



University of Wisconsin - Stevens Point

**College of
Letters & Science**

The College-at-the-Core

The Twelfth Annual

**Undergraduate
Research
Symposium**

Friday, April 29, 2001

Science Building, A-wing

The background is a colorful stained glass illustration. On the left, a large green tree with yellow highlights stands in front of a yellow building with blue windows and a grey roof. To the right, another yellow building with a grey roof and a yellow dome is visible. The bottom of the image features a pink and white striped banner.

The College of Letters & Science wishes to thank the committee of students, faculty, and staff that planned and coordinated this event:

**Dona Warren, Assistant Dean
Organizing Committee Chair**

Nicholas Borski, Geoscience Major

Charles Clark, Associate Dean

Robert Fix, Information Technology

Todd Good, CDP & American Studies

Neil Heywood, Department of Geography & Geology

Jim Lawrence, Department of Chemistry

Ismalia Odogba, Department of Geology & Geography

Sarah Pogell - Department of English

Anju Reejhsinghani, Department of History

Shane Stricker, Office of the Dean

Lisa Viegut, Office of the Dean

Craig Wendorf, Department of Psychology

Dean's Welcome

Room A121
Science Building

2:00 PM

Oral Presentations

*See Program for Individual
Room Locations and Time Assignments*

2:30 PM – 3:25 PM

and

3:40 PM – 4:35 PM

Poster Presentations

1st and 2nd Floor A-Wing Corridors
Science Building

2:30 PM - 5:00 PM

Dean Christopher Cirmo will welcome the participants and attendants at 2:00 PM in Room A121 of the Science Building. Please plan to attend this welcome and enjoy some pre-program refreshments in the Hansen Lobby of the Science Building.

The first set of oral presentations will begin at 2:30, with two papers per session, each paper taking 25 minutes with a five minute break between papers. A 15 minute intermission will follow at 3:25, with the second set of oral presentations beginning at 3:40.

Please adhere to these starting and ending times. This will allow for smooth transitions between paper presentations.

Thank you.

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On behalf of the students, faculty and staff of the College of Letters and Science at UWSP, I am pleased to present the 12th annual Letters and Science Undergraduate Research Symposium. This event is a testament to the relationship that we value the most in our college: *the relationship that develops between faculty and students in the process of engaging in collaborative research efforts.*

In participating in this event, our students have an opportunity to not only showcase the work they have done, but also to demonstrate how a college education develops higher levels of critical thinking, enhanced speaking and writing skills, and a better ability to present important findings to the public. We need to promote this latter value in the current political and economic climate where the value of a college education is being questioned and reevaluated. Research is fundamentally an exercise in discovery. Whether it is to answer a question regarding a medical condition, to investigate the number of species of plants which constitute diversity in real world systems, or to delve into public perceptions of teaching and scholarship, each experience is characterized by one common thread...*faculty working with students to generate and disseminate knowledge.* At the College of Letters and Science, our ultimate goal is to free student minds to think and to begin to trust in their ability to in some way contribute to and change their world. This elevation of “expectations” results in our students beginning to realize that they too can be professionals, and someday mentor and be an example to their own generation.

Please enjoy the colorful and diverse products of this great and ongoing enterprise of inquiry with which we are entrusted by the people of Wisconsin. You will be seeing the faces of future doctors, philosophers, lawyers, teachers, professors, business-people, politicians, scientists, and language specialists. Take the time to congratulate our students on their work, and to meet their faculty mentors, sharing in their new and exciting ideas. Let our students know that it does matter that they have taken the time to get to know their professors as teachers, mentors, confidantes and friends.

Welcome to the College of Letters and Science. Have a great time at our Symposium and thank you for attending.

A handwritten signature in black ink that reads "Christopher P. Civo". The signature is written in a cursive, flowing style.

Dean of the College of Letters and Science.

Professor of Geography/Geology

Oral Presentations
2:30 – 3:25
First & Second Floor Science Building

Group 1

Room A109

Moderator: Dr. Emmet Judziewicz

Aulonemia carjatensis: A New Bolivian Bamboo Species with Sheath Auricles

Eric Geisthardt, Christine Waas

Faculty Mentor: Dr. Emmet Judziewicz

Aulonemia carjatensis, a new bamboo species collected from Parque Nacional Madidi, Bolivia, will be both described and illustrated. This species is known from a single collection made at an elevation of 1700 meters, in a seasonal Juglans boliviana forest with upper sub-Andean scrub grasses. Six complete spikelets were dissected and a number of characteristics were measured; four of the individual florets contained mature caryopses. Lodicules and abaxial and adaxial leaf surfaces were examined using a Hitachi S3400 scanning electron microscope (SEM). Aulonemia carjatensis is distinguishable from its congeners in Aulonemia by the combination of large leaf blades (13-18 cm long, 4.7-5.7 cm wide), numerous fertile florets (7-13), and large awnless spikelets (23-40 mm long, 4-5 mm wide) which are distinctly larger than the spikelets of Aulonemia madidiensis, typically 20 X 1.9 mm with only 3-5 fertile florets. Aulonemia madidiensis has foliage leaves (22-33 X 7-9 cm) that are much larger than those of A. carjatensis. The lodicules of Aulonemia carjatensis are also distinguishable by the deflated basal cell of the elongate (2.3-2.5 mm) ciliate hairs.

Aulonemia insignis: A New Species of Bolivian Bamboo with Dimorphic Culms, Wine-Purple Leaf Margins and Sheath Auricles

Lane Gibbons

Faculty Mentor: Dr. Emmet Judziewicz

Aulonemia insignis, a new species of bamboo collected from the Apolobamba Integrated Management Natural Area within the La Paz Department of Bolivia, will be described and illustrated. The species is found at an elevation of approximately 2900 meters in a dense, wet, montane forest atop a sharp ridge. Various aspects of the single specimen's macro-morphology were analyzed, including the dissection of six spikelets, and a micro-analysis of the specimen's vegetative leaf morphology was completed utilizing a Hitachi S3400 scanning electron microscope (SEM). Major characteristics separating Aulonemia insignis

from its congeners include apparent dimorphic culms, conspicuous wine-purple stripes along the leaf margins, and prominently auriculate leaves. No other currently described species of *Aulonemia* exhibits separate reproductive culms with sparse leafing and vegetative culms with dense leafing. Related species such as *Aulonemia boliviana* and *A. viscosa* differ by displaying no leaf discoloration or wine-purple discoloration only at the base of their leaves, respectively. In addition, its prominently auriculate leaves distinguish *Aulonemia insignis* from possible close relatives *A. haenkei* and *A. juaensis*. Other characteristics demarcating *Aulonemia insignis* as a new species include leaves that are narrower than those of relatives *A. carjatensis* and *A. haenkei* but wider than those of *A. boliviana*, as well as unique diamond-shaped lodicules with glassy cilia emerging from their apices.

Group 2

Room A107

Moderator: Dr. Devinder Sandhu

Gametic Preference for a Region Containing a Male-sterility Female-sterility Gene in Soybean

Jordan Baumbach, Rebecca Slattery, Reid Palmer, Madan Bhattacharyya, Dr. Devinder Sandhu

Faculty Mentor: Dr. Devinder Sandhu

Agrobacterium tumefaciens is a bacterium that causes crown gall disease by inserting a piece of DNA (T-DNA) into the plant genome. This natural process is commonly used by researchers to integrate genes of interest into the plant genome. However, insertion into the plant genome is random and can interrupt functional genes, creating a mutant plant. In a recent study, this process has created a male-sterile, female-sterile (MSFS) mutant. In traditional Mendelian genetics, each gamete has a 50% chance of being passed on to the offspring. Segregation distortion can occur when a mutation creates a gene or set of genes that cause increased or decreased prevalence in offspring. The objectives of our study were (1) to study if MSFS mutation is due to T-DNA insertion, (2) to locate the MSFS gene in the soybean genome, and (3) to study segregation distortion in the region containing this sterility gene. DNA gel blot analysis using a gene from T-DNA (Bar gene) as a probe revealed that MSFS mutation is not a result of T-DNA insertion and may be due to spontaneous mutation. Selfed generations from original line (Williams) leading to MSFS mutant resulted in expected segregation ratios. When the mutant line was crossed with the Minsoy cultivar to generate a mapping population, it showed skewed segregation ratio in favor of the Minsoy gametes. We used bulked segregant analysis to locate the gene and used F2 population to map the gene. The gene mapped to molecular linkage group D1a (chromosome Gm01). We compared the genetic linkage map with the physical map to compare distribution of recombination in the gene containing region.

About 30 cM region near the gene shows strong segregation distortion in favor of Minsoy gametes.

The Shorter the Better: In Search of Candidate Genes to Develop an Alternate Dwarfing System in Wheat

Alina Ott, Jerott Moore, Dr. Devinder Sandhu

Faculty Mentor: Dr. Devinder Sandhu

Plant hormone manipulations have been an important aspect of the “Green Revolution” due to the development of dwarf plants that are resistant to lodging. These improvements were possible due to genes affecting the plant hormone gibberellins (GA). However, mutations in GA also inhibit mesocotyle elongation that adversely affects seedling germination in drought-prone areas where deep sowing is practiced. As an alternative, we are targeting brassinosteroids to understand their role in plant height. The gene Brassinosteroid-insensitive 1 (BRI1) is a promising candidate. The objectives of this study were to identify the BRI homologue in wheat and study its expression patterns in different wheat tissues and for different growth stages. The BRI1 gene has been identified in Arabidopsis and barley. Using the barley BRI1 sequence we identified wheat. Comparison between barley and wheat BRI1 proteins suggests a 96% identity. The BRI1 gene in wheat is 3817 base pairs (bp) with no introns. The coding region is 3375 bp. Comparison of wheat BRI1 with the wheat expressed sequence tag (EST) database revealed high expression of the gene in the crown region of the stem. We developed seven pairs of primers for the BRI1 gene. Expression analysis using reverse-transcriptase polymerase chain reaction (RT-PCR) indicated that the expression of BRI1 is higher in crown region of the stem as compared to leaves, leaf sheaths, or roots. The gene is expressed at a very low level in the roots. A virus induced gene silencing (VIGS) technique will be used to confirm involvement of BRI1 in plant height in wheat. In addition, we are characterizing seventeen known wheat mutants for hormone levels (GA, auxin and brassinosteroids) to identify putative candidate genes involved in dwarfing.

Group 3

Room A106

Moderator: Dr. John Droske

A “Green” Step-Growth Synthesis of Crosslinkable Polyesters

Garrett M. Kraft

Faculty Mentor: Dr. John Droske

A solventless step-growth polymerization was used for the preparation of polyesters with a range of mechanical properties. A series of polyesters containing pendant thiol groups was synthesized from the polymerization of mercaptosuccinic acid with various diols. The pendant thiol groups allowed for

controllable crosslinking of the polymer through the formation of disulfide bonds. The crosslinked materials were optically transparent and exhibited mechanical properties ranging from highly flexible to hard, strong materials, depending on the degree of crosslinking. The materials were characterized before and after crosslinking via Differential Scanning Calorimetry (DSC), Gel Permeation Chromatography (GPC), FTIR, and NMR. DSC revealed that the glass transition temperature (T_g) was inversely proportional to the chain length of the repeat unit in the uncrosslinked parent materials. The T_g increased with thermal curing and advanced further with the addition of a chemical crosslinking agent. The trend persisted, with the T_g 's of the series advancing linearly with both chemical and thermal treatments.

Synthesis of Crosslinkable Polyesters for Use as Bioresorbable Bone Adhesives

Arnold Groehler

Faculty Mentor: Dr. John Droske

Aliphatic polyesters are useful materials for biomedical applications because they readily undergo hydrolysis and biodegrade. For example, poly (glycolic acid), poly (lactic acid), and polycaprolactone have been used for many years as resorbable sutures. Recently, our research group synthesized crosslinkable polyesters for possible use as bioresorbable bone adhesives. In this work, a series of copolymers was prepared via melt condensation using 1,4-butanediol with various ratios of succinic acid (SA) and 3-mercaptop succinic acid (MSA). Films were cast and each copolymer was characterized by ¹HNMR, FTIR, and differential scanning calorimetry (DSC). The glass transition temperatures (T_g) of the resultant films showed a linear dependence on the mole percent MSA in the polymer. The polymer films were also treated with either DMSO or ferric ammonium citrate solution to increase the extent of crosslinking. DSC of the treated films showed that the T_g 's advanced further, and again showed a linear dependence on the percent MSA that was used in the synthesis. In an alternate approach, hydroxy end-capped pre-polymers were prepared from 3-mercaptop succinic acid and an excess of various diols. The resultant thiol-containing diols were then chain-extended using equimolar amounts of succinyl chloride. The copolymers were characterized by ¹HNMR and FTIR, but the resultant films were not of the same high quality as those prepared via the one-step synthesis.

Group 4

Room A213

Moderators: Dr. Dave Gibbs, Dr. Anthony Ellertson

RSSpeaker: A Text-to-Speech and Voice-Recognition RSS Reader

Michael Herman

Faculty Mentor: Dr. Dave Gibbs

I designed and programmed an application to read RSS feeds. RSS stands for really simple syndication. RSS is an XML based format used to easily deliver changing web content like news stories. RSS uses tags to mark the information being delivered. This is similar to the way web pages are structured though, because it is XML based, it uses much stricter rules. This application is unique in that it has the ability to read the content of the RSS feed to the user and respond to verbal commands issued by the user. The user also has the option to use a windows media player remote control to control the playback of the headlines. If the user finds a headline that they find interesting, they can either click on it or, if voice recognition is on, issue a verbal command and the program will launch the webpage. The users have the ability to categorize their feeds. The information that is displayed is *title*, *link*, *publication date*, and *description*. This project is just a proof of concept. To make this application ready for public use it would need the ability to extract and read full articles from web pages. The problem with this is that every web page has a different structure. The class concepts that were reinforced in this project are XML schemas, schema validation, the structure of well-formed xml verses valid XML, and LINQ to XML. Schemas are used to validate both the RSS feeds and also the XML file containing the links to the RSS feeds. In this process I found that most RSS feeds don't comply strictly with the RSS standard. I use LINQ to XML to pull the information out of a valid feed and display it in the UI.

FishACES (Aqua Culture Extreme Simulation)

Gail Linder & 480 Student Group 2

Faculty Mentor: Dr. Anthony Ellertson

This project creates a new Aquaculture simulator to expand the current curriculum on fish farming. The objectives of the project are to educate students on three aspects of managing a profitable fish farm through specific agricultural, scientific, and business concepts. Students begin the simulation with a fish farm where they can create ponds, purchase fish, and manage pond settings. They have the option to run experiments in a controlled lab environment to test ideas before applying settings to their ponds. The simulation also includes a town which consists of a university, library, hospital, and fish supply store. These locations provide a variety of resources for the student to assist them with managing their farm. The instructor has the option of assigning students warm, cool, or cold water fish. The simulation takes place over a typical nine month growing season. At the end of the season, the fish are sold and profits are added to the farm's bank

account. The end-of-season statistics are displayed in the form of charts and graphs tracking fish weight relative to pond temperature, social conditions, protein and oxygen levels, and profits earned.

Group 5

Room A210

Moderator: Dr. Robert Sirabian

The Guardian Angel of *Oliver Twist*

Thea Tracanna

Faculty Mentor: Dr. Robert Sirabian

In Charles Dickens's *Oliver Twist*, Nancy can be seen as a tragic, flawed character that sacrifices herself for the protection of young Oliver, but also challenges the stereotypical view of angelic Victorian women. Although initially Dickens did not plan for Nancy's role in the novel to be significant, her importance to the story line increased until she broke out of her stereotype and became the driving force in saving Oliver from a life of crime. As a prostitute, Nancy also becomes a foil to the innocent Rose Maylie. Her life on the streets with Fagin's gang contrasts strongly against Rose Maylie's life of wealth and purity. The two women both impact Oliver's life and try to protect him, yet Nancy consistently denies her own security and happiness when offered by Rose and Mr. Brownlow. Nancy believes she is flawed beyond help because of the life she has lived and the loyalty she feels towards Fagin's gang, even after divulging their secrets. Her tragedy is her (and middle-class Victorian society's) inability to see past her flaws and to recognize her own goodness before she is murdered by Bill Sikes.

