Celebration of Student Research, Creative Works and Academic Service Learning

Presentations April 12, 2012 in the LRC
From 9:00 a.m. until 3:30 p.m.

Sponsored by the Office of Academic Affairs and the College of Graduate Studies
April 12, 2012, marks the 17th annual symposium of student presentations entitled “Celebration of Student Research, Creative Works & Academic Service Learning.” The celebration is from 9:00 a.m. to 3:30 p.m. Oral presentations will be in the LRC Rooms 109 and 111 and the posters will be displayed in the LRC atrium. This event provides our students an excellent opportunity to gain experience in presenting their own work and will highlight, for the entire university community, the student/faculty mentoring of which we are so proud. Both undergraduate and graduate students have been invited to present the results of their independent scholarly and creative work.

*This celebration is sponsored by the Offices of Academic Affairs and Graduate Studies.*

**2012 Northern Michigan University Student Technology Innovation Awards**

**Matt Claucherty:** Earth, Environmental, and Geographic Sciences Department, Project Title: Using GIS to Model Least-cost Travel Paths through Wilderness Areas, Faculty Advisor: Robert Legg

**Samantha Randolph:** Art & Design (Graphic Communications), Project Title: Order & Chaos (Processing Processes), Faculty Advisor: Keith Ellis

**Program Schedule**

**LRC 109**

9:00  **Dr. Brian Cherry,** Assistant Provost of Graduate Education and Research, Opening Session

9:30  **Sarah Leissring:** Effect of Acute Feedback on Landing Patterns in a Horizontal Land and Cut Maneuver, Undergraduate Student, Department of Health, Physical Education, and Recreation, Faculty Advisor: Randall Jensen

9:45  **Eric Daniels:** Menstrual Cycle Phase Does Not Effect Knee Valgus Angle, Graduate Student, Health, Physical Education, and Recreation Department, Faculty Advisor: Randall Jensen

10:00 **Becky Salfai and Sara Storm:** To Increase Awareness of Birth Defects Caused by Alcohol Use in Pregnant Women through Education, Undergraduate Students, Department of Health, Physical Education and Recreation
10:15 **Sara DeBold:** Assessing Writing and Delivery Skills in the Basic Course in Public Speaking: The Use of Ten 30-Second Speeches, Undergraduate Student, Communication and Performance Studies Department, Faculty Advisor: Sara Potter

10:30 **Cameron Witbeck:** Wild in Isolation: Poetry, Graduate Student, English Department, Faculty Advisor: Austin Hummell

10:45 **Genean A. Granger:** Beyond Bellocq's: Original Poetry, Graduate Student, Department of English, Faculty Advisor: Lesley Larkin

11:00 **Emily Engelhard:** Our Acrylic Blood, Graduate Student, English Department, Faculty Advisor: Paul Lehmberg

11:15 **Darrin Moir:** Gravity Tender: Fiction, Nonfiction and Illustrations, Graduate Student, English Department, Faculty Advisor: Jen Howard

11:30 **Kevin Anttila:** Dining Services Energy Audit: A comprehensive energy study and upgrade project on NMU's campus, Undergraduate Student, Technology and Occupational Sciences Department, Faculty Advisor: Nicholas Griewahn

11:45 **Jessica Higginbotham:** "The Seafarer": A Tale of Two Exiles, Undergraduate Student, Departments of English and History, Faculty Advisor: Ray Ventre

12:00 **Brooke Boulton, Elizabeth Kepsel, Chanomi Maxwell-Parish, and John Minser:** Eyes Toward Heaven: An Interdisciplinary Project in Poetry and Physics, Graduate Students, English Department, Faculty Advisor: Beverly Matherne

12:15 **Caitlin Morski:** “Paris” (fiction), Graduate Student, English Department Faculty Advisor: John Smolens

12:30 **Kaitlin Krengel:** The Dream of a Woman, Undergraduate Student, English Department, Faculty Advisor: Ray Ventre

12:45 **Katherine Buel:** Across the Glittering Heath: A Short Story, Graduate Student, English Department, Faculty Advisor: Paul Lehmberg

1:00 **Megan Hennekens and Karly Genovese:** Promotion of Healthy Stress Management Skills in First Year College Students, Undergraduate Students, Department of Health, Physical Education, and Recreation, Faculty Advisor: Patricia Hogan

1:15 **Teresa Sherman-Jones:** Early Adversary Culture in J. D. Salinger's *The Catcher in the Rye*, Graduate Student, Department of English

1:30 **Ren VanderLind:** Adversary Culture and the "Myth" of Eroding Master Narratives Graduate Student, English Department, Faculty Advisor: Gabriel Brahm
1:45  **Alex Vartan Gubbins**: War Poetry: The War in Iraq, Graduate Student, English Department, Faculty Advisor: Beverly Matherne

2:00  **Olivia M. Olson**: Cotton Hill: King of the Hill's Disabled Other Graduate Student, English Department, Faculty Advisor: David Wood

2:15  **Beth Webb**: Stomata and Starch: Phytovolatilization Visual Aides Graduate Student, Biology Department, Faculty Advisor: Dr. Lesley Putman

2:30  **Mitchell L. Stephenson**: Reliability of Knee Joint Measures in a Cutting Movement, Undergraduate Student, Department of Health, Physical Education, and Recreation, Faculty Advisor: Dr. Randall Jensen

**LRC 111i**

9:30  **Chris Kovala**: An evaluation of calcified structures and the use of digital photographs in brook trout (Salvelinus fontinalis) age estimation, Graduate Student, Biology Department, Faculty Advisor: Jill Leonard

9:45  **Alexis Growe-Raney**: Juvenile Diet Selectivity of Three Salmonid Species in a Lake Superior Tributar, Graduate Student, Biology Department, Faculty Advisor: Jill Leonard

10:00  **Ricki E. Oldenkamp**: Lemur Social Cognition: Do social group sizes affect foraging decisions?, Undergraduate Student, Biology Department, Faculty Advisor: Erich Ottem

10:15  **Evan Clendening**: A New Look at Student Evaluation, Undergraduate Student, Department of Health, Physical Education, and Recreation, Faculty Advisor: Patricia Hogan

10:30  No presenter

10:45  **Luke Thominet**: Hightech/Lowtech: Accessible Technology Redundancies in Rural Locations, Graduate Student, English Department, Faculty Advisor: Elizabeth Monske

11:00  **Linda Sirois**: In Full View: Looking at the Impact of the Visual on Studying Racial Trauma in the College Literature Classroom, Graduate Student, English Department, Faculty Advisor: Lesley Larkin

11:15  **Heather Munsche**: Classification of Mental Illness in the 18th Century, Graduate Student, Psychology Department, Faculty Advisor: Harry Whitaker

11:30  **J. Kevin Lowe**: Three Strands of the Braid - The Gift is in the Journey: A video presentation, Undergraduate Student, Native American Studies, Faculty Advisor: April Lindala
11:45 Leah Kulikowski: Historical Fiction, Undergraduate Student, Departments of History and English, Faculty Advisor: Keith Kendall

12:00 Kristin Denryter: Spatial conservation of terrestrial vertebrate species in ecologically important zones in the U.P., Graduate Student, Department of Biology, Faculty Advisor: Patrick Brown

12:15 Eric Miltz-Miller: Visual observation of feeding strategies used by brook trout (Salvelinus fontinalis) and steelhead trout (Oncorhynchus mykiss, Undergraduate Student, Biology Department, Faculty Advisor: Jill Leonard

12:30 Aubrey Kall, Lauren Larsen, and Carolyn Tobin: Film Disposition and Enjoyment, Undergraduate Students, Communications and Performance Studies Department, Faculty Advisor: Mark Shevy

12:45 Jack Van Treese and Laura Mead: Exploring Boundaries: Thinking Creatively About Voice in Composition, Graduate Students, English Department, Faculty Advisor: Elizabeth Monske

1:00 Grace Makley: Absolut: A 400-Word Story, Undergraduate Student, English Department, Faculty Advisor: Ray Ventre

1:15 Olivia Ernst: Fierce Motherhood: Tamora’s Strength in Titus Andronicus, Undergraduate Student, Department of English, Faculty Advisor: David Wood

1:30 Zachary Shankland, Lawrence Carey, and Ashley Schmeling: Effects of atypical antipsychotic drugs on differential reinforcement of low rate 72s performance in rats, Graduate and Undergraduate Students, Psychology Department, Faculty Advisor: Adam Prus

1:45 Troy J. Cogan: Marquette County: A Historical Economic Analysis of Employment, Undergraduate Student, Economics Department, Faculty Advisor: Tawni Ferrarini

2:00 Tracy Pickering: 6.24.08: Creative Non-Fiction, Undergraduate Student, Departments of Modern Languages and Literatures and English, Faculty Advisor: Ray Ventre

2:15 Emily Bajko, Cassandra Evers, Brianna Garvey, and Jennifer Westman: Health & Family Planning for African Women, International Health Issue, Undergraduate Students, Health, Physical Education, and Recreation Department, Faculty Advisor: Patricia Hogan

2:30 John Minser: LOLcats, 4chan, and Digital Discourse in the Analog Classroom, Graduate Student, English Department, Faculty Advisor: Elizabeth Monske

2:45 Cameron Contois: Tweeting Through Classroom Borders, Graduate Student, English Department, Faculty Advisor: Elizabeth Monske
PRESENTATIONS AND PERFORMANCES

Dining Services Energy Audit: A comprehensive energy study and upgrade project on NMU's campus
Kevin Anttila, Undergraduate Student, Technology and Occupational Sciences Department
Faculty Advisor: Nicholas Griewahn

Beginning in January 2012, students from the Climate Control Technology program studied energy auditing techniques and applied them in the Market Place Dining Service facility on NMU's campus. This project is an effort to promote sustainability and energy responsibility at NMU and to provide services to campus across departmental boundaries and was funded in part by a Wildcat Innovation Fund grant provided by the Office of the Provost. The audit is comprehensive in nature and examines refrigeration and mechanical systems used in foodservice. Data was collected over several months and analyzed to reach three primary goals: 1) Reduce overall energy costs for the facility including all utility expenses, 2) Improve the efficiency of operations for employees, 3) Enhance equipment reliability for less product loss and downtime. The result of the research will be a proposal with suggestions for upgrades in equipment technology, practical improvements and preventative maintenance schedules for audited equipment. The document will compare/contrast upgrade packages based on estimated payback periods, user friendliness and feasibility. It is the hope of the researchers that the proposal will be considered or adopted at least in part during the upcoming renovation planning for the facility.

Health & Family Planning for African Women, International Health Issues
Emily Bajko, Cassandra Evers, Brianna Garvey, and Jennifer Westman
Undergraduate Students in HL 322, Management of Health & Fitness
Faculty Advisor: Patricia Hogan

Maternal death is a serious issue in Africa; women have a 1 in 16 chance of dying in pregnancy or during childbirth. To put such an alarming concern into perspective, the content of the problem first must be thought through Africa’s standpoint. As an international health issue, maternal death is perceived to be an easy fix; however, Africa holds 30 of the 34 countries on the United Nations list of low development indicators. In order to find a solution suitable for Africa specifically, a plethora of other problems need to be solved as
well. Millennium Development Goals set by the United Nations address a large range of health related international problems. From thorough research regarding maternal health, intervening at the educational level seems to be the best place to start. Being educated means being empowered, and for women it immensely impacts having the ability to make family planning choices. Combating a maternal health issue cannot be done solely by dealing with the obvious task at hand, but rather from the roots up. Having an education routinely drives learners to make good life decisions, which in turn creates healthier, more productive people around the globe.

