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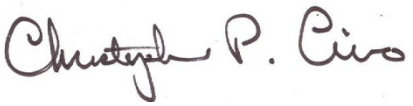
Welcome to the 18th annual College of Letters and Science Undergraduate Research Symposium.

The exercise of scholarship is fundamentally about discovery. As part of this annual celebration, we are proud to share how teaching and scholarship go together in the bond that develops between our faculty and their students. A fundamental role of higher education is giving our students the opportunity to discover the world of inquiry, where there are no simple answers and research naturally leads to more questions. Even though this issue is not satisfying to those attempting to redefine the word "fact," it is the fundamental reason we exist as a university. Our faculty, as experts in their fields, are the resource that our students most depend upon in experiencing a successful college career. Faculty expertise is shared by involving our students in the process of inquiry, and through undergraduate research experiences … what are known as *high impact practices*. We celebrate today the bond that exists between faculty and students, and how that bond enhances the student experience, through mentoring, inquiry and presentation of the results of inquiry. Our faculty give our students a glimpse into the exciting and often difficult questions posed by our world. In the College of Letters and Science, we strive to empower our students to question and participate in the process of discovering the power of objective inquiry. As teacher/scholars, our faculty raise the expectations of our students, giving them the intellectual tools needed to become professionals in whatever field they pursue in their careers. This is the forum we are here today to celebrate, and which honors that relationship. Please visit the lectures, demonstrations and posters created by our students, working with our faculty.



Christopher P. Cirmo
Dean, College of Letters and Science
Professor of Geography and Geology

Oral Presentations 2:20-3:10 p.m.

Science Building (A-wing) 1st and 2nd Floors

Group 1
2:20-3:10 p.m. Room A110

Are Introns of the Alpha-Spectrin Gene Associated with Hereditary Spherocytosis? - (Biology)

By: Adam M. Olson, Josef Hartzel
Faculty mentor, moderator: Diane Caporale

Hereditary Spherocytosis is a congenital form of anemia that produces life threatening effects to the functional shape of red blood cells. The disease is often caused by a frameshift mutation in both copies of the alpha-spectrin (SPTA1) gene, which codes for a crucial red blood cell membrane protein. The disorder has been identified in two individuals from a children's hospital in Toronto, Canada. Previous studies show both subjects have the mutated allele located in an exon region of the SPTA1 gene. However, a mutation in the second allele leading to the recessive nature of the disease has not been identified. This study examines the patients' 51 introns within the SPTA1 gene to try to identify a mutation of the second allele. Sequences are being compared with the wildtype form to determine whether there are any abnormal splicing patterns, which could produce a faulty transcript and, thus, a non-functional protein causing the disorder. Here we report the progress of this study.

HLA-DQ1 Alpha and Beta Genotypes Associated with Non-Celiac Gluten Sensitivity - (Biology)

By: Michael Maki
Faculty mentor, moderator: Diane Caporale

Non-Celiac Gluten Sensitivity (NCGS) is a gastrointestinal disease occurring in 3-6% of the population, while Celiac Disease (CD) and Wheat Allergy (WA) are found in 2-4%. Only by eliminating a diagnosis of CD and WA through medical testing and the elimination of foods from their diet can a patient be diagnosed with NCGS. Some reports have shown that proteins embedded in the membranes of leukocytes known as human leukocyte antigens (HLAs) are linked to comparable gastric diseases. To test this hypothesis, we screened a cohort of 41 NCGS and 41 non-NCGS participants for their HLA-DQ alpha and beta genotypes using AllSet+ Gold DQ Alpha1 and Beta1 high resolution allele-specific PCR kits. The HLA-DQ alpha and beta polypeptides create a dimer so genotypes were combined for each individual to observe allele combinations within and between each cohort. NCGS is starting to correlate with CD as data accrues. We are continuing to screen more participants within each cohort.

Group 2
2:20-3:10 p.m. Room A111

Life-History Shift in Storage Across Latitudes in Side-Blotched Lizards Suggests Climate Is Not Limiting at Higher Latitudes - (Biology)

By: Chun Huai Luo
Faculty mentor(s): Pete Zani
Moderator: Jaimie Klesmith

Many studies demonstrate that the importance of biotic limits (e.g., predation) decreases with increasing latitude, but the importance of abiotic limits (e.g., climate) increases with latitude. As latitude increases, the life history of a species is expected to shift from being dominated by biotic to abiotic limits, yet this idea has rarely been tested. We hypothesized that growth rate and energy storage will increase with latitude due to shorter growing season and to withstand harsher winter, respectively.To test this idea, side-blotched lizards from 12 populations were reared under common lab conditions to measure growth rates and storage prior to winter. Contrary to our expectations, lizards from low latitudes had higher growth rates and greater energy storage than those from higher latitudes suggesting that high-latitude lizards are not limited by predation or winter harshness. However, results suggest that low-latitude lizards are limited by both predation and winter mildness.