Boys Will Be Boys: An Analysis of Male Influences in *Great Expectations*

Nichole Marik

Faculty Mentor: Dr. Robert Sirabian

The novel *Great Expectations*, by Charles Dickens, tells the tale of young Pip growing up and discovering who he can be as a man. This self-discovery is aided by the significant male influences that Dickens chooses to surround Pip within the novel. Attributes such as loyalty, trust, faith, and love are not given to Pip by most female influences in his life, but are given to him from key male characters, notably Joe, Herbert Pocket, and Magwitch. These male influences provide a nontraditional idea of masculinity, one that, ironically, supports a more maternal environment, a protective and guiding set of values that Pip incorporates into his life. Although male characters offer Pip negative examples of behavior, it is through the positive guidance given from key male characters in *Great Expectations* that Pip's ideas of being a gentleman are tested and tried within both

the social and private aspects of his life. This gives significant insight into how the novel can be interpreted and how its characters are portrayed

Group 6

Room A208

Moderators: Dr. Matthew Davis, Dr. Dejan Kuzmanovic

Normative and Destabilizing American Gothic Literature

Amy Zandler

Faculty Mentor: Dr. Matthew Davis

The Gothic mode has had a strong influence on American literature since the nation was formed, as shown in the works of Charles Brockden Brown, Edgar Allan Poe, and Nathaniel Hawthorne. Common themes among these writers' works are the instability of human reason and the insufficiency of the normative to account for bizarre events. For example, in Brown's novel *Wieland*, the voices the characters hear are explained by ventriloquism, but the spontaneous combustion of the elder Wieland and Theodore's multiple escapes from a heavily guarded prison are glossed over. Likewise, Poe's longer work, *The Narrative of Arthur Gordon Pym of Nantucket*, begins with meticulous, scientific descriptions of the title character's oceanic voyage, but the tale is soon overrun with bizarre uncharted islands, hieroglyphics, and steaming Antarctic seas, and ends with a mysterious white, robed figure. In Poe's shorter works, the uncanny is sometimes explained away with alcoholism, drug use, or mental instability, but these factors never fully explain everything. Finally, in *The House of the Seven Gables*, Hawthorne describes Maule's curse of the Pyncheon family, the presence of the ghost of Alice Pyncheon, and the psychic phenomenon of Mesmerism before seemingly rationally explaining everything in the last two chapters. Again, many details are not accounted for, and the conclusion of the novel hints at the supernatural. These three authors show that American Gothic literature exists on a frontier between the explained and the inexplicable, much like the literal American frontier between familiar and unknown lands. By shifting the Gothic mode from the supernaturalism of Europe to a more psychological realm, their writings helped establish an American national literature.

Two Margarets and Their Ethics: The Outsider Figure in Wilde's *Lady Windermere's Fan*

Kacie Otto

Faculty Mentor: Dr. Dejan Kuzmanovic

This paper will focus on Oscar Wilde's play *Lady Windermere's Fan* and the way the presentation of the outsider character, Mrs. Erlynne, functions to reveal Oscar Wilde's critique of the ethical conventional viewpoints of Victorian upper-class society. Mrs. Erlynne is goodhearted but a mistake she made in the past and her

decision not to be a mother makes her a morally ambiguous character that other characters can't quite trust. For example, Lady Windermere, the play's presumed "good woman," is guided by a moral absolutism that stops her from seeing her own flaws, as well as the good in Mrs. Erlynne, until the end of the play. Wilde himself shared some of Mrs. Erlynne's ethical beliefs, and he uses the character to bring forth these ideas to the Victorian stage.

Group 7

Room A207

Moderator: Dr. Edgar Francis

Expressionist Art in Germany

David LaRose

Faculty Mentor: Dr. Brian Hale

Expressionist art can be described as a reaction against the established genres of realism and naturalism, which dominated the literary and artistic works of the nineteenth century. This anti-establishment movement in Wilhelmine Germany became one of the predominant artistic forms by the beginning of the twentieth century. However, many early twentieth-century Expressionist plays proved too controversial for German censors and were banned from performance until the end of World War I. Meanwhile, the Great War had a profound impact on German writers and artists, many of whom enlisted and fought on the front lines. By 1918, Expressionists had become increasingly disillusioned in response to the destruction and chaos of modern warfare, and they strove to bring about a revitalization of their movement. This presentation will analyze and trace the development of Expressionist drama and film during the Weimar Republic (1918-1933). The movement cannot be regarded simply as a "prelude to the absurd," but rather as a unique genre that developed as artists and writers engaged in creative work in the aftermath of the war. The presentation will note the various styles of Expressionist play- and screenwriters, analyze their "conformity" to the Expressionist aesthetic in the areas of acting and design, and synthesize the similarities and differences between Georg Kaiser's Gas trilogy: *Die Koralle* (1917), *Gas I* (1918), and *Gas II* (1920); Alfred Buerst's *Die Woelfe* (1921); Robert Wiene's *Das Kabinett des Doktor Caligari* (1919); and Fritz Lang's *Metropolis* (1926).

Zakat and The Red Crescent Society

Darlene Schoenbeck

Faculty Mentor: Dr. Edgar Francis

In the United States, we are quite familiar with the Red Cross as an institution that helps prepare for natural disasters and provides assistance when disaster does strike. Recently, Americans have been reminded of another international organization, as Red Crescent societies have provided temporary housing and

other assistance to refugees fleeing the conflict in Libya. This paper will examine the establishment and expansion of Red Crescent societies as distinctively Muslim partners in the International Red Cross and Red Crescent Movement. This partnership - and the efforts to define Red Crescent societies as Islamic organizations - has given rise to tensions ever since the first efforts to establish distinctive Red Crescent societies alongside the Red Cross. Nevertheless, there has been a marked increase in the establishment of Red Crescent societies since the middle of the twentieth century. In part, this expansion has been made possible through modern interpretations of the appropriate collection and distribution of zakat, a distinctive form of Islamic charity. In this paper, I will examine how this modern interpretation of zakat - along with other factors - has made the expansion of Red Crescent societies possible.

Group 8

Room A202

Moderator: Dr. Jennifer Collins

The Case for and Path of Counterinsurgency Reform in Colombia

Stephen Blankenheim

Faculty Mentor: Dr. Jennifer Collins

The Colombian government has engaged in extensive military actions against the FARC-EP (Revolutionary Armed Forces of Colombia--People's Party) and ELN (National Liberation Army) guerilla movements. These groups, in open rebellion since 1964, have come to control up to 40% of Colombia's territory and rely heavily on Colombia's drug trade for funding. While the Álvaro Uribe administration, through implementation of Plan Colombia and Plan Patriota, has made impressive gains in security and increased the legitimacy for the Colombian government, it has not succeeded in reducing drug production to the degree expected, nor has it brought the continent's longest-running armed conflict to a close. Further, serious human rights violations and major corruption scandals have occurred. This paper evaluates the case for reforming the Colombian government's counterinsurgency efforts in collaboration with the U.S. Department of Defense to render them more effective, at the same time reducing human rights abuses and corruption. The goals of governmental and non-state actors, recent changes in strategy, and the results of the 2010 Colombian presidential election will be taken into account in an attempt to explain what direction these reforms will likely take under the leadership of new president Juan Manuel Santos.

Liberation Theology and Revolution in El Salvador and Nicaragua

Valerie Landowski

Faculty Mentor: Dr. Jennifer Collins

My paper explores Liberation Theology in Latin America with a particular focus on the role it played in El Salvador and Nicaragua during the 1970s and 1980s. It considers the division within the Catholic Church between those who supported revolutionary social and political movements and those who wanted to maintain conservative tradition. Historically, the Catholic Church took a fairly conservative role toward revolutionary movements and social change; my research aims to discover why the Church decided to play such a pivotal role in the revolutions of Central America - specifically El Salvador and Nicaragua - in the 1970s and 1980s. My paper pinpoints specific actors who advanced the process of revolution: Christian-based communities, certain religious lay meetings, and leaders of the revolution. In the final part of my paper, I examine El Salvador and Nicaragua post-revolution and describe the role of the Church in modern Latin America. I also contrast the Salvadoran and Nicaraguan revolutions with the more Marxist and anti-religious approach that characterized the Cuban Revolution. I conclude by reflecting on the significance of these revolutions and the role of the Catholic Church in contemporary social and political movements.

Group 9

Room A110

Moderator: Jody Lewis

The Effect of Fixed Versus Flexible Views on Motivation

Kate Densing

Faculty Mentor: Dr. Jody Lewis

People typically hold one of two basic frameworks that comprise their theory of intelligence. Some people believe that intelligence is a fixed, or static, state that will not improve over time. Conversely, the malleable theory of intelligence posits that intelligence is flexible and, with enough time and effort, it can be improved upon. Research shows that students who hold a flexible view of intelligence perform better academically, have higher self-efficacy, and have more optimism than students with a fixed view of intelligence. The present study aimed to analyze the relationship between measures on theories of intelligence, locus of control, grit, optimism, and self-efficacy when an individual is prompted that there is evidence of one theory of intelligence to be true. Participants were randomly assigned to one of three groups: (1) flexible personality theory, (2) fixed personality theory, or (3) control group. The flexible theory group was given an article with research-based evidence stating that personality is flexible and can change through the lifespan. The fixed group was given an article with research-based evidence stating that personality is fixed and remains constant over time. The control group read an article that shows evidence of animals having

personalities similar to humans. We predict that the flexible personality theory group will report having a more flexible view of intelligence, higher levels of grit, self-efficacy and optimism, and an internal locus of control than the fixed personality group and the control group. If the research shows that a flexible theory of intelligence can be manipulated, the hope is that it can be taught in an academic setting to promote achievement in the classroom.

Navigating the Mind Field: Post Traumatic Stress Disorder in Military Veterans

Jessica Richter

Faculty Mentor: Dr. Jeana Magyar-Moe

Through the years, Post Traumatic Stress Disorder (PTSD) has been called “soldier’s heart,” “shell shock,” and “combat fatigue.” Just as the name has changed, it has been evident for many years that war can change a soldier. In this project, the diagnosis, treatment, causes, and symptoms of PTSD were examined via structured, in-depth interviews with professionals working with military veterans diagnosed with PTSD. In addition to looking at how PTSD affects the veteran, issues involving the family, reasons for seeking or not seeking treatment, what the military is doing to help soldiers with PTSD, and what is being done and can be done to reduce the number of service members developing PTSD are explored. Looking at how combat experiences can affect the mind, body, spirit, family, friends, career, and overall life of a military veteran shows that not all war injuries are visible and that there is help for the war that wages in the mind of a service member long after combat has ended.

Group 10

Room A111

Moderator: Dr. Neil Heywood

Taking the Road Less Traveled: Navigating through the Tropical Rainforests and Rivers of Southern Guyana

Rachel Maslakow

Faculty Mentor: Dr. Stephanie Aleman

Traveling through the rainforests and rivers of Southern Guyana can be a challenge and takes a great deal of skill. With no automobiles or airplanes, a trip of 400 miles may easily take more than ten days. Although these modes of transportation are available to some, access to them is considered a luxury for many of the Amerindians in this area, including the Waiwai of the Masakinyari village located in the far south on the upper reaches of the Essequibo River. Rather than using these modern conveniences that many of us take for granted in the Western World, Amerindians like the Waiwai have continued to use and

master other modes of transportation, such as canoes and foot travel, to navigate through the ever-changing rainforests and rivers of the Amazon. This paper will discuss these various modes of transportation and how the Waiwai have learned to travel through the tropical rainforests and rivers of Southern Guyana, where many native Guyanese would never dare to go.

Integrated Aquaponics Using Cool Water Fish: Yellow Perch & Bluegill

Kyle Woolever

Faculty Mentor: Dr. Christopher Hartleb

Aquaponics is defined as the symbiotic cultivation of plants and aquatic animals in a recirculating environment. Due to the warmer temperature requirements of the plants, the most popular fish in the aquaponic field is tilapia, but tilapia are produced at too high a price in aquaponic systems to make them a profitable selection. This project is intended to step outside the typical industry selection of fish and use local species, bluegill and yellow perch, that may be suitable for an aquaponics system and have a higher market value. The objectives of this experiment were to determine if bluegill and yellow perch could be successfully raised in aquaponic systems, and if using them produced a sufficient crop of lettuce in a typical production cycle. Preliminary results showed that bluegill had a higher productivity, averaging 19.6 g per tank/week in weight gain, and stimulated greater lettuce growth. In comparison, yellow perch, averaging 12.2 g per tank/week in weight gain, showed poorer lettuce growth. Other factors that influenced fish and plant growth were monitored, such as pH, dissolved oxygen, temperature, salinity, ammonia, and nitrite. Temperature, salinity, and dissolved oxygen remained relatively constant throughout the experiment, while nitrite levels were high during the first week and decreased in subsequent weeks. pH levels tend to remain lower in recirculating systems, so weekly water changes maintained a pH = 8.0. Ammonia levels were slightly higher in the bluegill aquaponic system, possibly due to higher fish densities, when compared to the yellow perch aquaponic system. The only unforeseen problem that arose was a persistent amount of cannibalism in the bluegill aquaponic system that may have been caused by underfeeding at the current fish growth rate.

Poster Presentations
2:30 – 5:00 pm
First & Second Floor, Science Building

Anthropology

Archival or Ephemeral? The Role of Art in Cross-cultural Contexts

Juan De Hoyos

Faculty Mentor: Dr. Stephanie Aleman

This body of work is an attempt to show the correlating histories of Western Art and Amerindian art, specifically the Waiwai of Masakenari in southern Guyana and their permeating affects within society. Through the creative process, the formation of identities can be seen by focusing on several aspects of what is in western terms considered art. Examining the use of tools and materials, and how they relate to a conceptual basis regarding how art is formed, lays a foundation for considering other aspects of art within community. Some of these aspects include ideas such as western archival or preservation ideologies juxtaposed with the more ephemeral or transient nature of both art and materials among the Waiwai, which offers a rich source for metaphors regarding social connections to nature. Finally, the analysis offers cross-cultural views of ownership and how ownership is implied based on the needs that qualify a piece as art.

Biology

Effectiveness of Disinfectants on Methicillin-resistant Staphylococcus Aureus (MRSA)

Ashley Ostrowski

Faculty Mentor: Dr. Terese Barta

The objective of this research was to test the effectiveness of disinfectants against Methicillin Resistant Staphylococcus aureus (MRSA). MRSA is an antibiotic-resistant bacterium that causes serious skin and wound infections in hospitals. The bacterium is also becoming more common outside of the hospital environment, including in athletic facilities. Two commercial products, Pure Green® and Envirocide®, and a 10% bleach solution, were tested using Staphylococcus aureus (MRSA and non-MRSA strains) and Staphylococcus epidermidis. Standard microbiological methods, such as the disk diffusion assay and minimum inhibitory concentration assay, were used to determine the efficacy of the disinfectants. Based on preliminary data, Envirocide®, a quaternary

ammonium compound, is more effective than either Pure Green® or 10% bleach on the organisms tested. Two additional products, Goldshield® and Blue Wonder®, a cleaner used in the UWSP Allen Center, were originally included in the study. However, both chemicals were found to be contaminated with bacteria or fungi. Experiments are underway to test the efficacy of Envirocide® and Pure Green® on artificially contaminated surfaces. Vinyl cloth similar to what is used on athletic equipment (such as weight-lifting benches) will be swab-inoculated with bacteria. The surfaces will be sampled before and after cleaning them with the chemicals using Replicate Organism Direct Agar Contact (RODAC) plates. Results of this study will have practical implications for the athletic training facilities at UWSP.

