns and open forums. Participants thus far have been between 18 and 30 years old, primarily white, and heterosexual; more data collection is necessary and currently ongoing. This study has implications for aiding our university in best educating students in the future about gender diversity. Education on this topic will only increase inclusivity of gender variant individuals and therefore improve the campus climate.
Biological Sciences

THE EFFECTS OF BISPHENOL-A (BPA) ON THE FEMINIZATION OF DANIO RERIO
Lina Wang
*Theresa Salerno, Faculty Mentor (Department of Chemistry & Geology)*
*Shannon Fisher, Faculty Mentor (Department of Biological Sciences)*

IMPACTS OF A FLOOD PULSE ON LIMNETIC MACROINVERTEBRATE COMMUNITIES IN MINNESOTA RIVER BACKWATERS
Jessica Nelson
*Shannon Fisher, Faculty Mentor (Department of Biological Sciences)*
*Adam Nickel, Graduate Student Mentor (Department of Biological Sciences)*
*URC SUPPLY GRANT RECIPIENT*

INFLUENCES ON REDETERMINATION OF BENEFITS COMPLETION ON PUBLIC DRAINAGE SYSTEMS IN THE MINNESOTA RIVER BASIN
Christina Stueber
*Shannon Fisher, Faculty Mentor (Department of Biological Sciences)*
*URC SUPPLY GRANT RECIPIENT*

CARBOHYDRATE ALLOCATION PATTERNS IN SOUTHERN MINNESOTA HERBICIDE (ENDOTHAL) TREATED CURLYLEAF PONDWEED (*POTOMOGETON CRISPUS*) POPULATIONS
Erika Magnusson
*Christopher Ruhland, Faculty Mentor (Department of Biological Sciences)*
*Zachrie Gutknecht, Graduate Student Mentor (Department of Biological Sciences)*
*URC SUPPLY GRANT RECIPIENT*

EXAMINING THE VERITY OF THE EMPTY NICHE HYPOTHESIS USING LOCAL WETLANDS AS MODELS
Nicholas Stephens
*Bradley Cook, Faculty Mentor (Department of Biological Sciences)*
*MINNESOTA STATE FOUNDATION GRANT RECIPIENT*
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In waters across the globe, an endocrine disrupter-related increase in the feminization of male fish has been observed. Bisphenol-A (BPA), farm runoff, and soil contaminants from wastewater treatment plants can increase aquatic endocrine disrupter concentration. Three replications of four 42-liter tanks with BPA concentrations of 0.0, 0.2, 2.0, and 20.0 parts per billion (ppb) were run for 1 week. Eggs were collected on day 7 after a 14:10 hour light:dark cycle. The ANOVA among BPA concentrations was significant (P<0.001). The Holm-Sidak test detected a significant difference in mean fertilization percentage between 20.0 ppb (1.78%) and all of the lower concentrations (0.0, 0.2, and 2.0 ppb; all >85%; P<0.050). Visually, the offspring appeared to have a larger female:male ratio in higher BPA concentrations; however, visual gender identification is not always reliable. Further testing (phase 2) for P250 aromatase using Reverse Transcriptase- Quantitative Real time Polymerase Chain Reaction (RT-QPCR) was done to more accurately determine the male: female ratios. RNA isolation was done using the RNeasy procedure from Qiagen for three offspring from 0.0, 2.0, and 20.0ppb and two offspring from 0.2ppb. 2-step RT-PCR method was used to analyze cDNA obtained from the RNA isolation with high capacity cDNA reverse Transcription Kit. Efficiency curves and PCR analysis was inconclusive, but did show that there are high expressers and low expressers of aromatase B in *D. rerio*.

IMPACTS OF A FLOOD PULSE ON LIMNETIC MACROINVERTEBRATE COMMUNITIES IN MINNESOTA RIVER BACKWATERS
Jessica Nelson
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Backwater habitats change seasonally during connection events with the main channel. As a result, limnetic macroinvertebrate communities and water quality parameters may change seasonally during backwater flushing events. The objective of this study was to assess limnetic macroinvertebrate communities in three backwaters of the Minnesota River (Anderson, St. Peter, and Harris), each with differing connectivity. Sampling was conducted before (period 1), during (period 2), and after (periods 3 and 4) a flood pulse occurred in the summer of 2012. To evaluate backwater limnetic macroinvertebrate communities 10 quatrefoil light trap nights and 10 random sled net pulls (30-m each) were completed each period. Ten sled net drift samples (3 min each) were also conducted in the main channel adjacent to each backwater. Comparisons of limnetic macroinvertebrate communities between backwaters and the main channel will allow for inferences on the impacts of connectivity and water quality. A better understanding of Minnesota River backwater and main channel limnetic macroinvertebrates communities will be established, allowing for guidance on river management practices.
INFLUENCES ON REDETERMINATION OF BENEFITS COMPLETION ON PUBLIC DRAINAGE SYSTEMS IN THE MINNESOTA RIVER BASIN
Christina Stueber
Shannon Fisher, Faculty Mentor (Department of Biological Sciences)