Thermal and Seasonal Influences on the Winter Activity of Side-Blotched Lizards - (Biology)

By: Abby Pendergast
Faculty mentor(s): Pete Zani
Moderator: Jaimie Klesmith

Throughout winter, reptiles utilize hibernacula (overwintering sites) to avoid harsh conditions. Previous research has shown that emergence may be common throughout the winter and due to cues such as temperature, barometric pressure, or solar irradiance. This study focuses on the emergence of side-blotched lizards in nature with our goals being to clarify how temperature influences i) daily emergence, ii) seasonal patterns of emergence, and iii) microhabitat preference in natural vs. artificial sites. To test these ideas, we used natural hibernacula (rock crevices) as well as constructed an artificial overwintering site. We found the relationship between activity and temperature was site-specific, but thetiming of emergence changed seasonally with activity commencing later in the day mid-winter. Although thermal cues are a primary factor governing activity, there appear to be other factors that affect activity during winter such as time of year and site (i.e., crevice) selection.

Group 3
2:20-3:10 p.m. Room A112

Digital Influence on Attention Span - (Computing and New Media Technologies)

By: Anika Neela, Anika Sheela, Robert Vanden Boogart
Faculty mentor, moderator: Tim Krause

A person's attention span is the duration that they can focus on one object or objective without becoming disinterested or distracted. With the introduction and popularization of technologies such as the smart phone, the average attention span of a human being has been reduced to around 8 seconds. Some even say that modern day people have a shorter attention span than that of a goldfish. People grow up in different environments and experience different levels of technology usage. Our research is to look into the factors that impact our attention span and answer these questions: Do people in different countries or continents have different attention spans? If so, how much of an impact do digital devices have?

Moodboards as Design and Competitive Research for Web Development - (Computing and New Media Technologies)

By: Brandi Haslitt
Faculty mentor, moderator: Tim Krause

Under the ashTree by artist Ashley Megal is a local business that sells her illustrations on prints, cards and T-shirts. Her art is colorful, vibrant, unique, whimsical, organic and beautiful. An early step in this process was creating a moodboard to help the team with future design decisions. The process to create the moodboard for Ashley's new site required competitive research, initial stakeholder meeting, using Pinterest to explore the themes from the meeting, several drafts, feedback and Ashley's own moodboard. The moodboard she created was a valuable part in reaching the final moodboard design. Since Ashley's art is unique from piece to piece, uses a full spectrum of colors and varying techniques it was challenging to find the right fit. With patience, the help of our client and time searching for stock photos, the final moodboard captures Ashley's personality, her artwork and will be a valuable tool in building her website.

Group 4
2:20-3:10 p.m. Room A202

Living Legends: The Warden as a Story-weaver in Bioware's Dragon Age: Origins - (English)

By: Melanie Snyder
Faculty mentor(s): G. Christopher Williams
Moderator: Ross Tangedal

In a discussion of the game Dragon Age: Origins, Kristine Jørgensen argues that the character Alistair functions as the protagonist of the game's story, while the player-character's Warden is only a witness to his story. However, rather than remove the possibility of the player controlling the narrative, as Jørgensen suggests, this set-up allows for the player to take on the position of the game's designer, rather than that of a

mere character. A similar interaction is explored in the novel The French Lieutenant's Woman. At several points, the reality of the novel's narrator is blended with that of his fictional creation. In one moment, he finds himself physically beside his own central character, Charles, asking: "Now could I use you? Now what could I do with you?" (405). These same questions permeate the narrative systems of Dragon Age Origins, allowing the player's role as protagonist to be one in which the player acts as creator of the story, not only as an actor in it.