Effect of Neonatal Maternal Separation on Later Aggressive and Reproductive Behaviors in Male Rats

Nina Christianson

Faculty Mentor: Dr. Karin Bodensteiner

In humans, stressful events during childhood, such as parental loss, neglect, or abuse, are risk factors for the development of psychopathologies in later life, and individuals who experience maltreatment as children often show impulsive aggression and antisocial behaviors. To study the possible mechanism(s) behind these behavioral outcomes, rodent maternal separation protocols are widely used as animal models of early life stress. Although maternal separation is known to result in long-lasting changes in emotional, behavioral, and neuroendocrine responses, the effects of maternal separation on adult male aggression and reproductive behavior are not well understood. To assess the effects of maternal separation on later aggressive and reproductive behaviors, male pups were separated from their mothers for 3 hr or 0 hr (control) daily from postnatal day 1 through 14. On postnatal days 38, 40 and 42, all subjects were examined for testicular descent and preputial separation. Blood samples were also taken for later analyses of serum testosterone and corticosterone. Latency to mount a female in estrus and inter-male aggressive behaviors will be measured once the subjects become fully mature (between 14 to 16 weeks of age). Although data collection and analyses are ongoing, it is hypothesized that maternal separation will decrease time to puberty, increase inter-male aggression, and decrease latency to mount a female in estrus. Information gained from this study will further our understanding of how events during the early neonatal period influence later adult behaviors, and should provide the basis for further studies examining possible endocrinological and physiological mechanisms behind this influence.

Genetics of Alzheimer's Disease

Patti Brown

Faculty Mentors: Dr. Diane Caporale

An extensive review of current genetic research into Alzheimer's disease will be presented. This review includes the most recent discoveries regarding variations in the area surrounding the risk factor Apolipoprotein E (APOE) gene on Chromosome 19. Original research is being conducted on a single family of three generations for suspected risk factors. This family has two suspected Alzheimer's disease cases in past generations and one diagnosed current case. Test subjects have provided a DNA sample via a cheek cell scraping. The primary risk factors under investigation are genes and mutations found on chromosome 19, including the APOE alleles and -491 promoter region mutations. A pedigree will be constructed for this family illustrating the risk factors present or absent in the diagnosed case and in the later generations.

Effect of Lipophilic Compounds on Early Development of Microcrustaceans

Evan Hutchison, Matthew Gunderson

Faculty Mentor: Dr. Joseph Covi

The brine shrimp, *Artemia franciscana*, is a micro-crustacean that produces anoxia tolerant embryos. Embryonic development is completely arrested under anoxia, and metabolic heat production drops below detection limits. A large diversity of zooplankton species found in fresh water systems also produces anoxia tolerant embryos to carry the population through environmental insults that kill larval and adult stages. These embryos represent a genetic bank that spans months to centuries. This mode of survival depends on the presence of cuticle that prevents the passage of all but low molecular weight gasses and water. However, recent research demonstrates that lipophilic compounds are able to penetrate the cuticle of *A. franciscana* embryos. Little is known about the potential for bioaccumulation in dormant micro-crustacean embryos, or the effects that accumulating toxins could have on early development and survivorship. Answering these unknowns will provide novel information that could significantly impact our understanding of piscicide and pollutant toxicity in aquatic systems. We have developed a model that uses *A. franciscana* embryos to assess the potential ecological impact of lipophilic toxins. Our system implements a comparative analysis of hatching success in (1) dormant embryos exposed to toxins over a chronic timeframe, (2) developing embryos exposed to toxins over an acute timeframe, and (3) control embryos not exposed to toxins. By comparing hatching success of the chronic and acute exposures, we can determine the importance of bioaccumulation in the toxicity of lipophilic compounds. Preliminary data indicate that cleanup measures along sandy beaches of the Louisiana coast may mitigate the detrimental effects of crude oil on micro-crustacean egg banks.

Cutting Development in Genus *Antirrhinum* in Response to Cut Shape and Root Hormone Treatment

Eric Nielsen, Lucas Swart

Faculty Mentors: Dr. Virginia Freire, John Hardy

Antirrhinum majus L., the garden snapdragon, has been cultivated for hundreds of years for its ornamental value. Germination is well-studied, yet we observed a lack of research on *A. majus* propagation from cuttings. In general, plants grown from cuttings show faster growth and development than those grown from seeds. Given their commercial value, if cuttings of *A. majus* show similar results, cutting propagation could be more profitable than traditional seed propagation. Though genetic variability would be limited through the use of vegetative (clonal) propagation, mass-production of a preferred phenotype could be simplified. We are currently studying two factors that may have an influence on cutting establishment: shape of cut (45° and 90° cuts examined) and rooting hormone application (use or lack of RooTone rooting powder). Our study includes four treatment types (45° with RT, 90° with RT, 45° without RT, 90° without RT). The experiment is being conducted in the UWSP Greenhouse. Weekly assessments are underway to record the number of leaves, overall growth, yellowing, and wilting. At the end of our study we will measure each plant's wet and dry weights. We hope to identify a method that may allow for the production of uniform snapdragons with increased efficiency.

The Effects of Companion Planting: *Lycopersicon esculentum* Mill. and *Borago officinalis* L.

Abby Jensen, Hannah Lutgen

Faculty Mentors: Dr. Virginia Freire, John Hardy

Popular knowledge suggests that borage (*Borago officinalis* L.) is a beneficial companion when planted among tomato (*Lycopersicon esculentum* Mill.) plants due to its insect-repelling and flavor enhancing properties. Presently, there is no scientific data to support this claim. The purpose of this study is to evaluate the effects of borage on germination, growth and health of tomato plants in a greenhouse setting. Three plant treatments: one tomato (cv. 'Sungold hybrid') monoculture, one borage monoculture, and one mixed planting of tomato and borage, were directly seeded into pots with ten replications per treatment. All thirty pots were randomly placed into flats and grown in the greenhouse. Weekly measurements of percent germination and number of true leaves were recorded over a 25 day period. Relative leaf chlorophyll content was analyzed using standard measurements obtained by a portable Spado-meter (SPAD-502) to indicate overall health of plants. Preliminary results suggest that tomatoes grown in the mixed planting treatments had a greater germination rate and photosynthetic capacity than the monoculture tomato plants. The germination rate and leaf development of borage plants were relatively similar in monoculture and

mixed-planting treatments. On the other hand, the chlorophyll content of borage was higher in the mixed treatment as compared to the monoculture grown borage.

Enhancing True Potato Seed Germination and Growth with Gibberellic Acid (GA₃), Reverse Osmosis Water, and Sodium Hypochlorite (bleach)

Carol Kropidlowski, Scott Behselich

Faculty Mentors: Dr. Virginia Freire, John Hardy

Wild potatoes contain a wide genetic diversity that can be useful in breeding programs to develop new varieties with desirable characteristics. True potato seed (TPS) from each wild potato line has its own dormancy variations. We hope to determine a better method to break seed dormancy and rapidly produce vigorous and viable plants to use for crosses in the greenhouse or field. For this experiment we chose a cross between open-pollinated *Solanum chacoense* Bitt. and *Solanum chomatophilum* Bitt. Each has resistance to late blight (*Phytophthora infestans*), and the latter also has resistance to early blight (*Alternaria solani*); wilt (*Verticillium* spp.); ring rot (*Corynebacterium sepedonicum*); blackleg (*Erwinia carotovora*); viruses PLRV, PMV, and PVX; and the insects Colorado potato beetle (*Leptinotarsa decemlineata*), flea beetle (*Empoasca* spp.), and leafbug (*Lygus* spp.). We are using gibberellic acid (GA₃) at 1500 ppm, reverse osmosis (RO) water, and sodium hypochlorite (NaOCl) concentration of 1% and 5%, to test the first and second generation TPS of the above cross. We determined the percent and rate of germination over twenty days after planting (DAP). At 20 DAP, we determined the number of plants having a first true leaf fully developed and the distances from soil line to those leaves, an indicator of vigor. We will compare these results for the variables of treatments (1%, 5%, and no sodium hypochlorite) and the F1 and F2 generation TPS used. A reduced number of thinned plants, with “usual and customary” care (fertilization and watering), will be monitored for continued vigor.

Optimal Temperature Range for Maximum Shiitake (*Lentinula edodes*) Yield: A Preliminary Study

Jaclyn Ramsey, Ben Tracey

Faculty Mentors: Dr. Virginia Freire, John Hardy

Shiitake mushrooms are one of the most popular edible mushrooms in Asia and continue to grow in popularity in the United States. They have long been used in eastern medicine and are becoming increasingly popular for alternative medicine in western cultures. Home cultivation is gaining popularity with mushroom lovers. Mushroom “grow kits” are available in a variety of forms, with easy to follow instructions. These kits are designed to allow consumers to grow mushrooms in indoor environments. The scientific community has established an optimal temperature range for shiitake growth of 50-80°. We believe this broad range can be narrowed to maximize growth. We hope to determine if there is a

more precise optimal range for maximum shiitake growth with home “block” kits. Mushrooms are being grown at three temperature ranges within the established optimal limits. Three shiitake “growing blocks” are being used. Substrate moisture content and gas exchange will be held constant on all three blocks using soil hygrometers and plastic tents. A minimum of two harvests for each block will be quantified to determine yield, based on individual and total weights and stem and cap sizes. At present one harvest has been made on two of the three blocks. The highest temperature range did not produce any mushrooms and developed a black mold-like appearance on its exterior. The exterior was washed, as per instructions from the retailer, prior to the second grow cycle. The middle temperature produced seven mushrooms of variable size, with a total mass of 167.8 g and average mass of 24 g. The lowest range produced one large mushroom at 47.34 g, the largest mass recorded for an individual mushroom. A minimum of one more harvest will be conducted before our data are analyzed.

A Survey of Adult Mosquitoes from Hunt Hill Audubon Sanctuary

Erica Swenson

Mentor: Dr. Jamee Hubbard

Wisconsin’s many landscapes provide ideal habitat for many types of mosquitoes. Fifty-two mosquito species have been found in Wisconsin to date; however, the last comprehensive survey of northern Wisconsin mosquitoes was in the mid-1960s. There have been a few other localized surveys in Wisconsin, mainly in the southern and south-central regions, and mainly focused on monitoring for mosquito disease vectors or monitoring for particular species of mosquitoes in urban areas. Several factors, including climate change, habitat alterations, and introduction of new species of mosquitoes into the United States, have likely produced a change in the mosquito species distribution in Wisconsin. For example, *Aedes albopictus* and *Ochlerotatus japonicus* are known to have been introduced to the United States since the 1960’s surveys; both of these species have been shown to be able to carry mosquito-borne viruses. *Ochlerotatus japonicus* was confirmed in Wisconsin in 2007, but it is unknown to what extent it can be found in Wisconsin. *Aedes albopictus* is currently a southern mosquito, but its range is expanding northward, possibly due to warmer winter temperatures that reduce mortality of overwintering insects. Changes in mosquito distribution will not only have an impact on the ecology of an area, but it can result in a change in the distribution of mosquito-borne diseases in Wisconsin. The objective of this project was to determine the mosquito species present in four habitats at each of four environmental education centers in northern Wisconsin: Beaver Creek Reserve, Hunt Hill Audubon Sanctuary, Treehaven, and Fallen Timbers Environmental Education Center. This gives us data on abundance of mosquitoes, species distribution, and seasonal activity for each habitat.

The New Andean Bamboo Species *Aulonemia madidiensis*

Dain Ziegler, Michael Zueger

Faculty Mentor: Dr. Emmet Judziewicz

Aulonemia madidiensis, a new bamboo species collected from Madidi National Park, located in the upper Amazon River basin of Bolivia, and from several sites in Peru, is described and illustrated. Several specimen collections of *A. madidiensis* were made in montane forested habitats of Peru and Bolivia at elevations ranging from 900 meters to 3100 meters above sea level. The morphological characteristics of 10 spikelets were examined while noting distinctive features. Abaxial and adaxial leaf surfaces were analyzed using a Hitachi S3400 scanning electron microscope (SEM). *Aulonemia madidiensis* is distinguishable from its congeners by the absence of awns on the spikelets, and large sheath auricles exhibiting prominent fimbriate bristles. *Aulonemia madidiensis* is also differentiated by large foliage leaves and substantial panicles producing small spikelets. SEM analysis reveals an abundance of papillae and numerous macro-hairs. Commonly, four papillae overarch each stomate producing a distinctive cross-like shape.

Monitoring Arctic Falcon Populations with Undergraduate Students

Robert Goodwin

Faculty Mentor: Dr. Robert Rosenfield

Climate change has caused many recent and rapid changes in the planet's ecosystems. Many of the most marked changes have occurred in the Arctic, where ecological consequences of climate change are globally underreported. Predicting and managing for future ecological consequences will likely require establishing long-term baseline and monitoring studies in a pan-Arctic network. Such studies will benefit from integration of research with education. Unfortunately, conducting field work in the Arctic is logistically difficult, and securing long-term funding exacerbates this problem. Here we report a means to extend and augment baseline research on Arctic falcons with long-term funding provided by volunteer undergraduate students. We used teams of six to ten undergraduate students from the University of Wisconsin at Stevens Point to principally collect non-invasive genetic samples and determine occupancy and productivity at historical nest sites of Gyrfalcons (*Falco rusticolus*) and Peregrine Falcons (*F. peregrinus*) on long-term study sites located on the Yukon Delta National Wildlife Refuge, Alaska, and near Kangerlussuaq, West Greenland, respectively, in four years during 2003 – 2010.

Complete Map of the Genes Involved in Fertility Pathway in Soybean

Joshua Rogers, Jordan Baumbach, Alina Ott, Warren Kistenbroker, Emiline Buhler, Alexandra Ollhoff, Eric Wermedal, Jerott Moore, J.P. Ciszewski, Reid Palmer, Devinder Sandhu

Faculty Mentor: Dr. Devinder Sandhu

In soybean, manual cross-pollination to produce large quantities of hybrid seed is difficult and time consuming. Identification of an environmentally stable male-sterility system could make hybrid seed production commercially viable. Understanding genes involved in fertility pathway may shed light on biology of reproduction in plants. There are 17 male-sterile, female-sterile (MSFS) mutants identified in soybean. For the characterization of these genes, we first need to analyze if these are unique genes. This will involve crossing all the mutants with each other and looking for complementation. Alternatively, all genes can be mapped, and their map locations may confirm if they are unique genes. In the last five years, our group has mapped six MSFS genes to soybean chromosomes. The objectives of this study were to map remaining 11 genes on to soybean chromosomes and to identify and name unique genes. This will become a comprehensive source of the mapping information for all the MSFS genes in soybean. F₂ populations were generated for all the genes, and DNA was isolated for 1400 leaf samples. Fertile and sterile bulks were generated for the bulked segregant analyses. A total of 700 SSR markers were used on the bulks for each gene to identify the chromosome containing the gene. Of the eleven genes, we have already found chromosomal locations of 7 genes. Once all the genes are located onto chromosomes, entire F₂ populations will be used for fine mapping. This will provide clear picture about the total number of unique MSFS genes in soybeans. Hence, we will be able to provide gene symbols to all novel genes. Sequence comparisons with the genomic regions may result in identifying the candidate genes.

The Rise and Fall of Crossing-over and Gene Distribution on Soybean Chromosomes

Alina Ott, Brian Trautschold, Dr. Devinder Sandhu

Faculty Mentor: Dr. Devinder Sandhu

Soybean is a major crop that is an important source of oil and proteins. A number of genetic linkage maps have been developed in soybean to locate markers and genes. Specifically, hundreds of simple sequence repeat (SSR) markers have been developed and mapped. In addition, the soybean genome was recently sequenced, which resulted in the generation of vast amounts of genetic information. The objectives of this investigation were to use SSR markers in developing a connection between genetic and physical maps and to determine the physical distribution of recombination on soybean chromosomes. A total of 2,188 SSR marker sequences were used for sequence-based physical localization on soybean chromosomes. Linkage information was used from different maps to create an

integrated genetic map. Comparison of the integrated genetic linkage maps and the sequence based physical maps revealed that the distal 25% of the chromosomes were the most marker and gene-dense. In comparison, the proximal 25% of each chromosome contained more than seven times fewer genes and markers. At the whole genome level, the marker and gene density showed a high correlation with the physical distance from the centromere. Recombination showed similar distribution patterns, with most occurring in the telomeric regions, though the correlation between recombination and distance from the centromere was low. Most of the centromeric regions were low in recombination with few exceptions. A high correlation between the distribution of SSR markers and genes suggested close association of SSRs with genes. The knowledge of distribution of recombination on chromosomes may be applied in characterizing and targeting genes.