Across the Glittering Heath: A Short Story
Katherine Buel, Graduate Student, Department of English
Faculty Advisor: Paul Lehmberg

"Across the Glittering Heath" adapts a portion of the legend of Sigurd, greatest of the Norse heroes. This particular portion concerns Regin, Sigurd's foster-father, who recalls the events surrounding the demise of his family. When Regin's brother, Otter, is killed by the trickster god, Loki, Loki compensates the family through the payment of weregild. This weregild, though, is a cursed treasure that inspires greed in the family. Regin's other brother, Fafnir, a man who can take the shape of a dragon, murders his father for the gold, destroys his own people, and casts Regin out as a beggar. Years later, remembering these events, Regin broods on revenge. He forges a sword for the hero Sigurd, his foster-son. This sword, Regin makes Sigurd promise, will be the one to kill the dragon Fafnir.

A New Look at Student Evaluation
Evan Clendening, Undergraduate Student, Department of Health, Physical Education, and Recreation
Faculty Advisor: Patricia Hogan

Many traditional assignments aren't always able to grasp a student's competence in a subject. Because of the many types of learning styles in which people can learn, it is important to foster the many types of learning. This can be accomplished through new methods of new technology and innovation.

Tweeting Through Classroom Borders
Cameron Contois, Graduate Student, English Department
Faculty Advisor: Elizabeth Monske

Cameron Contois will discuss the use of the microblog website Twitter to create a sense of community in the composition classroom. Shelley Rodrigo (2011) explains how she her students used “Twitter to practice sentence level writing concerns and [was] surprised when students 'made them their own' by developing themes or stories.” When familiar social networking sites are brought into academia, learning can extend beyond the borders of a classroom. Twitter can bring a sense of familiarity and comfort to the student, reinforcing student identity.
Menstrual Cycle Phase Does Not Effect Knee Valgus Angle
Eric Daniels, Graduate Student, Health, Physical Education, and Recreation Department
Faculty Advisor: Randall Jensen

Background: Seventy percent of ACL injuries occur while changing direction. Knee valgus is a predictor of ACL injuries and occurs during change of direction. Females demonstrate greater knee valgus than males. Menstrual cycle phases are believed to contribute to this increase. The current study’s purpose is to determine if knee valgus angles change at different phases of the menstrual cycle. Hypothesis: Knee valgus angles change between four menstrual cycle phases. Methods: Ten healthy, college aged, female subjects who met inclusion criteria were followed through one menstrual cycle. Subjects completed four testing sessions, each correlating to menstrual cycle phases. Times were calculated using a protocol of Eiling et al. (2007), menses, mid-follicular, ovulation, and mid-luteal. Each session consisted of a five-minute warm up on a cycle ergometer, marker attachment to the subjects’ left leg (hip, knee, and ankle) and three-drop jumps. Each trial was recorded with a high-speed digital video recorder. Results: No significant differences in knee valgus were found between menstrual cycle phases. Conclusion: Valgus angle is a risk factor for ACL. Fluctuating female sex hormones are considered a contributor to females exhibiting greater valgus angle. The current study demonstrates no menstrual cycle affect on knee valgus angles.

Assessing Writing and Delivery Skills in the Basic Course in Public Speaking:
The Use of Ten 30-Second Speeches
Sara DeBold, Undergraduate Student, Communication and Performance Studies Department
Faculty Advisor: Sara Potter

Repeated exposure has long been regarded as a positive teaching component in developing understanding. At Northern Michigan University, a prior pretest/posttest study demonstrated that changes made in teaching methodology of the basic communication course (SP100), to include student presentations of ten 30-second speeches, resulted in significant improvement of students’ writing and delivery skills, and lessened their communication apprehension. The current pretest/posttest study, completed in the spring of 2011, further supports the significance of a continued use of repeated exposure in the basic communication course. A significant increase in students’ knowledge of speech writing components, delivery skills, and reduction in communication apprehension were demonstrated. The present study also explored student satisfaction with their classroom experience. Pedagogical implications and suggestions for future research are discussed.

Spatial conservation of terrestrial vertebrate species in ecologically important zones in the U.P.
Kristin Denryter, Graduate Student, Department of Biology
Faculty Advisor: Patrick Brown

Without an adequate reserve system to protect ecologically important habitat, the future of the over 280 terrestrial vertebrate species in the U.P. is uncertain. Essential to conserving terrestrial vertebrates is a conservation assessment that determines the accuracy of Gap
Analysis land cover data for natural communities and the location and representation of ecologically important zones (EIZs) on the landscape. This project aims to identify the accuracy of Gap Analysis data and to determine the range of buffers needed surrounding protected areas to capture at least 70% of terrestrial vertebrate species. These analyses will be conducted with a geographic information system (GIS) and turned into a conservation atlas of the Upper Peninsula. Terrestrial vertebrate species serve as an indicator of the important ecological functions and evolutionary processes occurring on the landscape. Identifying where these species, natural communities, and ecologically important areas occur is a necessary step in developing meaningful conservation plans. When completed, this analysis will highlight target areas of high biodiversity for potential acquisition and addition to a reserve system in the future. Ideally, representation of EIZs in in stewardship layers of a GIS will reflect their present occurrence on the landscape.

**Our Acrylic Blood**  
Emily Engelhard, Graduate Student, English Department  
Faculty Advisor: Paul Lehmberg

In "Our Acrylic Blood," a personal essay that captures the intricate and intimate bond made between mother and daughter during pregnancy, the author meditates on the concept of personal identity and how her identity was forged while still in her mother's womb. Engelhard's mother, an abstract painter, spent the majority of her pregnancy standing in front of canvases with her paint brushes and imagination, and the intrinsic, invaluable love and appreciation she harbored for the formation of her acrylic works deeply defined and inspired the daughter growing within her. Through the creation art, a mother's life became her daughter's identity.

**Fierce Motherhood: Tamora’s Strength in Titus Andronicus**  
Olivia Ernst, Undergraduate Student, Department of English  
Faculty Advisor: David Wood

Fierce Motherhood is a 3,500 word research essay on William Shakespeare’s early play, Titus Andronicus, which explores interpretations of the character Tamora regarding gender roles, motherhood, and sexism still present in modern-day scholarship. The goal was to give new insight into her character through comparison with the title character, Titus. The paper concludes that Tamora and Titus act in surprisingly identical ways and that even though sexist attitudes have often cast Tamora as the villain and Titus as the hero, Shakespeare’s writing provided some progressive insights into her motivations and justifications, proving himself deserving of his timeless reputation.

**Eyes Toward Heaven: An Interdisciplinary Project in Poetry and Physics**  
Brooke Boulton, Elizabeth Kepsel, Chanomi Maxwell-Parish, and John Minser, Graduate Students, Department of English  
Faculty Advisor: Beverly Matherne

This will be a reading of astronomy-themed poetry composed by four graduate students in the English Department: Brooke Boulton, Elizabeth Kepsel, Chanomi Maxwell-Parish, and
John Minser. These students, under the direction of Professor Beverly Matherne, wrote the poems after an evening-long collaboration between the English and Physics Departments, arranged by Matherne and Professor Mark Jacobs. Jacobs showed the poetry students various stars and formations through the high-powered telescope in the NMU observatory, and provided an astronomy lesson about what they saw. Four of Jacobs' Physics students helped manage the equipment and provide instruction: Amelia Shirts, Erika Egan, Elizabeth Butler, and Paige Vial.

Matherne said that when she first brought up the idea to Jacobs, “he quoted the great Oscar Wilde, who once said, ‘All of us are in the gutter, but some of us are looking at the stars.’” Matherne’s objective was to "take my students out of their regular grooves and throw them onto paths that would bring them to new realizations...Surely they would be wowed by the sheer beauty of what they saw, but more than that, by the discovery, maybe for the first time, that the universe is not only vast but knowable."

**Beyond Bellocq's: Original Poetry**  
Genean A. Granger, Graduate Student, Department of English  
Faculty Advisor: Lesley Larkin

"Bellocq's Ophelia" was the Common Reader for the 2012 International English Honors Society Convention. E. J. Bellocq photographed prostitutes in New Orleans. Poet, Natasha Trethewey used Bellocq's photographs to bring Ophelia to life.

Poetry functions as a camera lens for the poet. Poem 1: "Leaving Normal" speaks to a common consciousness, an introspective or self-analysis of life's difficulties while searching for understanding. Poem 2: "Dirty Laundry" reveals that even mundane tasks can blossom through the matrix of language. Poem 3: "Loose Connections" is a letter poem and ekphrastic poem that references Edward Hopper's paintings. Trethewey used letters in her novella-in-verse. Poem 4: "Shall Not Hurt Them" is a poem born from a dream and written at 3 a.m. Dreams are embedded in a web of associations of psychological contexts and they often speak to our subconscious.

Just as Bellocq was unsure of how his photographs would appear until they were developed, creating poetry makes us realize that art is not a science and that the creative process consists of shaping our images into our finished work. Poetry sets one's inspiration free, allowing the poet a chance to know himself and to discover dimensions of existence he had been unaware of.

**Juvenile Diet Selectivity of Three Salmonid Species in a Lake Superior Tributary**  
Alexis Growe-Raney, Fish Biology Laboratory, Department of Biology  
Faculty Advisor: Jill Leonard

Sympatric native and exotic juvenile salmonid diets were assessed to determine the potential for interspecific competition and niche differentiation. From May-November of 2010 available forage and stomach content samples were collected and used to calculate diet overlap/selectivity indices for prey items in the diet of native brook trout Salvelinus fontinalis and exotic steelhead Oncorhynchus mykiss and coho salmon Oncorhynchus kisutch in a
A tributary of Lake Superior in Pictured Rocks National Lakeshore. Samples were assessed for abundance and biomass of organisms and were based on seasonal and habitat specific collections. Larval chironomids dominated drift year-round while summer showed a high proportion of dipteran adults; winter drift showed a large number of larval plecopterans and ephemeropterans. All trout species primarily fed on drift invertebrates; however, benthic feeding (increased relative abundances of oligochaetes and gastropods in diet) was suggested under specific conditions, possibly indicating niche differentiation. Evidence of species-specific benthic feeding may point to shifting foraging tactics due niche differentiation caused by the historic introduction of exotic salmonids to a stream with an established native salmonid population in the same feeding guild.

**War Poetry: The War in Iraq**
Alex Vartan Gubbins, Graduate Student, Department of English
Faculty Advisor: Beverly Matherne

I will perform four poems completed in Professor Matherne’s poetry workshop class, EN601, which will contribute to my MFA thesis in poetry. My thesis concentrates on the meaning of war through my experiences as a Veteran of The War in Iraq. My poetry looks to move the audience’s sentiments of war by using brief narratives drawn from on and off the battlefield—my content ranges from a soldier transporting a carcass to a mother’s grieving for her late son. I want the audience to gain sensual pleasure from listening to my recitation; however, I also hope the audience will feel rewarded by understanding my poetry’s emotional messages.