Why Mario Works: Super Mario as Transformative Icon for the Working Class - (English)

By: Brady Simenson
Faculty mentor(s): G. Christopher Williams
Moderator: Ross Tangedal

Super Mario has become an icon for Nintendo akin to what Mickey Mouse is for Disney. His image is used to sell various products like clothing, food, and school supplies. Mario has transcended the realm of character and sits firmly in the realm of icon. Just as he changes between physical forms, genres, and even mediums, he also becomes a figure of transformation throughout culture. This "ability to dynamically assume any form" is how silent film director Sergei Eisenstein, in his book *Eisenstein on Disney*, believes screen icons of his era appealed to the lower class. Like Mickey Mouse and Charlie Chaplin, Mario's ability to change and manipulate his physical form, such as growing taller to smash obstacles, as well as his ability to take on an infinite number of social roles, be it doctor or tennis player, makes him a hero of the working people, a group who greatly desire the freedom of form he represents.

Group 5
2:20-3:10 p.m. Room A207

Ethics and Reason - (Philosophy)

By: Jacob Hoppman
Faculty mentor(s): Dona Warren
Moderator: Jason Zinser

The purpose of this paper is to examine whether or not ethical claims, or 'ought' statements, can be grounded in reason. Hume's 'is-ought' distinction is a starting premise from which it is concluded that for 'ought's to be grounded in reason there must be an axiomatic 'ought' - one that is true by definition. This is because an 'ought' cannot be grounded in descriptive accounts, and it cannot be grounded in another 'ought' because this would result in an infinite regress. The two ways we can discuss ethics without referring to 'oughts' grounded in reason are also explored: namely, how the Law of Non-Contradiction applies to ethics and how if an 'ought' is presumed we can still discuss the extent to which descriptive accounts align with this presumed 'ought.'

Virtuous Vegetarianism - (Philosophy)
By: Michael Doerr
Faculty mentor, moderator: Jason Zinser

While arguments for vegetarianism are frequently grounded in deontological or consequentialist theory, very little scholarship has focused on analyzing the consumption of animal products from within the theoretical framework of virtue ethics. Several ethicists have pointed out that the virtue of compassion requires the adoption of a vegetarian lifestyle. Taking Rosalind Hursthouse's position as a representative example, I argue that these accounts are insubstantial and inadequate. To successfully ground vegetarianism in virtue ethics, several challenges must be addressed. We must define compassion so that it extends to animals, a requirement that may prove problematic for neo-Aristotelian accounts. We also must explore practical challenges related to animal sentience and to the distance between consumers and animals. Such problems affect how we conceptualize compassion and how we determine what kind of vegetarianism to adopt.

Group 6
2:20-3:10 p.m. Room A210

Film and Punishment: A Cross-National Study on the Relationship between Film and Popular Attitudes toward Capital Punishment - (Sociology and Social Work)
By: Jillian Behling
Faculty mentor, moderator: David Barry

Globally, capital punishment is practiced and supported in varying degrees. Past sociological studies suggest media has the potential to influence popular opinions about the use of death penalty. The present study will examine the relationship between public attitude about capital punishment and media, focusing specifically on the film industry. A content analysis of international movies across eight sampled countries was conducted. Data from the World Values Survey was then used to compare popular perceptions toward capital punishment in each country with the findings from the film analysis. This sociological study of media builds on literature that suggests film as potentially influential in public opinion towards capital punishment. This study contributes by offering further insight into the connection between media and public/political opinion.

Risk-Taking Beauty of the New Circus - (World Languages)
By: Sophia Wonser
Faculty mentor(s): Vera Klekovkina
Moderator: David Barry

In the New Circus, everything is possible; everything one imagines can become real. It is a world where art and dance, passion and perseverance intertwine to create a unique act of deeply personal and artistic expression. It is a worldwide community, which is endlessly creating, growing, and learning together through personal connections and social media, in studios and in circus tents, on the streets or in public parks. The New Circus is a place where pain lives alongside pride, and where every success overcomes

fear; every challenge tests determination and heightens expression; every move displays the body's kinesthetic potential and its natural beauty. I will examine the transformation of the traditional, side-show aerial circus act into a creative unraveling of ideas, methods, and techniques – the New Circus – a global community which welcomes hybrid genres of dance, glorifies the artistic process and the creativity of performers, and values artists' prowess of an apparatus.

Oral Presentations 4:00-4:50 p.m.