Ultrastructure of the Epidermis of the Teleost Caudal Fin

Robert Goodwin, Timothy Rushmer

Faculty Mentor: Dr. Robert Schmitz

The caudal fin of teleost fishes is used to generate force against water in order to propel the fish forward. The skeleton of the caudal fin consists of several pairs of bony fin rays called lepidotrichia. These rays are segmented longitudinally, and the joints between the segments allow the rays to bend laterally, giving the fin its observed flexibility. Holding the fin rays together is a network of connective tissue, which is then encased in a layer of epidermal skin cells. Proximally, the connective tissue appears to be structured to transfer bending forces to the lepidotrichia. However, distally, this connective component is reduced and the lepidotrichia are mostly covered by epidermis. The epidermis from the proximal and distal portions of the caudal fin of the fathead minnow, *Pimephales promelas*, has been examined with the transmission electron microscope. When these two regions are compared, differences in the cell structure of the epidermis are observed. The proximal epidermis contains more goblet cells than the distal epidermis. The keratinocytes along the entire length of the fin are highly interdigitated; however, the distal cells are more flattened than the proximal cells. The plasma membranes of adjacent cells are very electron dense, and no intercellular spaces are observed between cells. These “continuous junctions” do not resemble the junctions typically observed in vertebrate tissues. We hypothesize that these “continuous junctions” mechanically hold the epidermal cells together, allowing the epidermis to transmit tensile forces needed to undulate the caudal fin during swimming. More work is required to characterize these junctions and determine how the epidermis functions during swimming.

Metabolomics of the MEP Pathway

Justin Klesmith

Faculty Mentors: Dr. Eric Singasaas, Bill DeVita

The aim of our research is to quantify metabolic intermediates of the 2-C-methyl-d-erythritol 4-phosphate (MEP) biochemical pathway in engineered bacteria. We are engineering these bacteria in order to increase sustainability the biofuels industry by diversifying the type of fuel and fine chemical products produced. One product of the MEP pathway is isoprene, which is a reduced carbon biochemical. Isoprene is produced in wild type bacteria, and its production was enhanced by a custom operon. To help facilitate and optimize isoprene production, a methodology of metabolite quantification was developed. The measurement of metabolites provides a snapshot of a biochemical pathway and, in turn, provides data that can be used by the researcher to introduce changes into an organism that are advantageous to biochemical production. First, we synthesized one metabolite of interest, DMAPP. We then focused on quantification of DMAPP and other metabolites on a triple quadrupole liquid chromatography mass spectrometer. The instrument response and ion fragmentation was optimized, along with other metabolites in tandem mass spectrometry. Next, we developed a liquid chromatography quantification method. Lastly, we began the initial development of a sampling procedure applicable under the conditions needed for LC-MS quantification. We have obtained the fragmentation and collision data of mass transitions and adducts of the metabolites, along with initial retention data from different columns. Future results will incorporate quantification data from samples taken from fermentations. These results will be analyzed by metabolic control analysis and possibly enable the optimization of the custom operon.

Tylose Development in Grapevines Worsens Pierce's Disease Symptoms

Kevin Thompson, Hans Severson

Faculty Mentor: Dr. Qiang Sun

Pierce's disease (PD) of grapevines is severely affecting grape and wine industries in many regions of the United States. The causal bacterium *Xylella fastidiosa* is spread through the vessel (water conduit) system of host grapevine after introduction to the vine by insect vector. Tyloses (cellular structures forming in vessel) have been reported in PD-susceptible host grapes to block the vessel system, but their functional role is not decisively clear in grapevine PD as well as other plant vascular diseases. The current study investigated tylose development in grapevine genotypes with different PD resistance. Samples of each genotype were collected from the grapevines 12 weeks after inoculation, when the PD-susceptible genotypes had severe external PD symptoms but PD-resistant and tolerant genotypes showed no symptoms. Our data indicated that in PD-susceptible genotypes, over 60 % of the vessels were blocked by tyloses throughout the infected plants, and in PD-tolerant and resistant genotypes, less than 10 % of the vessels contained tyloses. This suggests that intensive tylose

development in infected grapevines makes the disease symptom development worse by blocking the water supply in the vines.

A Non-invasive, Non-lethal Method of Sexing Central Mudminnows Collected from Wisconsin

Bradley Smith

Faculty Mentors: Dr. Justin Sipiorski, Dr. Steven Seiler, Dr. Meredith Seiler

As a potential baitfish species, the Central Mudminnow (*Umbra limi*) has many advantages over species sold traditionally as bait. Mudminnows adapt easily to captivity, eat a wide array of food items, and can more easily withstand poor water quality than standard baitfishes. Successful captive breeding has never been achieved and remains one of the last hurdles faced by baitfish culturists attempting to rear this species for sale on the wholesale baitfish market. A critical aspect in the captive rearing of fishes, in which sexes are fairly similar morphologically, is to reliably and non-invasively assign breeding individuals to the proper sex. We used multivariate statistical methods on a standard set of morphological measurements, taken from individuals of known sex, to assess which characters could be used most reliably to sex adult Mudminnows. We are in the initial phases of testing the use of these key measurements to sex individual Mudminnows collected from throughout the State of Wisconsin, interred in the Becker Memorial Ichthyological Collection of the UWSP COLS Museum of Natural History.

A Dynamic and Integrated Approach to Developing a Snake Husbandry and Captive Breeding Program in the Live Herpetofaunal Collection at UWSP

Gwendolyn Schwanke

Faculty Mentors: Dr. Erik Wild, Dr. Justin Sipiorski

In the Live Reptile and Amphibian Collection in the Biology Department at UWSP, we care for eight species of snakes (17 individuals) with a long-range goal of developing captive breeding programs for many (but not all) species under our care. We are creating protocols for care that simultaneously treat each snake individually, consider specific needs of mated pairs of snakes, and also incorporate general ecological requirements and tolerances specific to the respective taxonomic affiliations of each snake species. These protocols borrow from the most up-to-date scientific methods on snake husbandry and captive breeding. Students are constrained by the budget of the lab and a limited and variable volunteer corps. Any UWSP student involved in the creation and administration of these programs will confront similar logistical, personnel, and budgetary issues in the professional world. Currently there are two mated pairs of snakes. One pair has successfully produced offspring.

Proposal to Assess the Occurrence of Kleptogenesis in Blue Spotted Salamander Populations (*Ambystoma laterale*-*jeffersonianum* Complex) Across Wisconsin

Matthew Rucker

Faculty Mentors: Dr. Erik Wild, Dr. Justin Sipiorski

Biodiversity is a vital part of maintaining a healthy ecosystem; however, even amongst animals that are well observed, some unidentified biodiversity remains cryptic. Amphibians and reptiles receive less attention, but fulfill no less vital a role in the environment. Such is the case with Blue Spotted Salamanders (*Ambystoma laterale*), which are known to readily hybridize with the Jefferson Salamander (*A. jeffersonianum*) yielding mostly females. Further studies reveal the persistence of polyploid individuals, raising new questions. These all-female lineages are unisexuals that persist through kleptogenesis, a method of enhancing fitness, involving a sympatric sexual *Ambystoma* salamander to fulfill one of three modes of development: gynogenesis, genome replacement, or polyploidy. There is a high potential for these kleptogens to occur in Wisconsin; however, currently only *A. laterale* is recognized to occur. The issue is that the unisexual *Ambystoma* salamanders are morphologically identical to sympatric ambystomatids, and the only way to distinguish the two species is through molecular analysis of their genome. This is important for Wisconsin biodiversity as the perception of a healthy, fecund *A. laterale* population may be erroneous. If the unisexuals are present and are achieving higher persistence rates than the sexual ambystomatids, then the need for conservation may be pressing, as has already been achieved for populations of the sexual *A. laterale* and *A. jeffersonianum* in many other parts of their range. I present here a detailed proposal to gather tissue samples from across the state and to identify the individuals using a nonlethal method of molecular genetic analysis.

Comparative Antibacterial Properties of Crocodylian Immunology and Select Wisconsin Snake Species

Charles Determan, Logan Huse

Faculty Mentor: Dr. Erik Wild

Previous studies have demonstrated the broad spectrum antibacterial properties of crocodylian immune systems in the wild. Despite developing interest in reptilian immunology, little data has been reported regarding the antibacterial properties of entirely captive-raised crocodylians. Secondly, despite the broad resistance representative in crocodylians, essentially nothing has been reported pertaining to the antibacterial resistance among other reptiles. Herein we report the results of immunological assays of blood serum from a captive American alligator and compare these to known values for wild alligators. Serum was separated from whole blood by differential sedimentation and subsequently tested against a wide range of bacteria following established methods. Immunological assays of select

native Wisconsin species of snakes will be reported as well. The potential significance of such findings and further research directions will be discussed.

Geographic Variation in Morphometrics of the Western Chorus Frog (*Pseudacris maculata*) in Wisconsin

Ian Mogenson

Faculty Mentor: Dr. Erik Wild

Geographic variation of morphological features can provide evidence of the processes of evolution, such as localized adaptation resulting in clinal variation, or integration, among species in areas of sympatry. Chorus frogs of the genus *Pseudacris* have been the focus of such studies because they are commonly found over broad geographic areas. Indeed, geographic variation in morphometric features among populations of some species of chorus frogs of the genus *Pseudacris* have been documented in some regions of the U.S. In particular, tibia length, reflecting the length of the hind limb, has been shown to vary geographically. The present study assesses variation among Wisconsin populations of the Western Chorus Frog (*Pseudacris maculata*). Over one hundred preserved specimens of *Pseudacris maculata* were examined, and standard morphometric measurements were taken. These data were statistically analyzed, and the results will be presented and discussed. Hypotheses for explaining the pattern of variation will be assessed.

Variation in the Timing of Skeletal Development in the Pickerel Frog (*Lithobates palustris*)

Spencer Siddons, Brandon Carmichael

Faculty Mentor: Dr. Erik Wild

The biphasic life cycle of anurans with an aquatic tadpole and terrestrial adult is one of the most fascinating biological transformations because a tadpole is structurally very different from an adult frog. Numerous researchers have documented this transformation in numerous species of frogs. Most of these works have focused on the skeletal system and its transformation from being completely cartilaginous in a young tadpole to being replaced by bone in the adult. However, few studies have attempted to describe the variation in the timing of the developmental events of the skeleton within a single species. Ten egg clutches of the Pickerel Frog (*Lithobates palustris*) were collected from Arcadia, Virginia, and kept in captivity. Samples (4–6) of the hatched tadpoles were preserved regularly throughout their development providing a comprehensive series of developmental stages with numerous tadpoles of each age. The preserved tadpoles were measured and their external anatomy described. The specimens were then cleared-and-stained such that the skeleton was clearly visible. Specimens were examined under a dissection microscope and the appearances of individual bones of the skeleton were recorded. Variation in the development of

external anatomy and in the timing and sequence of the appearance of individual skeletal elements are reported and compared with that reported previously for the species and its relatives.

Effects of Burrow Distance on Anti-predator Vigilance in Foraging Yellow-bellied Marmots (*Marmota flaviventris*)

Alexandra Anderson

Faculty Mentor: Dr. Christopher Yahnke

The risk of predation influences the behavior of individuals and can determine how an animal allocates its time when searching for and obtaining food. To reduce predation risk, many animals use refuges and protective cover to increase their chances of survival, but it is unclear how these safe areas affect anti-predator vigilance behaviors (scanning and looking for predators) when the animal is no longer covered. I experimentally tested the effects of burrow distance on anti-predator vigilance in foraging yellow-bellied marmots (*Marmota flaviventris*) by placing food at increasing distances (1, 5, 10, and 20m) from designated marmot burrows. I measured (1) time latency to forage at feeding stations, (2) reluctance to forage at stations, (3) proportion of time allocated to anti-predator vigilance and foraging, and (4) alert and flight initiation distances in response to an approaching threat. Marmots were reluctant to forage far from the burrow, and time latency to forage increased linearly as distance from the burrow increased. When individuals foraged alone, distance from burrow did not affect the proportion of time allocated to foraging or anti-predator vigilance. However, individuals increased foraging and decreased anti-predator vigilance when 5m from the burrow in the presence of conspecifics. There was no effect of distance from burrow on alert and flight initiation distance. These findings suggest that marmots are equally alert at any distance from burrow, and there may be a distance limit to which social animals rely on others to alert them to predators.

Almont Paleofossil Accessioning and Identification

Brittini Buechel, Vicky Kingstad, Kevin Embacher, Jeremiah Wilkinson, Jennifer Bennett

Faculty Mentors: Pat Zellmer, Dr. Ray Reser, Dr. Michael Bozek

Plant fossils recovered from the Sentinel Butte Formation (Fort Union Group) near Almont, North Dakota, include more than 50 identified genera and 20 families from the Paleocene Epoch (65 – 56 million years ago). These fossils provide clear evidence for the evolution of North American flora following the Cretaceous-Tertiary (KT) boundary extinctions, exemplified by the emergence of the Ranunculaceae (buttercup) family, Cornus (dogwoods) and Acer (maples) genera within this fossil record. The preservation and species diversity of this site, combined with a single other location in China, is unequalled for this time period. Diagnostic internal anatomical leaf structure and external surface features of these

fossils renders these specimens unique. Currently UWSP houses the most extensive and comprehensive collection of Almont plant fossils collected to date. Due to the singular nature of these collections and the paucity of similar Paleocene plant fossil locales, these specimens represent a significant fossil resource for paleobotanical studies worldwide. One goal of the current student project is to provide an online pictorial database accessible to diverse research interests. A secondary focus is the completion and recording of field and accessioning records associated with these collections, with a view toward accrediting the paleofossil collections currently held by UWSP.

Green River Insect Fossils

Victoria Kingstad, Kevin Embacher, Brittnei Buechel, Jeremiah Wilkinson, Jennifer Bennett

Faculty Mentors: Pat Zellmer, Dr. Ray Reser, Dr. Michael Bozek

The UWSP Paleofossil collection contains conservatively 4,000 fossil specimens from the Green River Formation (GFR), one of the largest documented lacustrine (lake) sedimentary deposits on earth. Covering 25,000 square miles and averaging 2,000 feet thick, this formation outcrops across a region spanning contiguous sections of Colorado, Wyoming, and Utah, and represents several complex intermontane lake communities that existed from the Late Paleocene through the Late Eocene Epochs (approximately 54 - 37 million years ago), and provides a continuous record of about 17 million years of North American pre-history. Although this formation is world-renowned for extremely well preserved fish fossils, the GFR insect fossils provide an insight to the remarkable fauna diversity and paleoecology of this region. Fine textured sediment deposits resulted in extremely fine detail preservation in the insects, including wing venation, hairs, and exoskeleton detail readily seen using microscopy and digital micro-photography. Students working on the UWSP GRF paleofossil accessioning are also involved in photodocumentation of the various insect species found in this formation. The poster presentation illustrates a number of the major insect families and orders preserved in the fossil record from this region.

Chemistry

Conductive and Semiconductive Organic Molecules: Synthesis and Applications

Steven Long, Qianwei Ren

Faculty Mentor: Dr. Nathan Bowling

The ultimate goal of our research is to produce conductive organic molecules. By controlling the pi orbitals, certain organic molecules take on conductive properties. The advantage of conductive conjugated molecules as opposed to current metal

conductors is that organic materials are far less expensive than the metal or silicon in use today. Also, due to the world's extremely limited knowledge of conductive organic materials, other useful properties may come about in our work. The main purpose of these molecules is to build conductors and semiconductors that would be used in the manufacturing of many popular electronics such as transistors, solar cell technology, and light-emitting diodes.

Discotic Molecules: Synthetic Organic Approaches toward Photovoltaics

Daniel Bondeson

Faculty Mentor: Dr. Nathan Bowling

With current environmental crises, attention must be focused on developing alternative energy sources. Organic photovoltaics present one such energy source through use of organic semiconductors that convert solar energy into electrical energy. My research focuses on synthesizing and studying several molecules designed to possess interesting photovoltaic properties. Synthesis of these molecules uses interesting organic chemistry techniques to build fairly large and complex structures. Once synthesized, spectrophotometric studies will be used to analyze the properties of the molecules, which could make them useful sources of electrical energy.