Redetermination of benefits is the process of updating the benefitted value for an entire drainage system. These benefits include land use, crop productivity, and land values due to reduced moisture levels (i.e. drainage), and are recorded at the time of establishment. In the Minnesota River Basin many public drainage system benefits have not been updated in recent years. I am in the process of creating an inventory of the public drainage systems per county with an indication of those that have been redetermined. A comparison of the number of redetermined systems to the percent farmland per count and the total number of systems in the county will be carried out. This statistical analysis, using linear regression, will provide insight on the relationship of redetermined systems to percent farmland and the total number of systems. Based on this study, inferences on why all the systems in the basin have not been redetermined can be made. After the redetermination process, not only are benefits updated, but a 1-rod (16.5 ft) perennial vegetative buffer strip is required along any open sections of the system. Buffers improve ditch bank stability, reduce ditch maintenance, and reduce sediment/nutrient runoff. With insight on the possible influences on the redetermination process, county officials can improve plans to complete redetermination of benefits on public drainage systems across the basin. Completing redetermination of benefits on drainage systems in the Minnesota River Basin will also assist in water quality improvements in the Minnesota River.

CARBOHYDRATE ALLOCATION PATTERNS IN SOUTHERN MINNESOTA HERBICIDE (ENDOTHAL) TREATED CURLYLEAF PONDWEED (POTOMOGETON CRISPUS) POPULATIONS
Erika Magnusson
Christopher Ruhland, Faculty Mentor (Department of Biological Sciences)
Zachrie Gutknecht, Graduate Student Mentor (Department of Biological Sciences)

In southern Minnesota, land management, nutrient loading, and disturbances have allowed *Potamogeton crispus* to establish and dominate many lentic macrophyte communities. The major advantage for *P. crispus* is its life cycle that produces carbohydrate storage organs known as turions, assisting growth during the winter months. Current field research on multiple lakes has observed weak and discolored turions, particularly on lakes treated with herbicide. My research is attempting to assess if endothall can effectively control *P. crispus* turions by decreasing carbohydrate concentrations. Since 2006, the Duck Lake association has been applying endothall in attempts to reduce *P. crispus* and re-establish native plant communities. Turions were randomly collected from Duck Lake and two other non-treated lakes (Ballentyne Lake and West Jefferson). I used a procedure called “Colorimetric Methods for Determination of Sugars” previously cited by Michel Dubois, K.A. Gilles, J.K. Hamilton, P.A. Rebers and Fred Smith (1955) to determine carbohydrate allocation patterns in herbicide/non-herbicide treated *Potomogeton crispus* turions. The procedure involves extracting sugars from weighted *Potomogeton crispus* turions, hydrolyzing starch to glucose and measuring glucose hydrolysate (allocated carbohydrate) of each *Potomogeton crispus* turion. Data of total nonstructural carbohydrate Duck Lake treated turions versus untreated turions provide a statistically significant difference ($P = <0.001$). My research has determined a decrease of carbohydrate concentration of *P. crispus* turions in the endothal treated Duck Lake. My research demonstrates how current Aquathol-K treatments are affecting turion carbohydrate allocations. A larger implication of my research provides direction for macrophyte management focused on effective selective herbicide treatment.
Invasive species are a major concern for many ecologists, park managers, and restoration scientists. The empty niche hypothesis proposes that introduced plant species become invasive because they can exploit unused resources, or empty niches, in a community. This study looks for empty niches by using historical descriptions of local wetlands to make models based on native species and their resource use. If there are any gaps in resource use that a commonly invasive species, Phalaris arundinacea (reed canary grass), Typha angustifolia (narrow-leaf cattail) or Typha x glauca (hybrid cattail), would fit into, then that wetland will be considered to have an empty niche. Wetlands with an empty niche should have the invasive species currently present; this will be examined in field studies, along with the degree to which the invader is in the niche indicated by the model.
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