Science Building (A-wing) 1st Floor

Group 7
4:00-4:50 p.m. Room A107

Behavioral Patterns in Predator-Prey Interactions Between Lizards - (Biology)

By: Bridget Walker, Abby Pendergast, Liz Wagner
Faculty mentor(s): Pete Zani
Moderator: Terese Barta

Predator-prey interactions are an important aspect of life history as they determine the survival of the predator and/or the prey. Quantifying predator and prey behavior occurring in these interactions may allow us to find patterns of and determine which strategies prove successful for both the predator and the prey. Using a predator-prey system involving side-blotched lizards and long-nosed leopard lizards, we placed field-fresh individuals of both species together in small arenas in the field and videoed the resulting encounters. We measured several aspects of predator-prey interactions based upon five events: detection, identification, approach, subjugation, and consumption. Each of these events provided information on both predator and prey behaviors and how they interact to determine the outcome. These events also indicate how predators and prey interact in order to enable success or failure for either player during these encounters.

Use of Biochar to Increase Microbial Growth from Compost Tea Inoculation - (Other)

By: Alex Thomas, Lindsey Weiss
Faculty mentor(s): Robert Michitsch, Bryant Scharenbroch
Moderator: Terese Barta

Compost teas are known as plant disease suppressants and a source of microbes potentially beneficial to plants. Compost teas have gained interest in fields like agriculture, silviculture, and gardening in recent years. Despite their popularity, the mechanisms behind compost tea and its benefits have not been identified in the literature. Studies suggest the tea increases nutrients for plant growth and acts as an inoculate, spreading microbes to the soil which lead to more available carbon and other nutrients. Identifying the effects of compost teas is important for future applications in science and in practice. Our experiment ran four treatments using a sanitized sand and potting mix substrate with two treatments amended to be 10% biochar by volume. One treatment of each substrate was inoculated with a compost tea sample, creating the four separate

treatments. Wisconsin Fast Plants were analyzed for microbial respiration, microbial biomass, and plant biomass after 40 days of growth.

Group 8
4:00-4:50 p.m. Room A110

On a Correspondence Between Marked Tableaux and P-tableaux - (Mathematical Science)

By: Janet Koehne, Carmen Johnson
Faculty mentor(s): Matt Welz

In this talk we explore and explain some of the connections between two different sets of objects, Marked tableaux and P-tableaux, that play roles in representation theory and in algebraic combinatorics. In his paper, "Eulerian numbers, tableaux, and the Betti numbers of a toric variety," Stembridge establishes that Marked tableaux give the multiplicity of irreducibles of a representation. Later, in "Chromatic Quasisymmetric Functions and Hessenberg Varieties," Shareshian and Wachs come about P-tableaux in a similar way, and establish indirectly that there is a bijective correspondence between these two sets of tableaux. We present the results of our research thus far which include: a direct combinatorial bijection between these tableaux for certain shapes, and a hypothetical algorithm to transform Marked tableaux into P-tableaux.

Proof that Breadth-First Yields Shortest Path - (Mathematical Science)

By: Eric Hodkiewicz
Faculty mentor(s): Andy Felt
Moderator: Matt Welz

The breadth-first algorithm is used for constructing a spanning tree on a connected graph. Using known results associated with Djikstra's method, we will show that this algorithm always yields the shortest path, in number of connecting edges, from the original node to each other node in the graph. This may have implications in the field of computing.

Group 9
4:00-4:50 p.m. Room A111

Putnam's Choice Gems: How "The Complete Works of Washington Irving" Helped Build a Publishing Empire - (English)

By: Kimberly Tenor
Faculty mentor, moderator: Ross Tangedal

George Palmer Putnam (1814-1872) was a successful and prominent figure in 19th century American publishing. His collaboration with esteemed authors and other professionals in the industry is well-documented in Ezra Greenspan's works on Putnam. This paper explores the span of time when Putnam established his own publishing firm and especially focuses on his publishing contracts with American author Washington Irving. Putnam's marketing methods and success with publishing "The Complete Works of Washington Irving" illustrates how publishers and authors benefited from royalty contracts and target sales audiences in the developing literary marketplace of the 19th century.

Mapping Change Over Time in the Legend Lake System - (Geography and Geology)

By: Casey Trickle, Ethan Bott
Faculty mentor(s): Christine Koeller
Moderator: Ross Tangedal

Legend Lake, Menominee County, is a system of lake basins with regulated influent and effluent dams. Active aquatic invasive plants have been actively managed through chemical treatments that require accurate water volume estimates to be effective. Bathymetric maps constructed for Legend Lake in 1991 were believed to contain errors resulting in inaccurate volume calculations. Utilizing depth data acquired in 2016 with high-accuracy GPS and echosounding technologies, 3D models were generated and contour lines derived to construct an updated, more accurate bathymetric map of Legend Lake. A previous bathymetric map from 1991 was georectified and compared to the 2016 model using a geographic information system (GIS) to display depth changes between the two time periods. Results show the 2016 bathymetric map yielded seven percent more volume than was reported in 1991. In addition, a spatial overlay comparison shows areas where Legend Lake depth is shallower or deeper than reported in 1991.