**Promotion of Healthy Stress Management Skills in First Year College Students**
Megan Hennekens and Karly Genovese, Undergraduate Students, Department of Health, Physical Education, and Recreation
Faculty Advisor: Patricia Hogan

As first year college students enter into the real world, evidence shows that there are internal and external stressors that are prevalent. Depending on the individual and how he or she interacts with the demands put upon them, it is vital for one to be educated about healthy stress management skills in order to cope and adapt to the world around us. Healthy stress management skills are those techniques and coping patterns that promote well-being and assist one to be capable of meeting the internal and external demands of daily living. This project was developed to assess the need, identify measurable objectives, plan, implement, and evaluate a reliable and valid program that promotes healthy stress management skills in first year college students through education. In order to ensure results, the research/program would be compared to a control group and pre/post testing. Evidence based research of natural wellness and preventative health education for the transitional population in need has proven to be effective. Promotion of healthy stress management skills is important because it is carried with an individual throughout the rest of his or her life.
"The Seafarer": A Tale of Two Exiles
Jessica Higginbotham, Undergraduate Student, Departments of English and History
Faculty Advisor: Ray Ventre

“The Seafarer” was written by an unknown Anglo-Saxon poet no later than 975 C.E. The poem is part of The Exeter Book, which is a collection of Anglo-Saxon writings that was presented to Exeter Cathedral by Bishop Leofric some time before 1072 C.E (“The Seafarer” 25). “The Seafarer” can be interpreted has having two distinct parts: one where the narrator is exiled from God, the other where he exiles himself from society. The separation from God can be interpreted as a moral lesson used to connect to the seafarer’s audience, while the exile from society is in accordance with the mentality of monasticism being a form of exile to achieve spiritual enlightenment (Napran 1). Therefore, the author’s state of exile is twofold; the original self-imposed exile in denying God and the later self-imposed exile for spiritual fulfillment. The seafarer has these two exiles in order to demonstrate the struggles and ultimate rewards of an ascetic life.

Film Disposition and Enjoyment
Aubrey Kall, Lauren Larsen, Carolyn Tobin, Undergraduate Students, Communications and Performance Studies Department
Faculty Advisor: Mark Shevy

One of the most common reasons people watch movies, videos, and television is to experience enjoyment. The affective disposition theory of enjoyment states that enjoyment is a function of viewers’ evaluation of characters and the positive and negative events that those characters experience. Literature in the psychology of film music suggests that music can influence viewers’ evaluation of characters and the interpretation of their motives. The current study integrates disposition theory and music psychology to test whether music can influence the disposition that viewers form toward a character and whether that influence alters viewers’ enjoyment as the character experiences positive or negative events. A 3x2 between-subjects experimental design was constructed, in which viewers saw a one-minute video and then rated their disposition toward the character and their enjoyment of the story. The beginning of the video was identical in all conditions, consisting of a girl finding a dog. However, the musical soundtrack differed, presenting either a positive or negative feeling, or no music. The story ending was also manipulated to show the girl being rewarded or punished. Disposition theory, the Congruence Associationist Model, initial findings, and suggestions for future research are discussed.

The Dream of a Woman
Kaitlin Krenge, Undergraduate Student, English Department
Faculty Advisor: Ray Ventre

A fiction short story piece presented at an international conference in New Orleans, LA with themes of loss and dreams.
An evaluation of calcified structures and the use of digital photographs in brook trout (Salvelinus fontinalis) age estimation
Chris Kovala, Graduate Student, Biology Department
Faculty Advisor: Jill Leonard

Fish aging provides crucial data for fisheries managers to make informed decisions on catch limits and population status; however, there is a continuing discussion within the field on the accuracy and effectiveness of aging in fishes, including brook trout (Salvelinus fontinalis). This study was conducted to examine the precision and accuracy of age determination of brook trout using scales, fin rays, and otoliths. Fish were collected from across the species range and age determination from a variety of calcified structures was analyzed to evaluate which structures yielded the most accurate and precise age results. Additionally, photographs of the calcified structures were taken to determine the validity of aging brook trout via digital images. Surveys were administered to 36 brook trout fisheries managers across North America to determine current aging practices and assess the effectiveness of digital photography in aging. 143 Brook trout were then collected from Georgia, Virginia, Pennsylvania, New York, and Idaho. Fish were processed, and aging structures removed, prepared and photographed; the structures were presented to readers from Michigan, Georgia, Virginia, Pennsylvania and Idaho for age assessment. Inter/intra-reader and inter/intra-structure comparisons were completed and the use of digital photography in the aging process was assessed.

Historical Fiction
Leah Kulikowski, Undergraduate Student, Departments of History and English
Faculty Advisor: Keith Kendall

I aim to connect fact and fiction together in a novel length story about Pope Innocent II and his rise to power, how he built a diplomatic sphere, and influenced the beginning of papal historical records.

Effect of Acute Feedback on Landing Patterns in a Horizontal Land and Cut Maneuver
Sarah Leissring, Undergraduate Student, Department of Health, Physical Education, and Recreation
Faculty Advisor: Randall Jensen

The purpose of the current study was to assess the effects of acute feedback on valgus angle and peak ground reaction forces (GRF) during a horizontal land and cut maneuver. Nine division II women soccer players randomly performed 12 horizontal land and cut maneuvers, with 3 left cuts and 3 right cuts pre- and post-feedback. Feedback was based on script from previous studies as well as results from studies using the Landing Error Scoring System. A three-way repeated measures ANOVA was used to compare the differences in knee valgus angle and peak GRF. Significance was set at p < 0.05. There were no significant differences between trials and no significant interactions across conditions or in GRF between legs, pre- and post-feedback, or trials. Knee valgus angle decreased with acute feedback while GRF were not affected by the same acute feedback given during a horizontal land and cut task. Therefore, acute feedback may be a useful tool for decreasing knee valgus angle during cutting tasks in ACL injury prevention programs.
Three Strands of the Braid - The Gift is in the Journey: A video presentation
Kevin Lowe, Undergraduate Student, Native American Studies
Faculty Advisor: April Lindala

This project is a five minute video presentation which outlines the mission of the Native American Studies program at Northern Michigan University. The Three Strands of the Braid refers to the three components to which the department devotes its focus (Academics and Research, Student Empowerment, and Community Outreach). The purpose of this video is to provide an overview of the program available to prospective students and to bring awareness of the opportunities this program offers to the institution and the community.

Absolut: A 400-Word Story
Grace Makley, Undergraduate Student, English Department
Faculty Advisor: Ray Ventre

Absolut is a flash fiction piece about alcohol, sleep, and the unexpected things a young man discovers about himself at college.

Visual observation of feeding strategies used by brook trout (Salvelinus fontinalis) and steelhead trout (Oncorhynchus mykiss)
Eric Miltz-Miller, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

The primary objective for this project was to examine feeding niche overlap of native brook trout (Salvelinus fontinalis) and non-native steelhead (Oncorhynchus mykiss) in a second order northern Michigan stream using snorkel surveys. Four behaviors were observed: column feeding, surface feeding, benthic picking, and benthic searching. Daytime observations were made in fall 2011 and spring/summer 2012. It was found that steelhead fed on average 2.1 times per individual per period, whereas brook trout fed 1.5 times per individual per period. Both species showed a preference towards column feeding (brook trout 80% and steelhead 71% of events). Feeding behaviors did not vary with the presence or absence of the other species. Our data did not suggest a shift in brook trout feeding behaviors due to the presence of steelhead; however, they do suggest that steelhead are more active which may lead to competition for food when these two species are found together.

LOLcats, 4chan, and Digital Discourse in the Analog Classroom
John Minser, Graduate Student, English Department
Faculty Advisor: Elizabeth Monske

John Minser will discuss the use of internet languages that intentionally subvert Standard English in the composition classroom. Henri Tajfel (1972) asserts that an “individual’s knowledge that he [or she] belongs to certain social groups” provides “some emotional and value significance to him of this group membership.” Students create online identities using the language of a digital subculture. Exploring online languages breaks down the walls
students erect between their idea of “academic writing” and their digital identities, thus allowing sincere student voice and identity to happen.

**Spoken-Word Poetry, YouTube Videos, and Student Identity**
Zarah Moeggenberg, Graduate Student, English Department
Faculty Advisor: Elizabeth Monske

Zarah Moeggenberg will show how YouTube videos and audio of spoken work poetry can help a student examine the rhythm of speech in writing. By using audio and visual examples of poetry, the student learns how to create an oral documentation of his or her narrative. Peter Middleton (2005) states that reading a poem out loud “re-establish[es] the authority of authorship in the face of its downsizing by the academic industry.” By creating an oral narrative, the student’s story gains immediacy and helps him or her find rhythm and self-identity in a narrative.

**Gravity Tender: Fiction, Nonfiction and Illustrations**
Darrin Moir, Graduate Student, English Department
Faculty Advisor: Jen Howard

This project addresses the interdisciplinary relationship between literary art and visual art carried out as an exploratory thesis project. Accordingly, I have created a collection of short stories and illustrations and explore the parallelism and interaction of words and imagery as a way to exchange stories and ideas. The finished product consists of four fiction stories and four nonfiction stories, accompanied by four color plates and five black and white illustrations assembled in a professionally bound book. I also have arranged to display the original artwork in the Huron Mountain Gallery on the main floor of the Peter White Library as a culmination of the project. All illustrations have been completed as oil paintings or ink drawings. Reproduction of the artwork will be digital for compilation and layout purposes. My stories and drawings are interconnected by themes and imagery of gravity in ways that represent the physical destruction of people’s lives through time and tragedy or the concept of a gravitational pull between individuals seeking a human connection.

**“Paris” (fiction)**
Caitlin Morski, Graduate Student, English Department
Faculty Advisor: John Smolens

Parry just wants to play basketball and graduate with a math degree. He keeps his head down, isn’t the flashiest player on the team, and does his homework. But when the captain of the team proposes that he help out in a sorority election, Parry chooses to take the ‘suggestion.’ What has he gotten himself into?
Classification of Mental Illness in the 18th Century
Heather Munsche, Graduate Student, Psychology Department
Faculty Advisor: Harry Whitaker

The 18th century was an age of classification. Perhaps the most famous figure in this movement was Carl Linnaeus, who developed a system which is still used today of separating living things into kingdoms, families, orders and classes. What many do not remember, however, is that Carl Linnaeus was a great physician in addition to being a renowned botanist. He endeavored to classify human diseases in his 1763 work, Genera Morborum. This presentation will focus on the classification of mental illnesses in the 18th century. The Linnean system will be compared with that of François Boissier de Sauvages of France, in his 1772 work, Nosologie méthodique, and Rudolpho Augusto Vogel of Germany, in his 1764 work, Generum Morborum. We will demonstrate where definitions of mental ailments were consistent in the various cultures and discuss where they diverged. The impact of these nosologies on the system of William Cullen of Scotland, who published Nosology, a popular system of disease classification approximately forty years later, in 1800, will also be explored.