Parallelogram-shaped Structures: A strategy for Generating Conductive Organic Molecules

Danielle Hamm, Kendra Ness

Faculty Mentor: Dr. Nathan Bowling

The objective of the proposed research is to configure large conjugated organic molecules that have conductive properties. These conductive complexes would have the general properties of some metals; however, they would be cheaper to make and use, more flexible (e.g. conductive plastics), and adaptable to fine-tuning of desired properties. Ultimately, these organic molecules could be used as organic conductors/semiconductors, which will allow them to be used in the fabrication of devices such as organic solar cells, organic thin-film transistors, and organic light-emitting diodes. Usually molecules resembling those in this study can rotate freely to provide the molecule with the most geometric stability. The objective is to insert a metal (both palladium and silver metals were experimentally tested) to hold the molecule in a planar configuration, the desired geometry for our purposes, by restricting the free rotation. A requirement for these molecular bridges is that the metal fit in a pocket containing nitrogen atoms on either side. This bidentate ligand is designed to meet a specific geometry, allowing the ligand molecule to bind to the central metal-atom to form a coordination complex. When metal is present the molecules planarize and π orbitals align. Metal studies were carried out using Nuclear Magnetic Resonance spectroscopy and UV-visible spectrum.

Theoretical Investigations into the Electronic Structure of π -allyl Complexes

Randall Siedschlag, Brittany Schreiber, Greyson Waldhart

Faculty Mentor: Dr. Jason D'Acchioli

Electron counting in organometallic complexes is one of the most important skills for inorganic chemists. A list of "rules" exists for systematically counting such electrons, but those rules do not always agree. This investigation deals with electron counting of organometallic compounds containing so-called π -allyl ligands via theoretical density functional theory techniques. An introduction to electron counting will be presented, along with conflicts in the rules and new discoveries.

Theoretical Studies and Synthetic Routes to Multiply Bonded Metal-Metal Complexes and Possible Uses in Photovoltaic Cells

Randall Siedschlag, Nick Wright, Chris Shaw

Faculty Mentor: Dr. Jason D'Acchioli

The need for scientists to find alternatives to fossil fuels has been in high demand for many years. One of those alternatives is the use of taking the sun's natural energy and turning it into something useful. One way of doing that is using photovoltaic devices that absorb sunlight and act as a source of electricity. A problem with modern day PVs is that they only use a small amount of the sun's actual energy, limiting their efficiency. Our investigation targets potential complexes for use in PVs. The complexes that we investigated were quadruply bonded Mo-Mo paddlewheels. We used density functional theory to probe the electronic structure of these complexes to see how useful they could be in the application of PVs. We then synthesized Mo-Mo complexes as candidates for use in PVs using Schlenk and drybox techniques. To date we have been able to successfully synthesize five paddlewheel complexes. We are currently in the process of producing enough paddlewheel for use with Professor Nathan Bowling's PV materials. Oddly enough, we have recently encountered the strange formation of a mononuclear species that has never been seen in the literature. We are also investigating this compound for potential electronic and catalytic applications.

Deposition of Bronze Microwires on Ultrananocrystalline Diamond (UNCD) Electrodes

Corina Grodek, Dr. Lori Lepak, Dr. Michael Zach

Faculty Mentor: Dr. Michael Zach

As technology advances, ever smaller wires are needed for devices, for applications in electronics, medicine, and clean energy. Electroplate-and-Lift (E&L) Lithography is a new technique for nanomanufacturing that has been developed here at UWSP by students in Dr. Zach's Nanofabrication Laboratory as

a fast, simple technique for the electrochemical synthesis of metal and semiconductor nanowires of various shapes and sizes. Most materials deposited so far are single elements, yet most engineered materials are alloys. In this poster, micro- and nanowires of bronze (an alloy of copper and tin) are made by the E&L process for the first time. The electrode is a reusable template made of ultrananocrystalline diamond (UNCD)TM, which has been patterned by photolithography into the shape of the wires. A very thin (~ 80 nm) conductive layer of nitrogen-doped UNCD (NUNCD) is sandwiched between two insulating layers of UNCD to use the exposed edges of the NUNCD layer as the working electrode. With a long enough deposition time, wires can be made large enough to see under an optical microscope, to find voltage conditions that lead to smooth wires. Once a good voltage has been found, a shorter deposition time can be used to make wires with diameters so small they can only be seen by scanning electron microscopy (SEM) – down to as small as the thickness of the NUNCD layer. The smoothness of bronze wires depends on the deposition voltage, and on whether they were deposited under bright light or in darkness. The deposition time affects the diameter of the wires but not their smoothness or their alloy composition. The elemental composition of wires plated from solutions with different concentrations of tin is also investigated using energy-dispersive spectroscopy (EDS).

Deposition of Microwires inside Microfluidic Channels on Ultrananocrystalline Diamond (UNCD) Electrodes

Jonathan Schueller, Dr. Lori Lepak, Dr. Michael Zach

Faculty Mentor: Dr. Michael Zach

Nanotechnology is becoming more and more important for making devices used for applications in medicine, electronics, and solar cells. Many kinds of devices will require a more economical method of incorporating nano- and microwires of specific compositions in spatially controlled positions – including depositing wires of different materials side-by-side. Microfluidic techniques offer a good way of positioning solutions, while electrochemistry is a good way to control the deposition of metal. Combining microfluidic and electrochemistry techniques allows us a new, novel method for controlling the synthesis of patterned nanowires. Microfluidic channels can be patterned by photolithography in a film of ultrananocrystalline diamond (UNCD)TM. UNCD is insulating, but it can be doped with nitrogen to make NUNCD, which is conducting. A stack of thin films of UNCD, NUNCD, and more UNCD was deposited on a silicon wafer, and the microfluidic channel patterns were etched down to the silicon to reveal the edge of the NUNCD. Existing templates were modified to give our group the tools for obtaining proof of concept data. An existing UNCD film stack was scratched through with a diamond scribe at both ends of a channel pattern to electrically isolate the two sides of the microfluidic channel from each other. This allows one side of the channel to be used as the working electrode and the other as the counter electrode, so that a wire only gets deposited on one side of the channel.

This first proof of concept data will be shown, as well as discussing ideas for future experiments with microfluidics made of SU8.

Computing and New Media Technologies

KML Featuring a Google Map of Copper Mines in the Keweenaw

Randal Schmit

Faculty Mentor: Dr. Dave Gibbs

KML (Keyhole Markup Language) is an xml file format that is used by the open source map producing community. KML is the main format that Google uses to display points on a map. My project explores the nuances of KML by transforming a proprietary file format used by ARC Map into a KML. During the transformation process, I used both DOM (Document Object Model) and LINQ (Language Integrated Query) to manipulate the original file and to create a KML. LINQ is Microsoft's way of transforming and manipulating XML files using the .NET Framework. DOM is another form of rules and routines that allow for manipulation of XML type files. The main goal of my project was to share some of the areas I found interesting in the Keweenaw with other rock hounds. To accomplish this, my project uses the KML in a variety of ways. First, I used a Google map plug-in with Visual Studio C# to preview the source file visually. Second, I made a transformation using DOM to save the source to a KML file. Third, I took that file and uploaded it to Google Maps which generates an I-frame that I use to display the map in a web page. The final result is a neatly formatted map of the Keweenaw that displays Mine locations in the Keweenaw, which is available at <http://students.uwsp.edu/rschm164/map.html>.

Group Tracking System for Sentry Insurance

Jesse Giebel, John Helmke

Faculty Mentor: Dr. Trudi Miller

This project replaces Sentry Insurance's current Group Task Tracking system with an up-to-date system that will better fit their business needs. The new system will be an intranet-based web application and will be used for the next 2-5 years. It is implemented using ASP.NET, VB.NET, NHibernate, and MSSQL. The Group Tracking System tracks the work items created daily by Sentry Insurance's Group Pensions department. Each work item is assigned a specific process comprised of several tasks that are to be completed in sequence. When a work process is created, its first task is selected by the user and assigned to an individual within the department. Each subsequent task is selected and assigned upon completion of the previous task. When the final task is finished, the work process is considered complete and can be closed. Users will be able to attach any number of notes to tasks and work items. The tasks can also be reassigned to

other users as needed. Work items and their active tasks can be searched and sorted by a number of different criteria. The most important view will be a search that displays all open work-item tasks that are assigned to the current user.

Reducing Processing Time through Beowulf Clustering

Derick Geisendorfer, Michael Ryskiewicz

Faculty Mentor: Dr. Trudi Miller

Our project is to develop a Beowulf cluster to reduce the computation time of the Mixed Integer Linear Programming (MILP) algorithms for the Center for Athletic Scheduling (CAS). Some of the calculations required by CAS can take days to complete. Multiple computers can be combined to be used as one supercomputer, configured as a Beowulf cluster. This increases the overall speed of the system, allowing the calculations of time-consuming algorithms to be finished in less time. Linux is used as the operating system on the primary computer, and a boot image of Linux is used on each additional computer. A Beowulf cluster uses parallel processing and a message passing interface (MPI) program in order to allow multiple processes to communicate with each other. COIN-OR Branch-and-Cut (CBC) is used to solve the MILP. CBC uses input from A Mathematical Programming Language (AMPL). AMPL is the program that allows the user to write the MILP. The MPI program (MPICH2) runs CBC and sends the different branches to different nodes within the cluster. We have used Ubuntu 10.10 and Debian GNU/Linux 6.0 together successfully to create a Beowulf cluster that runs the CBC file we received from CAS with MPICH2. A custom boot image was created and used in order to add additional computers into the Beowulf cluster.

Web-based Water Efficiency Calculator

Jesus Rehwinkel

Faculty Mentor: Dr. Trudi Miller

This project is a web-based application allowing users to input water usage data. The project is created at the request of Kevin Masarik, from the Center for Watershed Science and Education. This data will calculate the user's water usage and possible water savings. This project will educate users on how much water they are using each year. This benefits the user by allowing them to determine how much money they can save by reducing water usage and/or by purchasing a low-flow shower head or toilet. The goal of the project is to create a web-based application that is database driven and will also allow an administrator to add and update data to the database. This website is secured through Microsoft Windows network authentication. The main user website consists of three web pages: a welcome page where the user will have the ability to select their water district, and second and third pages which consist of shower and toilet usage data consecutively. A summary of water usage and savings will be presented on each

shower and toilet page. The administrator site will allow for searching, adding to, and updating the database. Data caching is used to decrease website load time.

SQL Tutor Module

Nathan Melville

Faculty Mentors: Dr. Trudi Miller, Dr. Robert Dollinger

SQL tutor is a module plug-in for the Ajax Enabled Query Tool (AEQ) developed in the CNMT Department under an LTDC grant. The overall goal of SQL tutor is to create a more efficient and speedy learning environment for students who are learning how to use SQL. Normally, to practice SQL, a student must construct a query, submit it to the instructor for feedback, wait for the instructor to grade the query, and receive feedback from the instructor. SQL tutor will automate the grading and feedback portions of this work flow, allowing the student to continue working towards the ideal solution. SQL tutor has transformation methods which will allow the system to recognize similarities between queries that were written using different techniques, but still have the same logical meaning. Once a student enters a query for grading, the system automatically parses the document to XML and compares it to an instructor supplied document. If a transformation is needed, the system will use the transformation methods, which implement LINQ to XML to change the document's structure so that it is similar to the instructor document. If the system can successfully compare the structures of the two documents, it will compare the tables and columns for correctness and return meaningful feedback for the student to learn from.

Geography & Geology

Holocene OSL Age Estimates of Parabolic Dunes along the Western Shore of Lake Michigan, Door Peninsula, WI, USA: Insights on the Coastal Dunes Geomorphic History

Brooke Burich

Faculty Mentor: Dr. Neil Heywood

A National Science Foundation study of the geomorphology and geochronology of dunes along the northwestern shore of Lake Michigan occurred during the summer of 2010 at Whitefish Dunes State Park, Door County, Wisconsin. Three-meter LiDAR, aerial photographs and field observations reveal a series of parabolic dunes superimposed on an 800 m wide strand plain that separates Lake Michigan from Clark Lake. There were two distinct sets of dunes: larger dunes (18-24 m relief) adjacent to Lake Michigan, and smaller dunes (3-7 m relief) farther inland. Closer to Clark Lake are a series of approximately 1 m tall beach ridges. The parabolic dunes show a paleowind direction of SSW. Percent coarse sand composition along transects between the modern beach and dunes

distinguish between eolian sediment and beach sediment. Particle-Size-Analysis (PSA) along with Ground Penetrating Radar (GPR) distinguished dune and beach strata. Sixteen samples were collected for Optically Stimulated Luminescence (OSL) from paleo-beach sediment and dune crests. These samples were processed using the single-aliquot regenerative method with 90-180 mm quartz grains. OSL ages are 4.6 ka for a beach ridge landward of the dunes and 4.4 ka for beach sand underlying the dunes. OSL ages of the dune crests ranged from 7.8 to 1.9 ka. Eight dune ages fell between 5.2 and 4.0 ka, which correlates with the Nipissing Lake Level High (6.0-4.3 ka). The similarity between the dune and beach sediment ages suggests rapid dune formation and stabilization. Three dune ages between 2.6 ka and 1.9 ka suggest that some dune activation may have been associated with the Algoma Transgression (3.3-2.3 ka). This research was made possible by the NSF Dune Undergraduate Geomorphology and Geochronology Project.

Igneous Formations of Big Bend National Park

Jake Budish

Faculty Mentor: Dr. Neil Heywood

Big Bend National Park, along the Texas boundary with Mexico, contains numerous Tertiary igneous formations surrounded by Cretaceous sedimentary rock. The mighty Rio Grande serves as the “natural” boundary, with its looming and breathtaking canyons, and as an oasis in an otherwise lowland desert environment. During a January 2011 course excursion, students visited the locations, practiced field mapping techniques, and utilized images of igneous formations throughout the Park. Exposed intrusive landforms, lava flows, and pyroclastic ashflow deposits were the principle subject of investigation.

Greywacke Outcrop in Brokaw, Wisconsin

Audrey Mennenga, Joy Stelzer

Faculty Mentor: Dr. Samantha Kaplan

Initial analysis shows that the Marshall Hill outcrop in Brokaw, Wisconsin, contains a highly deformed greywacke. This outcrop’s past consists of volcanic ash which was originally deposited in the shallow ocean waters of a back arc basin. The accumulating weight of the sediment layers in this deposit triggered several varying scale turbidity currents. The currents caused the sediment in the top layers to deform as they moved down slope, deeper into the ocean. As volcanic activity ceased, the sediment layers underwent cementation, forming solid rock. This was followed by a period of new tectonic activity which caused uplift, faulting, and various other impacts in the area. Today the Marshall Hill outcrop in Brokaw, Wisconsin, is visual evidence of this activity. Road cuts along the hill reveal features showing deformation from the turbidity currents, as well as faults and fractures from tectonic activity.

Site Selection and Feasibility Analysis of a Farmer's Market in the Village of Kronenwetter, Wisconsin

David Kratz, Omar Muhyar

Faculty Mentor: Dr. Ismaila Odogba

The Village of Kronenwetter, Wisconsin, lacks a farmer's market and seeks to establishment one. Establishing a farmer's market requires taking into consideration numerous factors that include the accessibility and visibility of the site, and feasibility of the market itself. However, two major issues pose challenges to the successful development of a farmer's market in the Village of Kronenwetter: the absence of a centrally located vacant plot of land within the Village of Kronenwetter, and the dearth of literature on factors that influence the viability of a farmer's market. To overcome these challenges, we use site suitability analysis in conjunction with Geographic Information Systems (GIS) to determine the most suitable site among three prospective locations for a farmer's market in the Village of Kronenwetter, which creates a link between the rural community and local farmers, while simultaneously creating an environment for social interaction.

Tiger Gardens Neighborhood: Development and Design of a New Residential Neighborhood

Philip Gritzmacher, Justin Hansen, Tara Tryba

Faculty Mentor: Dr. Ismaila Odogba

Communities develop neighborhood plans in order to provide a framework for the integration of new neighborhoods into the fabric of the built environment. The City of Marshfield, Wisconsin, has designated approximately 80 acres, located north of County Highway Y, for the design of a carefully planned mixture of predominantly single-family residential development. Taking into account the constraints of the site, the goals of the city as outlined in the comprehensive plan, and the desire to minimize the impact of new neighborhood development on the natural environment, three conceptual design plans were created for the Tiger Gardens Neighborhood using the 'conservation subdivision design' planning concept.