Group 10
4:00-4:50 p.m. Room A112

The Changing Role of Women: How Charles Dickens and J. K. Rowling Depict Gender Roles in David Copperfield and Harry Potter and the Chamber of Secrets - (English)

By: Emily Thiele
Faculty mentor, moderator: Robert Sirabian

Through their colorful and diverse parade of female characters which range from bland and domestic women and girls to bold, offbeat women who behave more like men, Charles Dickens and J. K. Rowling paint a fascinating palette of women despite the social contexts of their respective time periods. While acknowledging the value of traditional female role types, they also recognize nontraditional women such as Betsey Trotwood of David Copperfield and Professor McGonagall of Harry Potter. Furthermore, Dickens and Rowling introduce a middle ground that refrains from either the modern standard of making women indistinguishable from men or the Victorian standard of making them subordinate to men. This refreshing balance is especially found in the characters of Agnes Wickfield (*David Copperfield*) and Hermione Granger (*Harry Potter and the Chamber of Secrets*), who are strong and capable of standing beside their male protagonists as equals, yet still adamantly maintain their feminine qualities.

The Truth Behind Inheritance: A Critical Essay on Oliver Twist and Harry Potter and the Chamber of Secrets - (English)

By: Ta Xiong
Faculty mentor, moderator: Robert Sirabian

Exploring the familial background of key characters and the tests they face, this essay argues that Charles Dickens's *Oliver Twist* and J.K. Rowlings's *Harry Potter and the*

Chamber of Secrets take a combined view of nature and nurture to challenge a simplified view of goodness and evil. Both novels show that though individuals may inherit goodness at birth, they are tested by the choices they make. A person who is born good but fails to express goodness in his or her actions falls to evil. Similarly, a person who inherits evil at birth is given the opportunity to reclaim goodness through his or her actions. Oliver Twist and Harry Potter are accepted as heroes through their defiance of evil while other characters, such as Fagin and Lord Voldemort, are exposed as characters who are "born" evil and who choose to remain evil. Through Severus Snape, Hermione Granger, Monks, Rose Maylie, and Nancy, we see that the inheritance of goodness or evil alone does not constitute character.

Group 11
4:00-4:50 p.m. Room A207

Heroes or Villians?: An Examination of the Nature of the FARC - (Political Science)

By: Zachary Weber
Faculty mentor, moderator: Jennifer Collins

In the fall of 2016, the Colombian government signed a peace treaty with the Revolutionary Armed Forces of Colombia (FARC) to end an armed conflict that has plagued that country for a half century. FARC was born during a period known as La Violencia, characterized by political strife and violence. Embracing Marxism-Leninism, the FARC initially focused on protecting and promoting workers and peasants' rights. However, over the years, many Colombians began to view the group as nothing more than common criminals who ended up terrorizing many of the people they claimed to protect. This paper examines the history and conflicting perspectives on the organization. Does the FARC have a legitimate political agenda, or is it no more than criminal band? I conclude that though the FARC started out as a guerrilla movement with legitimate grievances, as it deepened its involvement in and reliance on the drug trade, it morphed into more of a criminal organization.

Inconfidência Mineira: The Uprising that Never Happened - (Political Science)

By: Elise Beck
Faculty mentor, moderator: Jennifer Collins

The Inconfidência Mineira was a conspiracy against the Portuguese crown that took place in the mining state of Minas Gerais (Brazil) during the late 16th century. Heavily influenced by the French and American Revolutions, a group of mostly elite creoles began conspiracies to detach from Portugal and install a new independent state, mainly to pursue economic goals related to the mining industry within their state. After one of the members denounced the conspiracy, the royal court exiled the majority and sentenced one member, "Tiradentes," to death. In this presentation, I will address the importance of the event and of the memory of "Tiradentes" in the future nation-building process of Brazil. I will briefly explain the context around the event, and then examine how it was eventually transformed into one of the most important narratives of Brazilian national history and identity.