Lemur Social Cognition: Do social group sizes affect foraging decisions?
Ricki E. Oldenkamp, Undergraduate Student, Biology Department
Faculty Advisor: Erich Ottem

The social intelligence hypothesis suggests that living in large social groups favors individuals capable of outcompeting conspecifics in social situations. This influential idea has yet to be backed up with data testing the presumption that there is indeed a relationship between cognition and sociality. With six species of lemurs we tested this idea by comparing their ability to outwit a competitor to steal a piece of fruit. The hypothesis that lemurs of larger social groups will be more effective in this task was supported by our findings. Thus social group size predicts performance in a social task in regards to foraging efficiency. Our data supports the social intelligence hypothesis that living in especially large social groups was a significant factor shaping non-human primate and possibly human primate psychology.

Cotton Hill: King of the Hill’s Disabled Other
Olivia M. Olson, Graduate Student, English Department
Faculty Advisor: David Wood

This presentation explores the ways in which Cotton Hill’s disabled physicality fits within common disability stereotypes prevalent in television and motion pictures as outlined by Longmore (2003). Although Cotton fits partially within each trope, no single stereotype completely explains his lived experience. Cotton’s repeated refusal to allow the “responsibility” of his disability to become an individual problem, consistently reminding characters in the show of their role in his treatment, illuminates the problematic assumption that the individual has the ability to overcome society’s assumptions about bodily difference. This presentation suggests that Cotton Hill’s role in King of the Hill as a disabled Other questions the legitimacy of the stereotypes themselves and draws attention to the
insufficient ways these stereotypes treat people with disabilities. This presentation will also examine the role of Cotton's age plays in the ways others interact with him.

6.24.08: Creative Non-Fiction
Tracy Pickering, Undergraduate Student, Departments of Modern Languages and Literatures and English
Faculty Advisor: Ray Ventre

A creative non-fiction piece recently presented at the 2012 Sigma Tau Delta Literary Convention, centered on the evolution of the grief process following the death of a parent.

To Increase Awareness of Birth Defects caused by Alcohol Use in Pregnant Women through Education
Becky Salfai and Sara Storm, Undergraduate Students, Department of Health, Physical Education, and Recreation

Consumption of alcohol during pregnancy has a great impact on the central nervous system which in turn may cause many functional mechanism problems and a range of birth defects and affects quality of life. Exposure to alcohol during pregnancy is 100% preventable and should be emphasized in this target population through education. Our presentation is a self-designed program based off of "Protect the Next Pregnancy" by Janet Hankin in 2002, in which we educate women on the dangers of alcohol use in the prenatal phases. Our program is mission-based and is designed under the research of both valid and reliable sources.

Lolcats, Twitter, Spoken Word Poetry, E-Portfolios and Student Identity
Virginia Schminke-Yaussy, Graduate Student, English Department
Faculty Advisor: Elizabeth Monske

Virginia Schminke-Yaussy will discuss how electronic portfolios, or “e-portfolios,” have expanded the borders of traditional portfolios, encouraging students to develop and assess their writing on their own terms with their own creativity. This presenter will focus on the use of flash-based websites for the development of student e-portfolios in the college composition classroom. The explorative and “playful” nature of student-created e-portfolios will be reviewed for its telling creation/re-creation of student identities.

Effects of atypical antipsychotic drugs on differential reinforcement of low rate 72s performance in rats
Zachary Shankland, Lawrence Carey, and Ashley Schmeling, Graduate and Undergraduate Students, Psychology Department
Faculty Advisor: Adam Prus

While generally not considered treatments for depression, some atypical antipsychotic drugs (e.g., quetiapine) produce improvements in mood and related negative symptoms in schizophrenia. Moreover, atypical antipsychotic drugs may augment antidepressant drug
effects in treatment resistant depression. The present study sought to evaluate newer and experimental atypical antipsychotic drugs in rats using a differential reinforcement of low rate 72s (DRL-72s) task, a standard antidepressant screening model. An antidepressant effect is characterized by a significant increase in reinforcement rate and in the ratio of reinforcers / responses. Both the atypical antipsychotic drug quetiapine and the quetiapine active metabolite and monoamine reuptake inhibitor N-Desalkylquetiapine, exhibited antidepressant effects in this task. Also the atypical antipsychotic drug risperidone significantly increase both reinforcement rates and the ratio of reinforcers / responses. The neurotensin NT1 receptor agonist and putative atypical antipsychotic drug PD149163 exhibited an increase in reinforcement rates and reinforcer/response ratios, but these effects did not occur at the same dose. Finally, the tricyclic antidepressant drug imipramine significantly increased reinforcement rates and the reinforcer/response ratio. The present findings extend DRL-72s profile to selected atypical antipsychotic drugs and novel atypical antipsychotic drug mechanisms.

Early Adversary Culture in J. D. Salinger's *The Catcher in the Rye*
Teresa Sherman-Jones, Graduate Student, English Department

Holden Caulfield struggles throughout J. D. Salinger’s *The Catcher in the Rye* with loneliness, alienation, Weltschmerz, and questions of authenticity. He is troubled by the “phoniness” of the people around him, but even more so by their cruelty and conformity. Greatly opposed to snobbishness, hot shots, Hollywood, and celebrities, Holden attempts to escape from the society that glorifies them, the society which has constructed an ideology of celebrity fascination, materialism, superficiality, and civility which pushes the boundaries between what is genuine and heartfelt, and what is fake and affected. Holden Caulfield in many ways – through his opposition to these bourgeois ideologies and desperation to break free from them – represents an early character of adversary culture.

In Full View: Looking at the Impact of the Visual on Studying Racial Trauma in the College Literature Classroom
Linda Sirois, Graduate Student, English Department
Faculty Advisor: Lesley Larkin

This study combines scientific research methods and literary analysis to explore some ways that the introduction of a visual element could impact the study of racially violent literature in a college classroom. The racial literature considered is written by and about African Americans, and read by primarily White readers, within a classroom that has little racial diversity. This study considers brain research that strongly links the interrelation of the visual with the learning process, as well as considering the developmental stages of the brain of the 18-22-year-old—the age of the majority of college students. After looking at physiological and sociological factors which are related to the study of racially traumatic literature and the impact of incorporating a visual component, this work focuses on a close reading of the controversial novel Push and how the film version of the narrative exemplifies the ways that a visual element can interact with a text in an educational context.
Reliability of Knee Joint Measures in a Cutting Movement
Mitchell L. Stephenson, Undergraduate Student, Department of Health, Physical Education, and Recreation
Faculty Advisor: Dr. Randall Jensen

Eight female soccer athletes performed six horizontal jump and cut maneuvers onto two AMTI force platforms. 3D kinematic analysis of 22 marked body landmarks coupled with ground reaction forces (GRF) were analyzed for peak knee flexion and valgus angles, GRF, and knee abduction moments with repeated measures ANOVA. Analysis indicated no significant difference between trials (p > 0.05). Average measures Intraclass Correlation Coefficients resulted in values of r = 0.71 to 0.99. Results indicate good reliability for flexion angles and excellent reliability for valgus angles, GRF, and knee abduction moments.

Hightech/Lowtech: Accessible Technology Redundancies in Rural Locations
Luke A. Thomine, Graduate Student, English Department
Faculty Advisor: Elizabeth Monske

With the current push towards deeper integration of technology into the classroom, educators are increasingly reliant on digital communication to not only provide additional resources to their students, but also to deliver the actual content of the course. This use of technology can further isolate students who are disconnected with modern information networks. I will share practical pedagogical advice from my classroom for combating this problem and insuring accessible information through redundancies. I will also discuss how methods being implemented locally further increase the accessibility of information.

Exploring Boundaries: Thinking Creatively About Voice in Composition
Jack Van Treese and Laura Mead, Graduate Students, English Department
Faculty Advisor: Elizabeth Monske

These presenters were part of a conference panel that analyzed the role of “voice” in Composition, not only in how it relates to student writing, but also in its consideration for other aspects of the student-teacher relationship. They discovered that writing teachers must be open to fostering student voice, but must also assess how their own voices can both enhance or infringe on the writing experience of students. Two avenues of research were conducted. The first was on recorded oral commentary for student writing, finding that recorded voice can save teachers time, while also providing more substantial and detailed feedback. The second was on the stresses and challenges faced by introverted students and reflective learners in discussion based learning, noting that practical methods incorporating technology and multiple mediums can help engage these students. Ultimately, these different forms of voice can cross established boundaries, both facilitating and complicating the relationship among student, instructor, and university.
Adversary Culture and the "Myth" of Eroding Master Narratives
Ren VanderLind, Graduate Student, English Department
Faculty Advisor: Gabriel Brahm

Since the emergence of adversary culture in the 1960s, there has been an undercurrent of distrust and discontent in American society. Today, adversary culture has become absorbed into capitalism, further widening the gap between our sense of individuality and collective belonging. We have reached a point of existential crisis -- the "myth" that we no longer possess meaningful master narratives to place us within a larger social context. Although many will argue that master narratives have no role in the postmodern context, I contend that remnants of our traditional narratives still exist. Instead of disappearing altogether, our traditions now stand fragmented, in opposition to our society's injunction to enjoy. Thus, it has become our task to find meaning in the space between individuality and collectivity. While there is no easy solution to our predicament, we can begin to reconstruct meaning by looking to literature.

Stomata and Starch: Phytovolatilization Visual Aides
Beth Webb, Graduate Student, Biology Department
Faculty Advisor: Dr. Lesley Putman

Stomata and starch are viable participants in the phytovolatilization of TCE and toluene. Studies indicate organic anions, provided by the in planta hydrolysis of starch, assist in the movement of K+ ions into the stomata guard cells (Semmens, 1947; Alvim, 1949; Esau, 1977; Lemos and Isaias, 1998). Stomata pores open when the K+ ions enter the guard cells, allowing transpiration of volatile TCE and toluene. Decreased starch levels, in guard cell chloroplasts, coincide with the stomata pores opening. Living leaf epidermis will be treated with TCE/toluene and observed using Confocal Microscopy to record the adaptation of stomata during the phytovolatilization event. The leaf epidermis pieces will also be stained with Potassium iodide-iodine solution to record the fluctuation of starch during phytovolatilization.

Wild in Isolation: Poetry
Cameron Witbeck, Graduate Student, English Department
Faculty Advisor: Austin Hummell

My presentation will cover a series of poems I wrote this summer after spending two weeks alone on Isle Royale. While I was on the island, I experienced cold, hunger, wolves, and moose. The poems explore the terrifying moment when you don't know if you're at the top of food chain anymore. The presentation will consist of a poetry reading and a short discussion period.
Agricultural Assessment of Michigan's Upper Peninsula by Dr. Steve Nelson: Overall Impact of Local Food Systems
Macrea Anderson, Undergraduate Student, Department of Political Science
Faculty Advisor: Steve Nelson

The agricultural impact of Michigan's Upper Peninsula is an often overlooked asset to the State of Michigan as a whole. Over the course of the recession Michigan has been facing, agriculture is one of the few areas that has been able to show a steady increase economically. Northern Michigan University in coordination with the Marquette Food Co-op has recently made an agriculture assessment of the Upper Peninsula by surveying local food producers on a vast amount of topics and following up with site-visits to UP farms. The results of this endeavor have strengthened the notion that there is the potential and a large area of growth for agriculture as a whole in the UP. As a result of this research we were able to learn that there are many similar problems that effect UP farmers such as a lack of a cost-effective distribution network for selling products. Through taking this assessment and getting personal feedback from local producers we are able to make recommendations and generalizations on the factors that encourage and discourage farming practices in the Upper Peninsula.