Trends in the Spatial and Temporal Variability of Snowfall Totals and Events in Wisconsin, 1974-2010

Daryn Hardwick

Faculty Mentor: Dr. Keith Rice

Many Upper Midwestern states have experienced increased drought conditions over the last decade. Past research has shown that decreases in snow cover have a detrimental effect on summer precipitation, groundwater levels, and adequate soil moisture content. This study examined if snowfall totals and singular snow

events decreased over the last thirty-five years in the state of Wisconsin. The geographic variability of snowfall in Wisconsin was also investigated to ascertain the spatial shifts in snowfall totals and snow storm frequency. Data collection and subsequent analysis was based on the National Climatic Data Center's Online Climate Data Directory for examination of the variation of frequency and spatial intensity of Wisconsin winter snowfall. Daily meteorological observations, instead of monthly data, were used from 117 weather stations from 1974 to 2010 in order to determine the frequency of snowstorm events. It was hypothesized that significant spatial variation in the temporal and spatial variation of both snowfall totals and events occurred over the study's time period extend. Yearly Wisconsin drought condition statistics were also correlated to the results of snowfall variation. Further evaluation and correlation of snowfall totals and drought conditions to the influence of El Nino and La Nina is recommended in future studies.

A Cartographic and Statistical Analysis of Commercial Land-use Change in Wisconsin's Northwoods: Tomahawk, Wisconsin 1930-2000

Elizabeth Roden, Stephen Hamilton, Charles Grieman, Kylie Betzler, Cameron Geelan

Faculty Mentor: Lisa Theo

Commercial Land use is an integral part of any economy. By looking at the changes in commercial land use over time, one can study the cultural and economic evolution of a central business district. The types of businesses, as well as the changes in the use of these storefronts over time, can speak volumes about the local economy. Using historical land use records, this project will attempt to piece together a cohesive and continuous time line of the land use changes in Tomahawk, Wisconsin's central business district between 1930 and 2000. By examining the changes in commercial land use, as well as the removal or addition of any commercial land in the area, the presenters intend to paint a historically accurate picture of the economic culture of Tomahawk, Wisconsin in the 20th Century.

The Spatial Distribution of University of Wisconsin-Stevens Point Alumni

Ben Overholt

Faculty Mentor: Lisa Theo

The current budget crisis has public institutions of higher education scrambling to find alternative sources of funding. While research institutions have a long history of seeking donations from private sources, teaching institutions and four-year campuses are just entering into this arena. When looking for funding outside of state government, often the first source considered is the institution's alumni. The University of Wisconsin-Stevens Point has an alumni database of nearly 70,000, and contact to date has always been via direct mail or limited email. What is

missing is a spatial component - the ability for alumni to access an interactive map via the campus webpage. Through this interactive map, alumni could search for fellow graduates who may have graduated from the same program, college, or year. They could also access fellow alumni when traveling, enabling them to make connections beyond their immediate residential location. The goal is that, with increased connections among the various alumni groups, donations to the alumni fund and University Foundation accounts will increase.

Iceland Field Work: In the Shadow of an Erupting Volcano

Nicole Rumpca

Faculty Mentor: Dr. Kevin Hefferan

Field excursions to Iceland in the summers of 2009 and 2010 provided an opportunity to observe before and after changes in Icelandic landscape as due to the April 14, 2010 Eyjafjallajökull eruption. The impact from the eruption completely covered the surrounding landscape and generated flooding as glacial melt water rushed to the sea via the Markarfljot River. In the summer of 2010, I participated in a field survey analyzing the impact of the ash on the vegetation in Thorsmork. Careful analysis of the ash impact from June 3, 2010 to August 30, 2010 was conducted. Ash samples were gathered for the University of Iceland in Reykjavik along the Laugavegur trek in early June to allow for the creation of maps showing the distribution and extent of ash fall. Numerous images of plants, ash distribution, and landscape changes were recorded each day. Together with researchers from Soil Conservation Service and the Gunnarsholt field station, vegetation was classified in sample plots with three distinct characteristics. The sample sites were of a dense forest, young forest, and gravel to show the various effects from ash. Three separate 10 x 10 meter plots were constructed at each site to specifically evaluate the vegetation and impact from ash. Data collected was recorded on a log sheet with images. Over this time, remarkable changes in the landscape were observed. I anticipate returning to Iceland in 2011 to continue field surveys of landscape rejuvenation as part of my anticipated graduate program research.

History

Stevens Point Journal and China's Cultural Revolution: A Comparative Media Analysis

Caitlin Bennett, Tahana Garsow, Ellen Larson

Faculty Mentor: Dr. Valerie Barske

This poster presentation provides a comparative analysis of Chinese propaganda posters and local Stevens Point media representations of China during the 1960s-70s. Under the leadership of Mao Zedong, China's Cultural Revolution (1966-

1976) featured intense attacks on “traditional” Chinese cultural practices and aggressive efforts to produce a new, modernized, visual culture for promoting specific ideologies to “the people.” In this process, Mao instituted the Red Guard, a mostly teen-aged group of enthusiasts who were to lead the people back to earlier Socialist ideals. The revolution involved an extensive use of visual propaganda to encourage popular participation and to discredit “revisionist” politicians/intellectuals accused of promoting foreign influences. These images received world-wide media attention not only as an indicator of tumultuous changes within China, but also as a backdrop to major international developments in Chinese relations with the Soviet Union, the U.S., and Vietnam. Despite increasing global economic connections between Wisconsin and the People’s Republic of China beginning in the 1970s, local media portrayals often inverted the pro-Mao messages of the Revolution posters to depict the Chinese government as a violent, conformist threat against their people and the world. This research project highlights competing historical representations of the Revolution by examining Chinese propaganda posters and contemporaneous newspaper articles from the *Stevens Point Journal*.

UWSP Archives on East Asia: Analyzing Works from the Malcolm L. Rosholt Collection

Michael Bixby, Julienna Hagan, John Lenz

Faculty Mentor: Dr. Valerie Barske

This research project represents the first study to analyze primary source materials on East Asia from the Malcolm L. Rosholt Archival Collection held in the UWSP Library. From 1932-1937, Wisconsin-born Rosholt covered the Japanese invasions of China as a journalist, publisher, and editor of an English-language newspaper in Shanghai. While in China, Rosholt focused on developing his language skills and achieving a complex understanding of Chinese cultural history. During World War II, the Army Air Corps commissioned Rosholt to employ his linguistic and cultural training as a liaison officer for the elite “Flying Tigers” from 1943 to 1945. Rosholt later became known for his works on local histories on Wisconsin, especially Portage County, but thus far his artifact collection and writings on Asia have yet to serve as the focus of historical scholarship. As part of an ongoing initiative to help UWSP students conduct original historical research on topics that connect East Asia and Central Wisconsin, this project examines Rosholt’s personal narratives on the Flying Tigers, his in-depth journal of Chinese-to-English translations, and visual artifacts from the “Four Great Masters” of the Yuan Dynasty (ca. 1271-1368). The poster presentation will also include a unique interactive component featuring specific artifacts from the collection offered for display with the generous assistance of UWSP Archivist Ruth Wachter-Nelson.

Physics & Astronomy

BUDDA Decomposition of Isolated Face-on Spiral Galaxies

Paulette Epstein, Alexander Bahr, Dr. Adriana Durbala

Faculty Mentor: Dr. Adriana Durbala

We perform Bulge/Disk/Bar photometric decomposition of face-on isolated spiral galaxies employing the BUDDA code

<http://www.sc.eso.org/~dgadotti/budda.html>. We present the typical procedure of deconstructing the 2D light distribution on SDSS i-band images for barred and non-barred galaxies. Our working sample of galaxies is extracted from “The All-Sky Catalog of Isolated Galaxies Selected from 2MASS” (Karachentseva, V. E. et al. 2010) and complements the AMIGA sample (www.iaa.es/AMIGA.html).

Photometric Properties of Face-on Isolated Spiral Galaxies

Alexander Bahr, Paulette Epstein, Dr. Adriana Durbala

Faculty Mentor: Dr. Adriana Durbala

We want to quantify the relative role of nature versus nurture in defining the observed properties of galaxies. In simpler terms, we would like to disentangle the “genetic” and the environmental influences in shaping the morphology of galaxies. In order to do that, one needs to firstly define a zero-order baseline, i.e., a sample of galaxies that have been minimally perturbed by neighbors in the last few billion years of their existence. Such a sample has been produced and refined in different stages in the context of the AMIGA international project (www.iaa.es/AMIGA.html). The recent catalogue “The All-Sky Catalog of Isolated Galaxies Selected from 2MASS” (Karachentseva, V. E. et al. 2010) allows us to complete and enrich the initial sample constructed within AMIGA with new objects, thus enhancing the statistical relevance of our study. Our focus is to define a subset of isolated disk spiral galaxies. We constrain the sample selection by: (1) orientation, restricting to almost face-on galaxies and (2) availability of good photometric images in SDSS. The goal is to “dissect” (decompose) these galaxies into major components (disk, bulge, bars, etc.) and study the properties of the components in a statistical context. Having a reasonable representation of all morphological types, we aim to test the bimodality of bulges and bars. We present a progress report of our work.

Exploration of Semiconductor-based Photoelectrochemical Water Splitting

Micah Broehm, Joseph Kwiatkowski

Faculty Mentor: Dr. Ken Menningen

A key requirement of a hydrogen economy is to find a renewable and reliable source of hydrogen gas, which would serve as the primary energy storage medium.

In this project, semiconductors are being created and tested for the purpose of building a photoelectrochemical water splitting system. Semiconductors made from varying amounts of hematite and tungsten oxide are being synthesized. In addition, measurements of the photoelectrochemical properties of gallium indium phosphide, gallium arsenide, indium phosphide, and silicon have been made. The goal is to discover a cheap, efficient, and robust system that could produce hydrogen from water and sunlight.

Construction of an Instrument to Measure the Tension of Freestanding Liquid-crystal Films

Logan Besaw, Dr. Mick Veum

Faculty Mentor: Dr. Mick Veum

Our research involves studying the surface properties of smectic liquid-crystals as a function of temperature. Liquid crystals are compounds with fluid-like properties similar to liquids, but whose molecules organize in a crystal-like fashion. The particular substances we study can be prepared as stable films without the support of a substrate (reminiscent of a soap bubble on a ring). The films, which can be as thin as two molecular layers, provide great systems in which to study the properties of fluid surfaces. We are constructing an experiment to study film tension as a function of temperature. The apparatus will allow control of the film in two ways. First, the temperature is controlled by housing the film in a temperature controlled chamber. Second, by controlling the pressure difference from one side of the film to the other, we can inflate the film to a desired radius (like a soap bubble). The pressure required to do so determines the tension of the film. We will present the details of the instrument, the state of our progress in building the instrument, as well as our research goals.

Modeling the Hbeta Emission Line in Luminosity-Averaged Quasar Spectra

Zachary Meadows (UWSP), Dr. Sebastian Zamfir (UWSP), Paola Marziani (IANF, Padua, Italy), Jack Sulentic (IAA, Granada, Spain)

Faculty Mentor: Dr. Sebastian Zamfir

We construct median optical spectra of quasars in bins of luminosity. The sample includes bright objects from Sloan Digital Sky Survey (with redshift $z < 0.7$) and sources at intermediate redshift $z \approx 0.9-3.0$ observed with the Very Large Telescope. The whole sample spans almost six decades in bolometric luminosity $43 < \log[L_{\text{bol}} (\text{erg s}^{-1})] < 49$. A typical signature of quasar spectra is the presence of broad emission lines (Balmer series of Hydrogen, FeII lines, etc.). We restrict our attention to objects that show the width of Hbeta = 4000 – 8000 km s⁻¹ and the relative strength of FeII emission $R_{\text{FeII}} = W(\text{FeII } 4434-4684)/W(\text{Hbeta})$ less than 0.5, i.e. quasars within a restricted region in the optical plane of the so-called 4D Eigenvector 1 (4DE1) parameter space. 4DE1 is an empirically-defined, luminosity independent that best discriminates and unifies the diversity of quasars.

We model the global profile of the broad Hbeta emission line under the assumption that it requires both a classical broad component (BC) and a redshifted very broad component (VBC). We investigate the properties of the two spectral components as a function of luminosity and report our preliminary results.

Psychology

The Role of Video Game Experience in Visual Search

Jonathon Wutke

Faculty Mentor: Dr. Patrick Conley

Though a large amount of research has been done on the social and educational effects of video games, less has been done on the cognitive effects of such games. This is surprising given that video games have progressed from nonexistent to ubiquitous in 35 years, and that the Entertainment Software Association (2010) has stated that 67% of American households participate in some form of video gaming. In this study, we attempted to determine what aspects of the participants' history with video games might affect visual attention. To accomplish this, we used a simple visual search task consisting of vertical line targets among rotated line distractors. To analyze how video game playing affects this visual search, we created a questionnaire that asked specific questions relating to participants' video game habits. Using regression analysis, we found that the most significant subject variable in predicting response time was not the sheer hours of video games played, but rather the age at which the participants began playing video games. Other aspects of students' gaming background were also shown to affect visual processing. These results demonstrate that the background of video game players must be taken into account when attempting to determine the effects of video game practice on visual attention.

The Effect of Cognitive Enrichment on Anxiety Levels in Mice

John Keniry, Porscha Carriveau, Michael Wegener

Faculty Mentor: Dr. Jody Lewis

Previous research has shown that environmental enrichment can be beneficial in reducing abnormal behavior in a wide variety of animals in captive settings. When mice are provided with environmental enrichment they are less reactive and have lower levels of anxiety in new situations. Research has also shown that animals that are given the ability to control their environment have lower anxiety levels. However, no research has attempted to use cognitive tasks as a form of enrichment. For the first study, one group of mice was raised in an environmentally enriched condition, while a second group was raised in an environmentally enriched setting and completed a daily spatial memory task. In the second study, groups of mice were raised in an environmentally enriched

condition, a cognitively enriched condition, or a control condition. The anxiety level of the mice in both studies was measured using an elevated plus maze and an open field test. We expect both the cognitively and environmentally enriched mice to have low anxiety levels compared to the mice raised in the control condition.

Assessing Intellectual Safety in the College Classroom

Jada Butler, Nancy Eriksson, Karl Heiman, Catherine Morrow, Brittany Titel

Faculty Mentor: Dr. Jeana Magyar-Moe

Intellectual safety is defined as “a caring environment in which the professor is open and caring, demonstrates respect, and embraces the uniqueness of students and their perspectives and does so in a classroom format where in which all are invited to participate actively, to engage in personal self-disclosure while trusting the confidentiality of such openness, and where the professor maintains a sense of control and direction to facilitate learning” (Schrader, 2004, p.98). Without intellectual safety, it may be difficult or impossible for students to embrace subject matter that may be foreign to them and that may challenge their personal assumptions, values, and beliefs. Without intellectual safety, students may become closed off to the material being presented, may fail to engage in the classroom, may experience anger or anxiety related to the class and the subject matter, or fail to take responsibility for their own learning (Schrader, 2004). It is plausible that without intellectual safety, students may simply tell their instructors what they believe he or she “wants” to hear or what they perceive to be most socially acceptable in order to do well in the class, even though they may not have fully engaged with the material or may hold very different perspectives from those of their instructors. Currently, no measure or method of assessment exists for use in evaluating levels of intellectual safety within the classroom. This study was designed to create and test several methods of assessing intellectual safety in a college classroom where the main foci of the course are understanding multicultural issues, racial identity development, and societal privileges, with a special emphasis upon white privilege. Results indicate that both assessment methods were effective.