Analysis of the NF-KappaB Pathway in Glioblastoma Multiforme
Ben D. Ayotte, Graduate Student, Biology Department
Faculty Advisor: Robert Winn

Glioblastoma multiforme (GBM) is a highly malignant brain cancer characterized by uncontrolled cellular proliferation, blood vessel growth, diffuse infiltration, and fierce resistance to cell death (Kesari, 2011). Recent insight into the molecular pathogenesis of GBM has identified the NF-κB signaling pathway to be redundantly activated in the most aggressive GBM tumors and blockade of this activation promotes decreases in both proliferation and growth of GBM cells (Nogueira et al., 2011). Due to these properties, NF-κB activation and the targets of its molecular signaling warrant further investigation in GBM, as it represents a potential focal point in tumorigenesis. In this study, the expression of NF-κB and 84 genes targeted by its signaling pathway will be assessed in the U87 GBM cell line via real-time polymerase chain reaction (RT-PCR) array. Through these analyses, correlations between specific gene transcription and glioma cell proliferation will be derived. This study will yield valuable insight into the transcriptional activity and targets of the NF-κB signaling pathway in GBM and provide experimental cues for future therapeutic strategies aimed at interrupting key molecular signaling events in the processes of tumor formation and proliferation.
Deliberate Practice: Repeated Lesson Implementations by Pre-Service Teachers
Donald J. Barr and Christina I. Labij, Graduate Students, Samantha A. Forintos, Freshman Fellow, School of Education
Faculty Advisor: Derek Anderson

From small tweaks to eliminating entire activities, and by becoming more comfortable with the material and the pacing, teachers generally agree that their lessons get better with practice. Whether or not practice improves performance is a highly debated and researched area in many domains of human performance. Whereas theory is associated with thinking and ideas, practice is rooted in the practical, in the doing. Most teachers recognize the symbiotic relationship between theory and practice. Within this framework, we designed a study involving teacher candidates who delivered, in pairs, 35-minute social studies lessons to groups of six to eight 4th-grade students four different times. Through observations of these repeated practice lessons, we wanted to learn how the teacher candidates’ lessons changed over the four iterations. In addition, through analysis of teacher candidates’ written reflections after teaching the four lessons, we also wanted to examine the candidates’ self-perceptions of the changes. In particular, we were interested in examining explanations for why they made specific changes. In this study, we found that the teacher candidates often adjusted their teaching after the second or third implementation of their lesson. The teacher candidates’ written reflections included profound findings related to four primary reasons for change.

The Detection of Energetics Extracted From Disposable Gloves Using High Performance Liquid Chromatography
Matthew Brege, Undergraduate Student, Chemistry Department
Faculty Advisor: Eugene Wickenheiser

The purpose of this study was to explore the possibility of using disposable gloves as evidence in forensic cases regarding explosives. Samples of disposable gloves were exposed to the vapors of an analog compound for dynamite for an extended period of time. The HPLC instrument was then used to show that the amount of compound absorbed by the glove was detectable, and the time frame the compound remained dissolved in the glove samples once they were exposed to air.

Substrate Preference of Rhinichthys cataractae in the Absence of High Velocity Water
Danielle Brough and Abigail Jacques, Undergraduate Students, Biology Department
Faculty Advisor: Jill Leonard

Longnose dace (Rhinichthys cataractae) are a common, native fish species found in the Upper Peninsula. The fish are known for their use of high velocity riffles with cobble substrate in cool water streams and likely use the spaces between cobbles and boulders as hiding places. We investigated whether longnose dace still prefer cobbles over gravel substrate in the absence of high velocity flows. Thirty-eight trials were run with nine individually marked fish to determine the overall substrate preference during day and night periods. The longnose dace in still water were found to prefer cobbles during the day, but selected gravel substrate at night. This suggests that longnose dace seek cover in the form
of crevices between cobbles during the daytime, but that this may not be necessary during the night.

**Artificial Coral Reef and Reef Restoration by Daniel Burlingame: A Meta-analysis of Coral Reef Growth**

Daniel Burlingame, Undergraduate Student, Department of Earth, Environmental and Geographical Sciences  
Faculty Advisor: Jill Leonard

This comparison of artificial coral reef and reef restoration addresses the history of reef degradation, measurements of restoration, and practices of artificial (manmade) coral reef ecosystems. The meta-analysis was conducted using scholarly articles on degradation history, comparisons between artificial reefs vs. restoration projects, and future implications of coral reef relations. I address the history, current events, and future implications of coral reef ecosystem research. With degradation causing 10% of coral reefs to be beyond repair and 30% to be in danger within the next 10-20 years, this research was conducted to assess solutions to restore productive coral reef ecosystems.

**Track-and-Stack Astro-Imaging**

Elizabeth Butler, Freshman Fellow, Physics Department  
Faculty Advisor: Mark Jacobs

When taking a picture of a galaxy with a telescope, the camera has to take a long exposure to get enough light. However, this means that the telescope the camera is attached to must follow or "track" the galaxy through the sky, and this can lead to a blurry, dim picture. Track-and-Stack imaging is a process that allows for a high-resolution picture without tracking error by taking many short-exposure images and stacking them on top of each other. In the lab we used a simulated starfield and a small, barely-lit post-it to test out two different, track-and-stack computer programs. Afterwards, we took the camera up to the observatory telescope and took images of real galaxies and nebulas.

**Marquette County: A Historical Economic Analysis of Employment**

Troy J. Cogan, Undergraduate Student, Economics Department  
Faculty Advisor: Tawni Ferrarini

This poster will analyze the changing employment, unemployment and jobless rates in the County of Marquette. The poster will feature first the trends of the entire Upper Peninsula and end with a narrow focus on Marquette County specifically. Shifting from looking at the whole Upper Peninsula, the poster will then focus specifically on Marquette County and explore what jobs are most prevalent in the county itself. The poster will then look at the county's ability to address challenges by looking at the unemployment and employment pre-and post-KI Sawyer Air Force Base closer in Marquette County. Population analysis will also be offered. The poster will finish with discussing the most recent unemployment, employment and jobless rates of Marquette County with a list of perceived key threats to the County. Interviews with key leaders in Marquette County will determine that list.
Early age Brook trout (Salvelinus fontinalis) growth patterns as measured using scale circuli spacing
Nicole Cook, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

Young brook trout don’t have scales, however they begin to develop several months after hatching. As time goes on, the scales start to form circuli and annuli. Circuli are visible rings on the scale and annuli are closely bunched sets of circuli used to indicate periods of very little growth (e.g. winter). Measuring the distance between circuli can help describe the growth pattern of the fish, which could indicate the nutrition available to the animal. I used brook trout scales that were obtained from two rivers, Mosquito R. and Seven Mile Cr. in Pictured Rocks National Lakeshore in 2009-2010, to determine if these circuli spacing patterns could be compared between rivers in 100-150mm long brook trout. Non-regenerated scales were mounted onto slides and then photographed. The growth patterns were similar for scales from the same river in different years. The average growth was greater in Mosquito R. than in Seven Mile Cr. In all the samples, there was very high growth in the center of the scale followed by slower and more even growth as the fish aged. These results suggest that circuli spacing can be used to assess growth in brook trout.

The Use of Facebook Results in Increased Connectivity between Companies and Consumers
Brittany Delich, Undergraduate Student, College of Business
Faculty Advisor: Gary Stark

Facebook started out as a social network to stay connected with family and friends. In recent years, the social media has evolved into a marketing platform. Today, we as consumers use it as a way to stay informed and up to date with companies that we interact with. On the flip side, companies use it as a way to stay connected with their consumers. The research for this project will be done to portray the effects that social networks, like Facebook, have on the connectivity between consumers and companies. Experiments will be ran, such as surveying groups of consumers to test the hypothesis which is, “The use of Facebook has increased connectivity between consumers and companies.”

Uncovering the Universe through CCD Camera Calibration
Arika Egan, Undergraduate Student, Freshmen Fellow, Physics Department
Faculty Advisor: Mark Jacobs

When using a CCD camera to take a picture of the night sky, the raw image is not an accurate portrayal of said sky. This is due to interfering properties of the telescope and camera. To remove the interferences, the image must be calibrated. The calibration process involves taking and averaging many frames of each interference type. The averaged frames are then removed from the raw image to produce an accurate representation of the sky. My research includes calibrating images through three grades of calibration and noting the differences. This was done as part of the NMU Freshmen Fellows program.
Synthesis and Characterization of a Chelated Biscarborane Derivative
Levi Ekanger, Undergraduate Student, Chemistry Department
Faculty Advisor: Thomas Getman

The syntheses of chelated biscarborane transition metal complexes of the form [M(biscarboranyl)2]- have been previously reported by Hawthorne et al., but no such complexes have been reported for elements in group 13 of the periodic table. Such complexes are expected to be among the most weakly coordinating anions ever synthesized. Attempts to isolate [M(biscarboranyl)2]- anions, where M = Al or Ga, were unsuccessful. In an attempt to isolate [B(biscarboranyl)2]- the anion [BF2(biscarborane)]-, I, was isolated in high yield and characterized via 11B NMR and FT-IR. The anion I, which contains only one biscarborane cage, demonstrates moderate hydrolytic stability. Future research will involve attempts to remove a fluoride ion from I with the hopes that the resulting B(biscarboranyl)F species will be more reactive to the addition of a second equivalent of (biscarboranyl)2-.

Power Produced by a Wind Turbine Using Fan Blades of Different Sizes and Shapes
Alexandra Fittante and Amelia Shirtz, Undergraduate Students, Physics Department
Faculty Advisor: Dave Donovan

Alternative sources of energy are quickly becoming more popular and are beginning to replace more conventional sources of power production, due in large part to the high demand for “greener” alternatives to the rapidly depleting supplies of non-renewable resources. One of these alternative energy sources is wind power, which is often generated by large wind turbines. In recent decades, wind turbines have become much more common, leading to a necessity to determine the most efficient means of operating the turbines, including optimal wind speed, blade orientation, and blade design. The goal of this project is to determine the most efficient blade design for a wind turbine on a small scale. The method used to determine efficiencies of various blade designs will be described as well as the results of the experiment.

The Use of Military Intervention as a Justified Response to Human Rights Violations
Helina Haile, Undergraduate Student, Department of International Studies
Faculty Advisor: Carol Strauss

This paper aims to answer the question of whether military intervention is a justified response to Human Right violations. The paper will address the various factors of intervention starting with the “Just War” theory commonly associated with peace and conflict resolution. An elaboration of the two sides of the English School of thought will serve as the basis for analyzing the debate over sovereignty. Further, an examination of the United Nations role in humanitarian efforts and how it handled past humanitarian crises will be included. Finally, this study will conclude with a discussion of the New Interventionist mentality that has become prevalent in recent years.
Anthropogenic Effects on Marine Apex Predators and Their Environment: A Meta-Analysis
Courtney R. Jackson, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

Over the past century, *Homo sapiens* have played a major role in altering ecosystems including detrimental population reductions of 400 million year old evolutionary lineages and apex predators; sharks. In comparing several different methods of anthropogenic degradation of the marine environment, I was able to identify the major factors in declining shark populations and the effects that reductions in shark populations have on specific ecosystems. I analyzed and compared data from the National Oceanic and Atmospheric Administration on climate change, pollution and shark populations and from the International Union for Conservation of Nature on shark populations. I also reviewed published literature related to declining shark populations. Unregulated fishing is the primary cause of decimating shark populations; as much as a 90% decline for some species within the last fifteen years. Declining shark populations have several cascading effects including impacts on species abundance, species diversity, and species distribution; resulting in the offset of complex interlaced marine ecosystems. Ecological and economic impacts have been correlated, but research is insufficient for estimations of shark populations and more data is needed in order to understand the full effects of declining shark populations.

Pitcher's Thistle (Cirsium pitcheri) Seedling Establishment Across Successional Gradient at Grand Sable Dunes, Pictured Rocks National Lakeshore
Matthew Keiser, Undergraduate Student, Biology Department
Faculty Advisor: Alan Rebertus

Pitcher’s thistle (*Cirsium pitcheri*) is an endangered dune plant endemic to the Great Lakes region. The largest known population of Pitcher’s thistle on Lake Superior is found on the Grand Sable Dunes at Pictured Rocks National Lakeshore (PIRO). The species’ endangered status is largely due to loss of habitat, both from invasive species such as Spotted knapweed (*Centaurea stoebe*) and by primary succession caused by dune stabilization. Pitcher’s thistle is an early successional species that will colonize areas of high disturbance such as open sand and blow-outs. Individual plants may take up to 8 years to reach maturity where in a single flowering event they produce seed and then die. As they are unable to reproduce vegetatively, seedling recruitment is essential for species survival. Our results show the effect of successional stage habitat on seedling establishment in a descriptive study analyzing transect data collected in each successional stage at three separate locations within the dune system.

Effects of timber management on insect biodiversity
Karla Kopp, Undergraduate Student, Biology Department
Faculty Advisor: Patrick Brown

Ground dwelling terrestrial invertebrates were collected over a two week span by using pitfall traps in mixed hardwood sites that represented clear cutting, selective cutting, and old growth forests in order to better understand the effects of timber management on
ecosystem biodiversity. A total of 2,796 individuals were collected, representing 27 different groups. There was a significantly different distribution of insects across all study sites. Of the Coleopterans, the 3 most commonly found were Carabids, Staphlynids, and Byrrhids. Carabids were most commonly caught in clearcut areas, while Staphlynids were more commonly caught in the old growth forest. Other ground dwelling invertebrates commonly found were Formicids and Arachnids. Formicids and Arachnids were both most commonly caught in clearcut areas. A more extensive study is required in order to properly represent the implications of biodiversity on managed forests. Based on this small baseline study, a range of forest management types are necessary to maintain the diversity of invertebrates, as well as other taxonomic groups that rely on them in the ecosystem.

**Surface Preference for Blue Mussel (Mytilus edulis) adhesion**
Karla Kopp, Undergraduate Student, Department of Biology
Faculty Advisor: Jill Leonard

Zebra mussels were introduced to the Great Lakes in 1986. Since then, they have spread throughout the Great Lakes and even down to the Mississippi Basin. Their ability to attach to solid surfaces using byssal threads makes it easy for them to spread. They are often found attached to boat motors and hulls and these boats carry the attached mussels when moving from lake to lake. Surface preference was studied on blue mussels with 4 different materials: wood, plastic, aluminum, and steel. Mussels had no significant preference to any of the surfaces, but did avoid attachment to steel. This can be explained by galvanic corrosion. Further studies should be conducted regarding mussel electromagnetic energy flow detection.

**Advertising Techniques; The Use of Humor to Imprint Brands on Consumers**
Kaitlin Krengel, Undergraduate Student, College of Business
Faculty Advisor: Gary Stark

Through the employment of simulated data collection, this research sets to hypothesize that the use of humor in advertising leads to increase brand recognition. This information could be used within marketing departments of large companies and advertising firms to better target and understand markets.

**Ocean acidification: a comparison of its effects on calcareous pteropods in tropical and polar seas**
Stephanie Larson, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

Ocean acidification is increasingly becoming a global concern as seas around the world become more acidic, and it is having varying effects on different organisms. The purpose of this study was to determine if, based on differences in water properties, tropical and polar oceans are affecting calcareous organisms, such as pteropods (planktonic molluscs), differently. My data was found in a variety of peer-reviewed journal articles that analyzed the rates of increased acidity in polar and tropical oceans, and then I related this information to the effects that the expected levels will have on pteropods. The results indicated that the
high latitude pteropods would have a greater difficulty forming their shells than those in tropical regions within only a few decades because the colder water will become more acidic and undersaturated in aragonite before the warmer, tropical waters reach such conditions. With the Polar Regions being most affected by ocean acidification, since dramatic changes will occur within decades, conservation and research should be focused on these regions. With such dramatic changes, many calcareous organisms will need to acclimate to the changing conditions or shift their habitat ranges to keep their species from going extinct.

Detection of the t-haplotype in the Mus domesticus – Mus musculus hybrid zone.
Matt Lindeman, Graduate Student, Biology Department
Faculty Advisor: Katherine Teeter

Mus domesticus and Mus musculus are two species of house mice, which have evolutionarily diverged and recently come into contact again. These species are closely related enough to interbreed (hybridize) resulting in gene flow between the two species. This secondary contact results in a hybrid zone, where each species occupies one side and the two hybridize in the middle. Hybrid zones serve as natural experiments for studying speciation. By studying gene flow and its barriers in this kind of system we can better understand how populations of one species become distinct species. The t-haplotype is a gene complex in Mus species which breaks the rules of normal Mendelian inheritance, causing itself to be transmitted to the next generation at a higher rate. A Polymerase Chain Reaction (PCR) based assay can be used to detect the t-haplotype in mice using only a DNA sample from each individual. Using this technique, I will determine the frequency and distribution of the t-haplotype in the Saxony transect of the M. domesticus – M. musculus hybrid zone. This project is a component of my thesis work studying molecular evolution in DNA sequences, which show high gene flow across the hybrid zone.

Blood Transfusion Simulation Evaluation of Student Learning
Carol Luedeman, Freshman Fellow, School of Nursing
Faculty Advisor: Julie Higbie

Skills regarding the administration of blood and blood products are important to the education of nursing students. However, few have the opportunity to administer blood or blood products while in school, and still fewer are able to witness a transfusion reaction. These reactions can range from an allergic reaction to a life-threatening anaphylactic cardiac arrest. It is important for students to learn how to recognize symptoms and intervene. This research examines the knowledge and skills learned by nursing students after participating in a simulation. A thirty-minute simulation provided the opportunity to hang blood products and witness several potential reactions in the nursing simulation center. The study utilized ten-question pre-and-post simulation tests designed to gauge the students’ knowledge of the procedure. Debriefing occurred after the simulation to review and reinforce the important concepts. A researcher was present at each simulation to answer questions and collect student consent forms. Tests used for data analysis included frequencies, paired t-tests and anovas. Results showed significant learning as a result of the simulation. Seven of ten questions on the test, including the total, were significant.
Simulation is an effective means of teaching complex concepts and the skills necessary to safely provide blood products to patients.

Lead Exporters in Baraga and Marquette County of the Upper Peninsula of Michigan
Kaitlin McDonald, Undergraduate Student, Economics Department
Faculty Advisor: Tawni Ferrarini

The purpose of this research is to identify some of the lead exporters in the 15 counties of the Upper Peninsula. This session will begin to provide a list of exporters, provide a brief history of them and identify current resources of value to them. This work will build on the work started by the East Michigan Council of Governments (EMCOG), the Eastern Upper Peninsula Regional Planning and Development Commission, and Michigan State University Center for Community and Economic Development. This research will grow and develop the Upper Peninsula economy, promoting regional and international relations and exports.

Guanosine analogues as targeted inhibition of Glioblastoma multiforme proliferation: A Thesis Study
Thomas McFall, Graduate Student, Biology Department
Faculty Advisor: Robert Winn

Recent studies have demonstrated that 85% of glioblastoma multiforme patients express Human Cytomegalovirus (HCMV). HCMV is a member of the herpes family, and carries a transcript for thymidine kinase. Thymidine kinase is an enzyme that is found in herpes viruses and is necessary for DNA replication and cell survival. Ganciclovir is a common guanosine analogue antiviral for targeting thymidine kinase in herpes viruses. It is considered a pro-drug, when administered it is in an inactive form until converted by viral thymidine kinase. The final product is a deoxyguanosine triphosphate that works as an inhibitor resulting in termination of DNA elongation. Guanosine analogues pose no cytotoxic threat to non-infected cells, and there must be active viral thymidine kinase to cause termination of DNA replication. The high specificity of guanosine analogues to herpes infected cells implies that targeting brain tumors with an active HCMV infection with antiviral therapy would inhibit growth and proliferation.

Evidence for an Early Holocene channel connecting the present day Tahquamenon and Manistique Rivers, eastern Upper Michigan, USA
Michael Michalek, Undergraduate Student, Department of Earth, Environmental and Geographical Sciences
Faculty Advisor: John Anderton

Until recently, geographers believed that over 9,000 years before present, water in early Lake Minong (modern Lake Superior) consistently drained through the Saint Mary’s River into Lake Stanley (modern Lake Huron). With the recent discovery of the Nadoway Barrier, it has been proposed that Lake Minong must have drained to a lower lying area in another location. Locally high elevations surrounded the entire perimeter of early Lake Minong except for in one specific area, Michigan’s eastern Upper Peninsula. It is proposed that a prehistoric channel connecting the present-day Tahquamenon River and Manistique River
is a likely link between Lake Minong and Lake Chippewa (modern Lake Michigan). The
dating of interior sand dunes and loess (windblown sand accumulations) in the eastern
Upper Peninsula also indicates a pattern consistent with the time in question. Further
evidence, such as Lake Superior varve and rhythmite correlation and dating, and Great
Lake isotopes records suggest unusually high water periods during the collapse of the
Nadoway Barrier. Sonar mapping of northern Lake Michigan has also revealed an apparent
delta off the coast of Manistique, indicating a water outlet dated around 9,000 years BP.
These initial findings require confirmatory landform dating and analysis.

Headsprout Early Reading as a Remedial Intervention for Low-Performing First Grade
Children
Heather A. Munsche, Graduate Student, Psychology Department
Faculty Advisor: Paul Andronis

Headsprout Early Reading effectively teaches reading to neurotypical children. This
research is evaluating it for effectiveness as a remedial intervention. Two first-grade classes
at Gilbert Elementary School in Gwinn, MI are participating in the program (total N=forty-
five). Students that have been identified as low-performing via Running Records and
DIBELS (Dynamic Indicators of Basic Early Literacy Skills) will receive forty lessons of
Headsprout (experimental N=twenty-four). Half of the experimental group (Group A,
N=twelve) began using Headsprout on January 19, 2012. The other half of the experimental
group (Group B, N=twelve) began Headsprout after Group A had completed the first twenty
lessons. Group B played Millie’s Math House, an educational game, until they began
Headsprout. Group A will play the Millie’s Math House after they have completed all forty
Headsprout lessons. This preliminary report compares students in Group A, who have
completed twenty lessons, to Group B before they began Headsprout.