Effects of a Positive Psychology Psychoeducational Training Program for Children

Catherine Morrow, Ashley Jankiewicz, Debra Simmerman, Brittany Titel

Faculty Mentor: Dr. Jeana Magyar-Moe

Positive psychology is the scientific study of optimal human functioning. It is an area of psychology that has been growing rapidly in the past twelve years and has been applied to a variety of different life and work domains. One area in which positive psychology appears to be particularly applicable is within school settings. Indeed, on national surveys, many students report experiencing high levels of

boredom, anger, and stress in school, which often leads to disengagement from critical learning and social development (Gilman, Huebner, & Furlong, 2009). Teaching concepts and principles of positive psychology in the elementary schools may serve to facilitate students' sense of agency and active school engagement, as well as promote school achievement and healthy social and emotional development at an early age (Gilman, Huebner, & Furlong, 2009). This study was designed to evaluate a brief, manualized positive psychology psychoeducational program for fifth- and sixth-grade students. The effects of teaching positive psychology principles including gratitude, altruism, hope, mindfulness, character strengths, and the benefits of positive emotions were evaluated in terms of changes in positive and negative affect, hope, gratitude, and life satisfaction as reported via self-report inventories designed for use with elementary-aged students. Results revealed statistically significant increases in gratitude, student life satisfaction, and positive affect, and decreases in negative affect. Qualitative analyses revealed a number of additional benefits related to well-being and overall enjoyment of the training program.

Effects of Couples Gratitude Journaling on Relationship Satisfaction and Well-Being

Catherine Morrow, Ashley Jankiewicz, Debra Simmerman, Brittany Titel

Faculty Mentor: Dr. Jeana Magyar-Moe

Positive Psychology is the scientific study of optimal human functioning. One construct within the literature on positive psychology that has been researched extensively is that of gratitude. Indeed, research shows that brief gratitude interventions result in a variety of positive psychological, physical, and interpersonal outcomes (Emmons & McCullough, 2003). In addition, gratitude is one of five strengths (as measured by the Values in Action Inventory of Character Strengths) that is most highly correlated to subjective well-being and happiness, and that has been empirically tested as a happiness intervention (Seligman et al, 2005). The effects of gratitude journaling within the context of a couple's relationship have not been empirically examined to date, yet a search of the internet reveals that many people are utilizing this technique in the interest of making relationships better, and it appears that some even utilize gratitude journaling within the context of couples therapy (Covalt, 2007). Furthermore, gratitude has been found to be one of five key factors that support the protective alliance between partners who report being happily married (Reibstein, 1997). In this study, the effects of a grateful outlook towards significant others on relationship satisfaction and personal well-being were examined. The data indicates that a conscious focus on grateful feelings towards one's partner - and regular sharing of those feelings within the relationship - results in both emotional and interpersonal benefits. More specifically, couples gratitude journaling appears to be beneficial for couples in terms of decreasing negative affect, increasing levels of gratitude, and increasing positive feelings towards partners.

Novelty versus Significance: The Isolation Effect with Taboo Words

Dana Smith, Trina Howard, Catrina Van Deraa

Faculty Mentor: Dr. Robert Nemeth

Although there have been many studies on isolation effect, Schmidt (2006) argues that there is a difference between novelty and significance on memory. Both novelty and significance can enhance memory; however, significant events may steal attentional resources resulting in poorer memory for background information and subsequent information. We conducted a 2 (List Type: taboo vs. neutral) \times 2 (Isolation: isolated vs. control) \times 9 (serial position in the list) within-subjects design to examine the effects of novelty and significance on memory. Fifty-two participants were visually presented with 20 nine-item lists and asked to freely recall the words immediately after each list was presented. We analyzed the results using separate 2 \times 2 ANOVAs on the 5th and 6th serial positions, since the manipulated word was in the 5th serial position. The results indicate a significant interaction between List Type and Isolation at the 5th serial position, $F(1, 51) = 43.81, p < .001, \eta^2 = .46$. Simple effects tests indicated that the isolation effect was greater for taboo words than neutral words. Furthermore, the results indicated a significant interaction between List Type and Isolation at the 6th serial position, $F(1, 51) = 35.84, p < .001, \eta^2 = .41$. Simple effects tests showed that memory was poorer for the item following the isolated taboo word compared to an all-neutral list. Our results support Schmidt's argument that there is a difference between novelty and significance. Taboo and neutral words, when isolated in a list of contrasting words, can produce an isolation effect. However, isolated taboo words produce a larger effect on memory and produce an "anterograde amnesia" effect.

Pink Monster Trucks and Camo Baby Dolls: The Impact of Implicit Color Labels on Preschool Children's Interest in Toys

Amanda Grunwald, Lauren Kaniewski

Faculty Mentor: Dr. Erica Weisgram

Gender schema theorists have shown that changing the explicit gender label associated with a toy can influence whether children identify a toy as "for them" or "for the other gender," and subsequently affect their interest and memory for a toy (Bradbard, Martin, Endsley, & Halverson, 1986). The current study investigates children's use of color as an implicit label of whether a toy is "for girls" or "for boys," as well as the implications these labels have on personal interests and stereotypes. Specifically, we investigate the interaction between the sex-type of a toy and the sex-typed colors displayed on the toy. Preschool children ($N = 30$) were presented with eight toys varying in toy type and toy color. Half of the toys were masculine toys, and half were feminine toys. Within each of those toy types, half were masculine in color, and half were feminine in color. Participants were allowed to play each toy for 30 seconds and then were asked to indicate their (a) interest in the toy and (b) stereotype of who should play with the

toy. Results indicated that boys' and girls' personal interests in the toys were affected by the type of toy; children showed greater interest in sex-typed toys than cross-sex-type toys. A trend also demonstrated that the color of the toys affects interest in cross-sex-typed toys, in that cross-sex-typed toys were more appealing when in "gender-appropriate" colors. Results also indicated that children's stereotypes of the toys were affected by both toy type and color. Specifically, feminine toys in "girl colors" were overwhelmingly said to be appropriate for "only girls," but those same feminine toys in "boy colors" were more likely to be perceived as appropriate for "only boys."

From Justice to Forgiveness: Stress, Resilience, and Life Satisfaction as Mediators

Kerby Timm

Faculty Mentor: Dr. Craig Wendorf

Past studies have examined how the willingness to forgive is linked to beliefs about justice. However, research has not yet examined the role of stress, resilience, and life satisfaction to mediate the relationships between forgiveness and justice. The current study examined the impact of people's beliefs about justice for the self and others on life outcomes (stress, resilience, and satisfaction), and the role of these outcomes on the willingness to forgive past, current, and future transgressions. UWSP students (N=213) completed an online survey incorporating existing, validated measures of each of the variables. Path Analyses showed that Justice for the Self significantly predicted Life Satisfaction, Stress, and Resilience, whereas Justice for Others predicted only Life Satisfaction. In turn, Resilience and Life Satisfaction significantly predicted Dispositional Forgiveness, whereas only Resilience predicted Forgiveness of Past Transgressions. The results indicate that life outcomes play an important mediational role in the link between justice and forgiveness. Consistent with emerging studies (e.g., Lucas et al., 2010), this study demonstrates that the belief that people receive fair outcomes and procedures in the course of daily events has a role in impacting life outcomes, and indirectly plays a role in the willingness to forgive the self and others.

Online Comments about Instructors: What is Recalled and What Might Be Transmitted?

Phillip Potter, Madeline David

Faculty Mentor: Dr. Craig Wendorf

Websites such as RateMyProfessor.com have the potential to impact students' decisions about college courses and instructors. Drawing on the social psychology of rumor (cf. Heath et al., 2001) and the psychology of student evaluations (cf. Marsh, 1991), this study examined students' recall of comments about instructors and their subsequent willingness to pass along such information. UWSP students

(N=179) evaluated fictional professor profiles on a web site similar to RateMyProfessor.com. Each profile contained comments related to knowledge, rapport, enthusiasm, grading fairness, and course difficulty. Each profile contained four neutral comments and one skewed comment (either positive or negative). After completing an evaluation of the instructor and filler tasks, students reproduced the profile comments as accurately as possible. Generally, comments were recalled with equal frequency, regardless of which comment was manipulated. Both aspects of the manipulations did, however, impact students' willingness to take the course, willingness to recommend the instructor, likelihood of enjoying the instructor's course, and perception of the instructor as "good." These results highlight the distinct likelihood of positive comments (as opposed to negative comments) being transmitted among students.

Which Teaching-Related Characteristics Do Students Value the Most in Making Instructor Evaluations?

Phillip Potter, Madeline David

Faculty Mentor: Dr. Craig Wendorf

The validity of instructor evaluations in the college setting has been long debated (cf. Greenwald & Gilmore, 1997). Nonetheless, research suggests that there are primary factors often assessed in the evaluations - such as instructor knowledge, rapport, course difficulty, instructor enthusiasm, and fairness in grading - and that these factors have differential predictive validity of overall ratings (Marsh, 1994). However, little research has directly assessed which of these teaching-related components are most preferred by students. UWSP students (N=179) were asked "How important are the following characteristics to you when determining whether to enroll in an instructor's class?" They then rated the relative importance of the five teaching-related characteristics (knowledge, rapport, course difficulty, enthusiasm, and fairness in grading) on a five-point Likert-type scale (1 = no importance, 5 = great importance). After completing the ratings, students also ranked the five characteristics. In general, knowledge and fairness were rated most important, with rapport and enthusiasm creating a second tier, and course difficulty rated least important. Perhaps surprisingly, gender was the only demographic variable to offer predictive differences; female students rated knowledge, course difficulty, enthusiasm, and fairness as significantly more important than their male counterparts. These results highlight the factors that may play a role in determining students' overall evaluations of instructors.

Oral Presentations
3:40 – 4:35
First & Second Floor, Science Building

Group 11

Room A109

Moderator: Dr. Christopher Yahnke

Bioacoustics Working Group: Sequence of Bat Arrival and Spring Bat Activity in Central Wisconsin

Jennifer Gruettner, Rebecca Gregory, Alexandra Anderson, Dustin Neubauer, Dave Redell, Jim Buchholz

Faculty Mentor: Dr. Christopher Yahnke

Bats have been making news headlines due to population declines related to White Nose Syndrome (WNS) and mortality associated with wind farms. Cave hibernating bats such as the little brown bat, one of the most common bats in Wisconsin, are particularly affected by this disease. Based on data from infested caves, WNS has the capacity to push this species to extinction within as little as two decades. The loss of these insectivorous animals could be devastating to the ecosystem and economy, as there would be far less insects being consumed. Among these would be an increase population of pest insects, which would increase risk of agricultural crops and timber damage. Since it was first documented in 2006, White Nose Syndrome has aggressively spread westward and northward from New England and is expected to reach Wisconsin within the next few years. Tree cavity nesting bats like the hoary bat and red bat are susceptible to mortality at wind farms. Wisconsin is positioning itself as a leader in wind energy technologies, and there are a number of new wind farms being developed in the state. A permanent Anabat bat detector was placed at Schmeekle Reserve by the WNDR in 2007. This device records the echolocation calls of bats. The Bioacoustics Working Group at UWSP analyzed echolocation calls collected during spring of 2010 and 2011. Sonograms were used to identify species based on frequency and duration of call. Time and date of recording was also collected. Knowledge of such bat characteristics can be used to develop an ecologically responsible approach towards wind energy in Wisconsin. This knowledge can be further utilized to assess and understand the rate of the spread of WNS, and its risk to resident bat populations.

Diet of Urban Breeding Cooper's Hawks in Victoria, British Columbia

Jenna Cava, Andy Stewart, Robert Rosenfield

Faculty Mentor: Dr. Robert Rosenfield

High nesting densities and reproductive success reported in urban Cooper's Hawks could be related to the abundance and type of prey available in cities. However, there has been only one detailed dietary study of urban breeding Cooper's Hawks to date. We used collection of prey remains, direct observations of hawks with prey, and video of two nests to assess the frequency of occurrence and biomass of prey species taken by breeding Cooper's Hawks in the city of Victoria, British Columbia, Canada. From the collection of 3,231 prey remains, 437 direct observations, and 783 video items at 90 nest sites, we found that small-to medium-sized bird species contributed the majority (79-94%) of prey recorded in all sampling techniques. These birds also contributed over half of prey biomass recorded in the direct observations and video data (57% and 93% respectively). Of the avian prey identified to the species, one native and two exotics provided the bulk (over 85%) of prey recorded in all samples: the American Robin (*Turdus migratorius*), European Starling (*Sturnus vulgaris*), and House Sparrow (*Passer domesticus*). Exotic prey species were an important component of the diet, contributing over half of items able to be identified as exotic or native in all samples. Mammals were inconsequential in terms of frequency and biomass, except at nest sites in or near the University of Victoria campus where nearly all European rabbits (*Oryctolagus cuniculus*) were recorded.

Group 12

Room A107

Moderators: Dr. Diane Caporale, Dr. Todd Huspeni

A Twelve-Year Surveillance Study: Assessing a Person's Risk of Contracting Two Tick-Borne Pathogens, Human Granulocytic Anaplasmosis and Lyme Disease, in Central Wisconsin

Britney Helling

Faculty Mentor: Dr. Diane Caporale

Human Granulocytic Anaplasmosis, HGA, is a human infectious disease of the blood spread by a deer tick vector harboring the bacterium *Anaplasma phagocytophilum*. This pathogen causes similar initial symptoms as Lyme disease, also caused by a tick-borne bacterium found throughout Wisconsin. HGA was first discovered in Wisconsin in 1994. Within the last decade the spread of the Lyme disease pathogen has dramatically increased as well as deer tick abundance in Central Wisconsin. To test whether deer tick abundance correlates with *Anaplasma* abundance, the DNA from ticks collected from 1999-2010 were analyzed. Methods included amplifying a 16S-like gene using PCR and identifying the pathogen by gel electrophoresis and DNA sequence comparisons. *Anaplasma* was first discovered in Schmeckle Reserve in 2004. Out of 107 deer

ticks collected around Lake Jonas, only 3 ticks harbored *Anaplasma*. In comparison, 16 out of 87 deer ticks collected in 2010 carried *Anaplasma*, which is a dramatic increase from 3% to 18% in just 6 years. Such a rise in prevalence suggests an increased risk for contracting both Lyme disease and HGA concurrently when bitten by a deer tick near campus. This poster reports the prevalence and coinfection rates of the agents of Lyme disease and HGA in deer ticks collected in two areas of Central WI for the last 12 years.

Identification and Host Survey of Mermithid Nematodes Parasitizing Wisconsin Stoneflies (Hexapoda: Plecoptera)

Emily Starke, Misbah Razvi, Jenna Hulke

Faculty Mentors: Dr. Todd Huspeni, Jeffrey Dimick, Stanley Szczytko

Mermithid nematodes are protelean parasitoids that commonly infect insects and other arthropods. Because mermithids kill their hosts, they can be important sources of host mortality. Although mermithids are found in insects with aquatic larval stages, such as mayflies and blackflies, their presence has not yet been documented in stoneflies. Samples of adult stoneflies provided by Dr. Stan Szczytko (UWSP, CNR), however, indicate that mermithids do occur in Wisconsin stoneflies. These infections were noted in the stonefly genus *Isoperla*. To assess parasitism among Wisconsin stonefly genera, between September 2010 and March 2011 we sampled 15 sites by dipnet, kicknet, and by hand in the following flowages: Flume Creek, Tomorrow River, Plover River, Spring Creek, Little Plover River, Hay Meadow Creek, Bradley Creek, Holt Creek, Comet Creek, Nace Creek, Little Rib River, Prairie River (MI), Black River, Manitowish River, and Bearskin Creek. We recovered the following quantities of nymphs in each genus: 25 *Acroneuria*, 4 *Agnatina*, 1 *Allocapnia*, 2 *Haploperla*, 16 *Isoperla*, 1 *Leuctra*, 18 *Paracapnia*, 89 *Paragnetina*, 28 *Perlesta*, 9 *Prostoia*, 5 *Pteronarcys*, 24 *Strophopteryx*, and 28 *Taeniopteryx*. We also collected over 200 adults of *Allocapnia* and *Taeniopteryx*. To date we have not yet observed mermithids in our samples, though many nymphs and adults remain to be dissected. We will continue to collect adults and nymphs to assess possible temporal variance in infection. In other studied hosts, mermithid development may occur in as little as two weeks. Given that infected adult stoneflies were provided by Dr. Szczytko, we hypothesize that mermithid infections likely occur in late nymphal instars and will be seasonally observed as more adult stoneflies emerge.