A scientific comparison between different photosymbiont sea slugs
LeeAnne Nawrot, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

Very few animals are able to acquire photosynthetic organelles that continuously fix carbon
for energy use. However, such symbioses can be found among the phyla Mollusca. Many
predictions have been made for why such animals are able to support the photosynthetic
symbiosis. This analysis compares carbon fixation rates along with the evolutionary impact
of kleptoplasty within Elysia chlorotica and Costasiella lilanae, which are two different
morphological types of Ascoglossa within the phyla Mollusca. Data has been collected from
research findings on the efficiency of the symbiotic organisms continue to fix carbon over
time with their obtained plastids from various forms of algae. At 65 days of starvation there
was an 87% decline of efficiency of C. lilanae chlorophyll for carbon fixation. In comparison,
the Elysiid species showed 60% decline of efficiency at 40 days. The overall results were
that the Ascoglossa efficiency was dependent on varying factors, but did not specifically
favor one species over the other. The capability for kleptoplasty is derived from a common
ancestor of the two mollusk species studied, which explains why they would be similarly as
effective at carbon fixation. Evolutionary connections help to better understand the rise of
such unique adaptations in marine organisms.
Coho salmon life history patterns as determined by scale analysis
Megan Niemi, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

Recent studies have suggested that there are multiple life histories used by migratory coho salmon (*Oncorhynchus kisutch*). The goal of this project is to determine if there are different growth patterns between cohorts of coho salmon that migrate to Lake Superior, which may indicate the presence of more than one life history. Fish lay down circuli, visible rings, on their scales as they grow. The spacing between these circuli likely indicates the growth pattern of the fish. In this study, I counted and measured the distance between circuli on coho salmon scales from Sevenmile Cr. in Pictured Rocks National Lakeshore. The results show that there are patterns of growth that indicate an increase in growth following the first year of life indicating the effects of migration. This study shows that circuli analysis can be used to track patterns of growth in adult coho salmon.

Waterfowl Migration Research Project
Northern Michigan University Chapter of The Wildlife Society
Faculty Advisor: John Bruggink

The Northern Michigan University chapter of The Wildlife Society conducted research on waterfowl migration in the Marquette area from 4 November 2011 to 7 December 2011. Survey sites included Lower Harbor, Lake LaVasseur, Presque Isle, and the newly flooded Dead River Basin. The objectives of the study were to examine aspects of waterfowl migration periods, as well as compare new data with data from a similar study conducted in 1983. Eight species of waterfowl were observed in 2011, including two species that were not observed in the 1983 study. Differences in percentages of each waterfowl species for the two studies may be significant. The Northern Michigan University chapter of The Wildlife Society hopes to continue the survey in the future in order to observe further changes in waterfowl migration patterns.

Endocrine disruptors in cetaceans and their global distributions: A Review and Comparison
Chelsea A. O'Driscoll, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

Endocrine disruptors are toxins capable of mimicking or counteracting natural hormones. The purpose of the meta-analysis was to compare areas where endocrine disruptors are concentrated and their effects on cetaceans. Published literature from the past 20 years relating to the global distribution of endocrine disruptors, including organochlorides and polychlorinated biphenyls, was explored and compiled from locations in the Atlantic Ocean, Mediterranean Sea, Brazilian coast, North Pacific, and Asian waters. The results indicate that endocrine disruptors are globally distributed exhibiting variable effects. Endocrine disruptors are known to cause metabolic and reproductive effects in cetaceans, but the effects can vary by species. For example, cetaceans in Brazilian waters contained high concentrations of endocrine disruptors likely due to the industrialization of Brazil. Cetaceans are closed systems allowing toxins to easily accumulate within them. The results indicate
that endocrine disruptors are a global problem and need to be dealt with on a global scale. In order to decrease the concentrations in the oceans, people need to minimize the amount distributed into water sources. Endocrine disruptors can cause metabolic and reproductive effects upon chronic exposure and thus humans are getting exposed as well as cetaceans to high concentrations and could exhibit similar effects.

**Meta-Analysis of Crab-Clam Interactions During Hypoxic Events**  
Gary J. Perron, Undergraduate Student, Biology Department  
Faculty Advisor: Jill Leonard

Hypoxic conditions, in general, can alter trophic interactions. However, these low dissolved oxygen events can vary, and this variance can alter the effects in the different levels of the food web. The blue crab predator, *Callinectes sapidus*’ foraging rates on two clam prey, *Mya arenaria* and *Macoma balthica*, were examined. In this meta-analysis I am looking at reasons why clams did or did not move to the surface of the benthos during low oxygen events and why crabs seem to be directly altered by dissolved oxygen content rather than competition. In integrated analysis, I found that while studying crab predation on clams we need to take many factors into account. Clam benthos burial depth during hypoxic conditions may be different in different species of clams. Interactions between crabs may be minimal under low dissolved oxygen in the open ocean where some crabs move in to these risky environments to take advantage of exposed, dead clams. Foraging rates may be most affected when crabs cannot escape hypoxic conditions.

**Effective Utilization of Social Media Platforms for the Expansion of Prospective Donor Bases in Mid-Range Non-Profits**  
Tracy Pickering, Undergraduate Student, Department of Modern Languages and Literatures  
Faculty Advisor: Steven Nelson

In this age of global interconnectedness, it has become increasingly important for non-profits to embrace the new avenues through which their message can be spread. In order to access to the widest audience possible, effective utilization of a social media campaign, tailored to the specific brand of the organization, is necessary. Through the careful observation of successful outreach strategies implemented online by seven non-profits, spanning a variety of causes, sizes, and branding types, the author extracts and adapts three strategies for the expansion of the online campaign for Accordia Global Health Foundation, a mid-range non-profit working to fight infectious disease in Africa.

**Vitamin D3 Inhibits the Proliferation of Cultured Glioblastoma Multiforme Cells**  
Justine M. Pinskey, Graduate Student, Biology Department  
Faculty Advisor: Robert Winn

Glioblastoma multiforme (GBM) is a common, aggressive type of brain tumor with a median survival of only fifteen months. Brain tumor stem cells (BTSCs) within GBM tumors resist standard treatments, initiate recurrence, and pose a significant challenge for GBM treatment. This study examined gene expression, proliferation, and apoptosis of GBM cells
in vitro to evaluate the effects of 1α,25-dihydroxyvitamin D3 (vitamin D3). Vitamin D3 is a safe, natural inhibitor of the hedgehog signaling pathway—a mechanism essential to BTSC function. Immunocytochemistry demonstrated that both established GBM cell lines and GBM-derived BTSCs expressed GlI1, indicating hedgehog signaling pathway activity within the cell populations. Vitamin D3 treatment reduced hedgehog target gene expression and significantly reduced cell proliferation, both in GBM cell lines and GBM-derived BTSCs. Vitamin D3 also prevented neurosphere formation and induced apoptosis in BTSC populations. Because of active vitamin D3's environmental instability, an in vivo model might provide a better indication of its anti-tumor effects. Ultimately, this work provides evidence that vitamin D3 may enhance standard GBM treatments by inhibiting BTSCs.

The role of brain-derived neurotrophic factor in the health and maintenance of motorneurons
Emily Pomeroy, Graduate Student, Biology Department
Faculty Advisor: Erich Ottem

Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disease that progresses to death within 5 years. There is little treatment available to patients, as little is known about factors that cause the disease. A mutation in the superoxide dismutase 1 (Sod1) gene accounts for 10% of cases. The other 90% of cases result from unknown causes and are referred to sporadic ALS (SALS). Despite this, most rodent models used to study ALS are created by mutating the Sod1 gene. These models do not appropriately represent SALS. One possible cause of SALS is a lack of brain-derived neurotrophic factor (BDNF), a molecule that promotes the health of motorneurons and muscles. When BDNF is reduced or eliminated in the muscles of experimental mice, they display a behavioral phenotype similar to ALS. However, it is unknown whether the phenotype is similar at the cellular level. The motorneurons of muscle-BDNF knockout mice will be analyzed for three ALS-specific markers. If the cellular markers of ALS are present in the motorneurons as well, then the muscle-BDNF knockout mice could serve as the animal model for SALS. This would allow for further research seeking a treatment for the overwhelming symptoms of this disease.

A Comparison of the Affects of Temperature on Thyroid Hormone for Overwintering Salmonid Species in Urbanized and Rural Stream
David Ruppel, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

The metabolism of fish slows down during the overwinter period because of decreased water temperatures. As the temperature decreases, the activity of the fish will also decrease allowing the fish to further decrease metabolic need during period of low food availability resulting in low growth. However, in urbanized areas, stream temperatures can be warmer than rural streams due to drainage or altered shading, which can affect the activity of fish. In this experiment, I looked at the difference in thyroxin (T4) hormone levels between brook trout (Salvelinus fontinalis) and brown trout (Salmo trutta) in urbanized and rural streams during fall and spring. I collected blood samples from ten fish of each species in each stream type and then analyzed these samples for T4 levels using enzyme-immunoassay.
Results suggested a difference in hormone level between the urbanized and rural stream which confirms that urbanization of streams affects the metabolic rate of the fish during winter and provides a metric to assess fish response to altered winter conditions.

**Glioblastoma-derived exosomes and immune suppression**
Keith Z. Sabin, Graduate Student, Biology Department
Faculty Advisor: Robert Winn

**Intro:** Glioblastoma multiforme (GBM) is the most common and malignant form of brain tumor in adults. It is associated with an average survival rate of 15 months with a 5 year survival rate of <4%. One of the contributing factors to this dismal prognosis is the immune suppression induced by the tumor. While many mechanisms of immune suppression have been investigated the role of GBM-derived exosomes remains poorly characterized.

**Methods:** GBM exosomes were isolated from the serum free media of established cell lines using differential ultracentrifugation. Once isolated, the exosomes or the resulting exosome-depleted medium was co-cultured with T cells. After a 24 hour incubation T cell proliferation was measured. The ability of GBM exosomes to induce apoptosis (programed cell death) was investigated in a similar manner.

**Results:** It was determined that GBM exosomes, not the exosome depleted media, were able to significantly inhibit T cell proliferation. The ability of GBM exosomes to induce apoptosis in T cells is still being investigated.

**Discussion:** Our data is consistent with reports that colon and prostate cancer derived exosomes contribute to immune escape. This is a novel finding in glioma biology and could lead to the development of much needed therapies.

**Effects of atypical antipsychotic drugs on differential reinforcement of low rate 72s performance in rats**
Zachary Shankland, Lawrence Carey, and Ashley Schmeling, Graduate and Undergraduate Students, Psychology Department
Faculty Advisor: Adam Prus

While generally not considered treatments for depression, some atypical antipsychotic drugs (e.g., quetiapine) produce improvements in mood and related negative symptoms in schizophrenia. Moreover, atypical antipsychotic drugs may augment antidepressant drug effects in treatment resistant depression. The present study sought to evaluate newer and experimental atypical antipsychotic drugs in rats using a differential reinforcement of low rate 72s (DRL-72s) task, a standard antidepressant screening model. An antidepressant effect is characterized by a significant increase in reinforcement rate and in the ratio of reinforcers / responses. Both the atypical antipsychotic drug quetiapine and the quetiapine active metabolite and monoamine reuptake inhibitor N-Desalkylquetiapine, exhibited antidepressant effects in this task. Also the atypical antipsychotic drug risperidone significantly increase both reinforcement rates and the ratio of reinforcers / responses. The neurotensin NT1 receptor agonist and putative atypical antipsychotic drug PD149163 exhibited an increase in reinforcement rates and reinforcer/response ratios, but these effects did not occur at the same dose. Finally, the tricyclic antidepressant drug imipramine significantly increased reinforcement rates and the reinforcer/response ratio. The present findings extend DRL-72s profile to selected atypical antipsychotic drugs and novel atypical antipsychotic drug mechanisms.
The Role of Brain-Derived Neurotrophic Factor in the Health and Maintenance of Skeletal Muscle
Leah L. Schuman, Graduate Student, Biology Department
Faculty Advisor: Erich Ottem

Neuromuscular diseases are a class of progressive degenerative disorders which affect many regions of the central nervous system. In some neuromuscular disorders such as amyotrophic lateral sclerosis (ALS), the first significant pathology is observable in skeletal muscle which later progresses to motorneurons. In contrast, the neuromuscular disease spinal and bulbar muscular atrophy (SBMA) first presents as a pathological process in motorneurons that later advances in skeletal muscle. Advancing disease pathology will ultimately result in the denervation of the motor unit or an uncoupling of the motoneurons from target muscle. Denervation accelerates both muscle and motorneuron atrophy and further weakens the motor unit. Brain-derived neurotrophic factor (BDNF) is a signaling protein which promotes survival, maintenance and differentiation of motorneurons and muscle, and is synthesized by both cell types. It is possible that a common factor in the advancement of pathology in neuromuscular diseases is a loss of BDNF from either muscles or motorneurons. To address the possibility, we generated a transgenic mouse line that is missing BDNF only in skeletal muscle. These mice exhibit several behavioral phenotypes indicative of an adult onset neuromuscular disease. As predicted, preliminary evidence suggests that these mice show distinct evidence of pathological processes in skeletal muscle.

Narrative-Based Intervention in a Young Language Disordered Child
Mia Shawhan, Undergraduate Student, and Dr. Helen Kahn, Department of Clinical Sciences
Faculty Advisor: Helen Kahn

This single-subject study investigated a Narrative-Based Language Intervention (NBLI) program for a 7-year-old female with auditory comprehension deficit and specific-language impairment. A 15-week therapy program focused on structure and key components of narratives and auditory comprehension. Results indicated an increase in all of the aforementioned skills.

Reconstructing Forest History from Tree Rings
Lauren Somogyi, Undergraduate Student (Freshman Fellow), Department of Earth, Environmental, and Geographical Sciences
Faculty Advisor: Susy S. Ziegler

Disturbances within a forest can be dated back in history through dendrochronology. The process uses the practice of cross dating tree cores and assigning specific dates to specific tree rings. Fire scars on individual trees record what year fires occurred and how far they spread. Cross-sections were collected from Acer saccharum (sugar maple) trees and nearby Pinus strobus (white pine) trees were cored to extract the record of growth rings. For each cross-section, I was able to determine the specific years that fire scared the trees.
Three out of seven trees were scared by fire in 1944, and two trees were scared in 1957. Some trees were burned in other years, but the fires were not big enough to scar every tree in the stand. Establishment dates of white pines ranged from 1904 to 1979, with four trees establishing in the 1960s. I hypothesize that fire helped clear the underbrush of the forest and allowed new trees to establish and existing trees to increase their growth. Further analysis of the tree rings to determine growth rates would help test this hypothesis.

Dynamics of coarse woody debris harvesting within managed hardwood forest of Michigan’s Upper Peninsula
Emily Sprengelmeyer, Undergraduate Student, Biology Department
Faculty Advisor: Patrick Brown

Coarse woody debris (CWD) includes large pieces of downed wood and is associated with old-growth forests. CWD protects against soil erosion, regulates soil temperature, and affects soil acidity, but these ecosystem functions may be weakened as interest in biofuels intensifies CWD harvests. In order to understand harvesting consequences CWD was examined in clear-cut, selective-cut, and non-harvested stands in the Escanaba State Forest and Dukes Experimental Forest, July, 2011. The difference between mean volume of CWD in clear-cut, selective-cut, and non-harvested sites was statistically significant. There was also a statistically significant difference in CWD decay class ($X^2 = 12.623$, df = 2, p = 0.002). There was a positive correlation between CWD volume and soil temperature and pH. Clear-cut sites averaged a low overall percentage of bare ground and maintained 21 different plant species while selective-cut sites averaged higher bare ground percentages. Based on results, CWD volume seems to affect understory characteristics. The already significant difference in CWD volume between clear-cut, selective-cut, and uncut stands may begin to rapidly diverge as biofuel harvests increase. Long-term studies of CWD retention are needed to document further changes and aid in the development of site-specific retention guidelines.

Inhibition of miR26a microRNA restores sensitivity to Temozolomide
Angela G. Stewart, Graduate Student, Biology Department
Faculty Advisor: Robert Winn

MicroRNAs have been associated with tumorgenesis of Glioblastoma Multiform (GBM). A microRNA (miRNA) is a small (22-25 nucleotides) RNA that can prevent the translation of messenger RNA (mRNA) into a protein by binding the mRNA (Huse et al 2008, Zamore and Haley 2005). The miRNA/mRNA complex is then degraded. PTEN is a tumor suppressor protein which regulates the AKT/PIP3 pathway, active in many cellular regulatory pathways. The microRNA miR26a is known to bind PTEN mRNA. The loss of PTEN promotes ideal conditions for the unregulated growth of tumor cells. Huse et al 2008 demonstrated that miR-26a is frequently amplified in human glioma. Jiang and colleagues (2007) showed lack of PTEN plays a role in the cells ability to resist chemotherapy treatment, specifically temozolomide (TMZ). TMZ is the current chemotherapy standard of care for GBM patients. This study investigated a possible link between miR26a inhibition and TMZ sensitivity. LN 229 glioma cell line (wild-type PTEN and miR26a positive) was treated with a miR26a oligo inhibitor, subsequent TMZ treatment. Cellular proliferation was
assayed. We demonstrated that treatment of LN229 glioma cells with the combination of microRNA inhibitor and TMZ resulted in a marked decrease in cell proliferation and viability.

**Excitatory synaptic input of motoneurons in transgenic mice**
Amanda Taisto, Undergraduate Student, Biology Department
Faculty Advisor: Erich Ottem

Brain-derived neurotrophic factor (BDNF) is a diffusible neurotropic factor produced by both skeletal muscle and motoneurons. Studies suggest that BDNF signaling at the target muscle and associated motoneuron terminals contributes to the stability and health of the motor unit but the specifics are unknown. In order to determine the specific role muscle-derived BDNF provides to the neuromuscular unit, transgenic mice were generated with missing or reduced muscle-derived BDNF in the skeletal muscle only. We then observed the density of excitatory synaptic input to motoneurons in both heterozygous BDNF knockout subjects and homozygous and control animals across two age groups to determine whether reduced or absent muscle-derived BDNF leads to progressive dendritic atrophy and loss of synaptic input.

**Marine Primary Production: An Illustrated Experiment**
Cora U. Thiele, Undergraduate Student, Biology Department
Faculty Advisor: Jill Leonard

Effective illustrations of multifaceted concepts such as marine primary production are challenging to create. Often a certain style of graphic emphasizes one facet. Previous attempts to illustrate primary production usually highlight only a single facet (e.g. trophic connections). In this study, the illustrations were intended to convey information to both students and scientific professionals regarding size, relatedness, and identity of marine primary producers. A survey was carried out with four test groups; the first three groups were presented with cartoon (I), textbook (II), and museum (III) style illustrations, while group IV served as a control group and was not shown any illustration. The general understanding of the location where primary production occurs in the ocean showed increase with exposure to all three styles of illustration compared with the control. Illustration I was the most effective in conveying accurate information about the source of marine primary production and the relationship between megafauna and phytoplankton. These findings show that the understanding of primary production in terms of location and the trophic relationship between megafauna and phytoplankton was increased by exposure to illustrations, particularly cartoons. This suggests that an effective style of illustration for multifaceted scientific concepts would be a scientifically accurate cartoon.

**Can a DNA swipe determine who used the laptop?**
Erin Wiley, Undergraduate Student, Chemistry Department
Faculty Advisor: Suzanne Williams

DNA evidence plays an increasingly important role in criminal investigations. However, in order to determine who deposited a DNA sample (i.e., the victim or the suspect), the DNA has to be in a large enough quantity and of a certain level of quality for analysis. This
project investigated whether DNA from commonly touched objects such as computer keyboards and cell phones normally contain enough intact DNA for definitive analysis. Cheek cells were used as a source of plentiful high quality DNA and compared to DNA collected from several commonly used objects. The analysis involved amplification followed by sizing of 16 different short tandem DNA repeats with a Promega Human Identification Kit and an ABI 310 genetic sequencer.

**Comparison of Growth Factors of Two Kelp Forests**
Matthew Wojda, Undergraduate Student, Biology Department  
Faculty Advisor: Jill Leonard

Kelps are commonly keystone species in areas where they occur and are important for the structure of marine ecosystems. Multiple biological and environmental factors can affect the growth of these kelp forests. The purpose of the project was to analyze differences in the growth patterns of two geographically separate kelp forests made up of mix of giant kelp (*Macrocystis integrifolia*) and bull kelp (*Nereocystis leutkeana*). Data from different government and published literature were used to compare kelp forests from the coast of Washington State and the coast of California. The results from this experiment show that certain factors such as water temperature and natural predators can impact each area in different ways. These results can help provide more insight into how to better preserve these important keystone species.

**Interpretation of the Depositional Environment of Felch Sandstones and Their Relationship to the Munising Formation**
Elizabeth Woodford, Undergraduate Student, Department of Earth, Environmental and Geographical Sciences  
Faculty Advisor: Robert Regis

In 2010, fossilized brachiopods were discovered in sandstone outcrops near the Groveland Mine, which is located near Felch, MI in Dickinson County. The sandstones located there are often correlated to the Munising Formation, which is well-exposed at Pictured Rocks National Lakeshore, and has been thoroughly studied. The Munising Formation is considered to be of Late Cambrian age and unfossiliferous. In order to better understand the depositional environment which may have led to the Felch area being more conducive to life than the depositional environment to the north, the discovery outcrop was mapped, numerous hand samples taken and twelve thin sections (to be analyzed through a petrographic microscope) were made. Then, those interpretations of the depositional environment were compared to the characteristics of the Munising Formation. Few direct correlations are apparent between the Munising Formation and the Felch Sandstones. However, the Felch Sandstones do share distinguishable features with other strata in the area, notably those found in and around Iron Mountain, MI. Further study of the Felch Sandstones, as well as those in the Iron Mountain area, is needed in order to determine a more distinct classification for these sandstones, rather than their common relation to the Munising Formation.