Group 13
Room A106
Moderator: Dr. John Droske

Copolymers with Varying Crosslink Density for Resorbable Applications

Brendan Gifford

Faculty Mentor: Dr. John Droske

Work in our research group has focused on the development of crosslinkable polyesters that show promise as biodegradable materials. These materials could result in less plastic waste that accumulates in landfills and may afford advanced biomedical applications, such as resorbable bone adhesives. This project involved the synthesis of a series of polyester copolymers from mercaptosuccinic acid (MSA), succinic acid (SA), and 1,5-pentanediol. The synthesis was performed without solvent under an inert atmosphere and was catalyzed with zinc chloride. The crosslink density of the final material was controlled by varying the MSA:SA ratio. Each material was heated in air to affect crosslinking and afforded high quality films. This series produced materials with properties ranging from transparent and “rubber-like” to hard and tough. The glass transition temperatures (T_g) were determined using differential scanning calorimetry (DSC). In this series, the T_g was shown to increase linearly with increasing mole percent MSA. This affirmed that the MSA and SA were incorporated into the polymer in the same ratio as the starting materials. Copolymers containing 10 mole % MSA and 90% SA and varying amounts of odd- and even-numbered diols were also prepared. These copolymers afforded films that exhibited unusual properties ranging from highly damped and rubbery to tough, flexible materials.

Shining Light on the Synthesis of New Solar Cells

Christopher Shaw

Faculty Mentor: Dr. Nathan Bowling

Energy independence is something for which we are all striving. In this talk, we will "shine some light" on the subject of solar cells as well as cover the trials and tribulations of our continuing research. We will also examine where our target compound fits into the green energy race, and will conclude with our goals and the possible applications of our compound.

Group 14
Room A213
Moderator: Dr. Andy Felt

Math Minerals

Jamie Briquelet & 480 Student Group 1

Faculty Mentors: Dr. Anthony Ellertson, Dr. Andy Felt

Math Minerals is a series of games based on the booklet titled Math Vitamins, developed by Andy Felt and the Suzuki Institute. Math Vitamins was designed as a brief break from music lessons, where children engage in educational games and activities that teach them essential math skills. Some of these skills include counting, pattern recognition, measuring, and comparing numbers and objects. All of these games are based on research which states “the simple act of playing games on boards that have numbered spaces improves numerical knowledge in preschool children, and the improvement is long-term.” Under the direction of Assistant Professor Anthony Ellertson, our WDMD 480 team developed several of Math Vitamins’ games using the Adobe Flash platform and AIR for mobile devices such as tablets and Android phones. The game begins with a game board consisting of fifty spaces. The parent and child select a starting point on the board, depending on how much time they have for the activities. After the starting space is chosen, the day’s math game is played. Each time the child plays a game, he or she will get to move his or her character a certain number of spaces on the game board. When the child reaches the end of the daily game board, he or she wins. Math Minerals follow the storyline of the main character, which can be selected by the child. It is their birthday and they want to invite friends over for a birthday party. Each of the friends invited can’t come to the party because they have work to do, so the child then goes to each region of the world to help out. In each region, the child will encounter new friends who guide them through the area and help them complete tasks. Once all tasks are completed for a region, the child receives a reward and travel to a new region.

Using Mathematical Optimization to Schedule a Large Conference

Scott Strand, Yin Xu

Faculty Mentor: Dr. Andy Felt

The American Suzuki Institute is an annual two-week music camp that takes place in August at UWSP. Organizers have found it difficult to create a high quality, hand-made schedule because of the size and complexity of the problem. An Operations Research class at UWSP has created a mathematical model to automatically create a schedule based on the requirements of the Institute. We will describe the application, explain the mathematics behind the solution method, and show the computer model.

Group 15
Room A210
Moderator: Dr. Robert Sirabian

The Coexistence of Life and Death in *Oliver Twist*

Anna Rakovec

Faculty Mentor: Dr. Robert Sirabian

Charles Dickens was known for writing novels which looked critically at the lives and stereotypes of his Victorian peers. His opinions on social class and relationships were often the most prevalent themes in his work. In *Oliver Twist*, these same themes play an active role in Dickens's exploration of life and death. Typically, life and death are viewed as part of a linear progression; however, in meeting many of the characters through the pages of *Oliver Twist*, readers begin to realize an interesting paradox: life and death are not the equivalent to a starting and an ending point. Rather, life and death co-exist with fluidity, with neither being exclusively sought after or deliberately avoided. Furthermore, the meaning of survival becomes subjective to the individual experiences of each character. For some, the lifestyles they lead preserve the same "death" they try desperately to avoid. This is most apparent in the characters of Bill Sikes or Fagin. Other characters, such as Little Dick or Rose Maylie, merely survive with the hope of attaining a more natural placement in an afterlife. In both cases, life and death are equally present and inspire a variety of different outcomes.

Death as a Literary Tool in *Oliver Twist*

Laura Spencer

Faculty Mentor: Dr. Robert Sirabian

Like a gravedigger using a shovel, Charles Dickens delves deeper into the ways that death and dying can provide a better understanding of human nature by acting as a sort of moral compass, and by alluding to the condition of the soul after death in his novel *Oliver Twist*. The story of young, orphaned Oliver is sad enough on its own, but Dickens chooses to surround the boy with many instances of violent murders and the isolation that often accompanies death. Through the innocent eyes of a child, Dickens uses death to expose the inescapable nature of death, the justice it can provide, and the tranquility that may be found in death. There seem to be two sides of death that Dickens is alluding to: the maliciously violent death that acts as a punishment for immoral characters, and the peaceful, serenity that death brings to others looking to escape their earthly jailhouses. The character of Sikes and the gruesome depiction of his death seem to complement and reflect his corrupt soul. Nancy also experiences a horrific death, but for her, death offers an escape from a life of crime she never wished to lead. A close reading of *Oliver Twist* can detect many of these themes within the work and supports the notion that Dickens was deeply concerned with how death affected not only the dying, but also those who witnessed and were affected by death.

Group 16
Room A208
Moderator: Dr. Dejan Kuzmanovic

The Corrupting Look: The Destructive Power of the Gaze on Oscar Wilde's Dorian Gray and Salome

Kassie Baron

Faculty Mentor: Dr. Dejan Kuzmanovic

This paper will dissect the effects of other characters' gazes on the main characters of *The Picture of Dorian Gray* and *Salome*, revealing that eventually being the object of another's gaze becomes the catalyst on a path to destruction. The modern "gaze theory," developed only recently in application to films, can be applied to literature from much earlier periods as well. Oscar Wilde's novel *The Picture of Dorian Gray* introduces the idea of the corruptive influence of the gaze. In his play *Salome*, written shortly after *Dorian Gray*, Wilde creates an exaggerated version of Dorian in the character of Salome. As a consequence, Salome's corruption is much more rapid and intense than Dorian's. Dorian Gray and Salome are both objectified by those gazing at them, which leads to their loss of subjectivity. It is through this loss of subjectivity that Dorian Gray's and Salome's desires become perverse in an effort to regain individual subjectivity, eventually leading to their destruction.

Love, Servitude, and Fluidity in Oscar Wilde's *A Picture of Dorian Gray*

Brianna McKichan

Faculty Mentor: Dr. Dejan Kuzmanovic

In Oscar Wilde's novel *A Picture of Dorian Gray*, the characters of Dorian and Sibyl Vane engage in a romantic relationship that helps to define them. Sibyl uses her romance with Dorian as a substitute form of servitude, taking the place of her acting, while Dorian uses the relationship as way of acquiring the fluidity of personality and identity that he so desires. Dorian does this by dominating Sibyl, and therefore owning all the personas she embodies night after night on the stage, while Sibyl not only surrenders to Dorian's power, but rejoices in it.

Group 17
Room A207
Moderator: Dr. Lee Willis

The Politics of Identity: Agency, Victimization, and the Ethnogenesis of the Sambo and Tawira Miskitu

Scott Helgeson

Faculty Mentor: Dr. Lee Willis

Over the last four decades, most scholars have interpreted Miskitu history through either a structuralist or agency analysis. Structuralists focus on the exogamous forces imposed upon the Mosquito Coast. Referencing the effects of British colonialism, Moravian evangelism, and North American neo-colonialism, they have crafted narratives of powerlessness, degradation, and victimization. Others examine the endogamous forces that arose within the Coast itself, citing adaptation, resistance, and the selective incorporation of European institutions. A third group of scholars has attempted to navigate the agency-victimization polemic by relying upon Gramscian and post-structural constructions of hegemony. However, scholars have largely ignored a second area of contention within the literature and, in so doing, have oversimplified the discussion. This contention arises from competing interpretations of the origins of the African presence in the region and from contradictory assessments of the effects of African incorporation into Amerindian tribal structures and the resulting Zambo ethnic group. The first recorded use of the term “Miskitu” as an ethnic identifier was applied specifically to the Zambos among the Amerindians of the region. By the turn of the century, that usage had spread to incorporate both the Zambos and their Tawira, or “straight-haired,” cousins. This paper will attempt to place these two debates into perspective and expose the connections between the Miskitu-Zambo and the agency-victimization polemic through a consideration of the literature.

By All Accounts, Life was Good at Camp McCoy

Elizabeth Sommer

Faculty Mentor: Dr. Nancy LoPatin-Lummis

Nestled in the valleys of western Wisconsin, Camp McCoy housed over 3,500 Japanese prisoners of war (POWs) during World War II. From 1942-1945, Camp McCoy served as the main Stateside camp caring for captured Japanese enemy combatants. How were these foreign enemies treated in the heartland? There is an abundance of proof showing that Camp McCoy’s Japanese POWs had fair and reasonable treatment. To prove amicable treatment towards Japanese POWs, this paper used evidence from camp inspections and records, U.S government documents, and Japanese prisoners’ opinions. Upon assessment of these documents, an image of paid

labor, religious tolerance, and freedom of expression emerges from the tumultuous times of WWII.

Group 18

Room A202

Moderator: Dr. Rob Harper

The Theologies of the Great Awakening: The Calvinist Doctrines of Jonathan Edwards and George Whitefield

Josiah Popp

Faculty Mentor: Dr. Rob Harper

The Great Awakening is best known as the sweeping religious revival that made its way through the British North American colonies primarily between 1739 and 1742. That this Great Awakening can be judged in one way or another as being “great” has rarely been disputed, not even by those who are the most ardent critics of the ideologies and effects that were brought forth by it. Instead, arguments amongst both early and later scholars have focused on what, if anything, the American colonists were awakened to. In order to answer this question, this research paper defines and analyzes a few of the common theologies that were explicitly stated by two of the Great Awakening’s most influential preachers: Jonathan Edwards (1703-1758), an evangelical Puritan who preached extensively in Northampton, Massachusetts, and George Whitefield (1714-1770), an Anglican and cofounder of Methodism from Gloucester, England, who preached throughout England and the American colonies. Specifically, this paper shows that these two preachers predominantly held common, Calvinist beliefs regarding the total depravity of man, free will, unconditional predestination, and the perseverance of the saints. Since Calvinism cannot be defined as one singular idea but as rather a summation of various theologies, this paper progressively defines these ideologies in relation to Edwards and Whitefield. In summary, since both Edwards and Whitefield adhered to Calvinism and were the most influential preachers of the Great Awakening, the Great Awakening should, in part, be viewed as a reawakening of Calvinism in the American colonies.

Connecting Paramilitarism and Neoliberalism in Colombia: The Political Economy of a “War on Drugs”

Michael Wilson

Faculty Mentor: Dr. Jennifer Collins

This paper explores and analyzes the connections between the so-called “war on drugs” in Colombia and the advance of a predatory neoliberal economic model in Colombia. The United States government is currently involved in a complex process that, through violence, asserts the authority, dominance, and supremacy of

U.S. economic interests in Colombia, as well as those of Colombian elites. This process, which involves the role of paramilitary forces, has informal as well as institutional repercussions on Colombia's model of resource distribution. This paper argues that the inner workings among the United States government, the Colombian state, and Colombian military and paramilitary organizations have served to assert control and dominance over Colombia's socioeconomic realm for the benefit of specific business interests through neoliberal policy and practice. Contrary to arguments that extol Colombia as a "model of prosperity" and democracy, what in fact has been happening - with U.S. military assistance - is a major restructuring that entrenches the power of transnational corporations through treaties and laws, and further concentrates economic and political control in the hands of Colombian landowners and elites. As a result, paramilitary terror has served as a means to maintain ground-level control and the suppression of civil society in Colombia.

Group 19

Room A110

Moderator: Dr. Helena Alden

Pharm Kids

Matthew Oldenburg

Faculty Mentor: Dr. Robert Wolensky

This presentation looks at a new shift in substance abuse/misuse by teens and college kids today. Young people are more likely to abuse pharmaceutical drugs than they are to abuse street drugs. This study explores the financial costs of pharmaceutical-related overdoses and their impact on student academic and social life; general student attitudes and misconceptions towards pharmaceutical misuse/abuse; various social implications; and relevant survey data. The findings are applied to possible solutions, social attitudes towards modern medicine and consumption, and criticisms of big pharmaceutical companies and their marketing methods.

The Elephant in the Room: Society and Domestic Violence

Jessica Richter

Faculty Mentor: Dr. Helena Alden

In the United States, one in four women will be a victim of domestic violence in her lifetime (Tjaden and Thoennes, 2000). Through IRB-approved interviews with survivors and advocates, this research project looks at the topic of domestic violence. Erving Goffman's theories about presentation of self (1959) and stigma (1963) are used to explain why domestic violence happens. In addition to using these theories, this research examines a small group of individuals and how, in

their experience and from their perspective, society can “look the other way.” This research is more than just an explanation of domestic violence. It is an attempt to find possible solutions through understanding the complex social situations involved. The relationship between domestic violence victims/survivors and society offers insight into a social phenomenon that affects 1.3 million women every year (Centers for Disease Control and Prevention, 2003). The interview data provide a set of key concepts focusing on who the abused are, who they present themselves to be, how society views them, and why things are this way. The intention of this research is to represent the specific voices of these individuals, using their stories to look at possible explanations of and solutions for domestic violence. Data such as this are important because, with awareness and understanding, social change can happen.

Group 20

Room A111

Moderator: Dr. Neil Heywood

Radon Hot-Spots in Wisconsin

Jake Budish

Faculty Mentor: Dr. Eugene Martin

Radon is a gas that is produced during radioactive decay of uranium and thorium in the soil and bedrock. This deadly, odorless gas has become a worldwide public health issue and is the second leading cause of lung cancer. By EPA standards, above 4 pCi/Liter of radon gas becomes a problem especially in homes where radon gas tends to seep into basements from the soil and bedrock and is deemed unsafe for humans. Below 4pCi/L is typically when radon is less of a concern. Several Geographical Information System (GIS) professionals, the Environmental Protection Agency, the Department of Natural Resources, and health affiliation organizations have explored the radon hazard-risk potential in certain areas around the United States, but where are the radon hotspots in Wisconsin? This research project explores the radon potential risks within Wisconsin based on the location of these landscape features: granite bedrock geology, well-drained soils, depth to bedrock, and developed areas. The research proved to be an extremely successful project that generated a very clear map of the radon hotspots based off the criteria chosen, and found hotspots right in Central Wisconsin. Location of high risk areas for radon exposure throughout Wisconsin will contribute to public awareness of this concern and encourage residents in these areas to have their homes and building tested for radon.

Photo Mapping Wisconsin Barns

Benjamin Ebertz

Faculty Mentors: Doug Miskowiak, Lisa Theo

The current steady demise of Wisconsin's barns has created a strong interest in one Wisconsin county to preserve the history of its barns and increase publicity for the dwindling Wisconsin icon. Citizens believe that Wisconsin barns hold deep historical significance including the dreams, struggles, hopes, and pride of communities along with having a great importance to the state's beautiful landscape. This has caused a citizen-based initiative to catalog all of its county's barns via photograph. This project attempts to increase the publicity of these barns by creating an easily accessible website with a navigable map used to show the location of these barns along with an attached photo. This project hopes to increase awareness of Wisconsin barns and establish a documented historical archive which can be utilized for many years to come.

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