Group 12
4:00-4:50 p.m. Room A210
Medical Big Data Analysis Based on High Speed Spark Cluster: Marshfield CURE (Big Data Search Query Tool) - (Computing and New Media Technologies)
By: Mark Newby, Jenna VanLinn, Daniel Cronce
Faculty mentor(s): Daehee Kim, Tim Krause, Tomi Heimonen
Moderator: Tim Krause

Marshfield CURE (Clinic Uncharted Research Environment) is a Big Data Search Query Tool that is a Web based application to be used by Marshfield Clinic's Research Division. The primary purpose of Marshfield CURE is to allow researchers to access research data regarding phenotypes and genotypes along with genomic variants to judge the likelihood of an individual having a specific disease. Marshfield CURE is being developed in two parts. The first part is setting up high-speed Big Data Analysis distributed cluster (called Spark Cluster) to store and access the 6TB of research data. The distributed cluster reduces processing and retrieving time significantly on 10Gbps network. The second part is developing the efficient user interface by using Shiny application that is a Web development framework on R. Overall, the goal of this project is to seamlessly combine the visualized graphic user interface with high-speed distributed cluster to handle Big Data. Scott Hebbring and Jamie Fox of the Marshfield Clinic Research Foundation sponsored the project.

Poster Presentations 3:10-4:00 p.m.

Science Building (A, B, C corridors)

The Humanities

A City of Our Own: Segregation and New York's Chinatown - (History)
By: Garrett Pagel
Faculty mentor(s): Taylor Easum, Tim Kennedy

This research project looks into the relationship between New York City and its Chinatown. Chinatown in New York City is the perfect example of a city within another city. It has its own identity and infrastructure. This project shows that because of early racial segregation, Chinese immigrants lived closely with one another. This caused a phenomena that made an immigrant refuge evolve into its own community. Chinatown has gone from a place of not just immigrant workers, but to a tourist attraction that thousands come to see every year. Using historical maps of New York's Chinatown, this poster will show how the area developed into a city of its own.

Analyzing Literary and Historical Representations of Women's Rights in Algeria - (History)

By: Karin Maki
Faculty mentor(s): Valerie Barske

In this research project, I examine the ongoing effects of the aftermath of French colonialism (ca. 1830-1962) in Algeria and the different issues that women face in present-day society. By analyzing various groups vying for power since gaining independence from the French, scholars may better understand the social struggles of women in a postcolonial patriarchy. I discuss the expansion of feminism in Algeria during the rise of Islamism. I analyze the political agency of women, their place in the workforce, their access to healthcare, etc. I consider various archival sources as well as literary works relevant to historical and anthropological disciplinary approaches to women's rights. In the end, I hope to shed greater light on female empowerment, women's political agency, as well as the ongoing postcolonial struggles with limitations on female subjectivities.

Brexit: The Janus-Faced Nature of Populism, Neoliberalism, and What They Mean for the European Union and the United Kingdom - (History)

By: Benjamin Hoffman
Faculty mentor(s): Valerie Barske

In my research, I analyze how Brexit emerges from a space created by the intersection of populism, neoliberal policies, globalization, and immigration. I investigate how Brexit may happen and what it means for the UK and the EU. Brexit references the vote by British citizens to leave the EU, which means invoking Article 50 of the Lisbon Treaty (2009). I explore the consequences of Brexit, such as London losing status as the finance capital of Europe, the future of neoliberal policies, and the potential fall of the neoliberal consensus. I use sources from The Times, The Guardian, Le Monde, the London School of Economics and Political Science, Maecenata Institut für Philanthropie und Zivilgesellschaft, and others. Britain leaving the EU also calls into question the future of the European project and may be read as a symptom of a global populism seen in the election of Donald Trump in the U.S., the popularity of Marine Le Pen in France, and voter dissatisfaction in Germany and Italy.

"Call Us The Leaders of the New School": The Globalization of South Korea's Pop Culture - (History) By: Evanne Hefty

Faculty mentor(s): Valerie Barske

In this project, I analyze how South Korea's popular culture represents a global phenomenon by examining responses to governmental economic change, the privatization of the Korean entertainment industry, and the international appeal of cultural elements created by globalization. My analysis of young K-Pop entertainers as "new school" leaders employs theoretical frameworks including neoliberalism and post-colonialism in terms of the impacts on Korean popular culture. I situate my work in an historical context by considering media and archival representations of Korea as early as the turn of the 20th century. For example, the primary source article, "The Korean

People: The Product of a Decayed Civilization" The Outlook (1905) highlights how views of Korea's global position change. In the end, my study emphasizes the importance of "soft power" in understanding how individual nations negotiate economic and ethnic identities in the context of globalizing cultural forces.

Cultivating Terrorism: What Determines Support for Terrorist Organizations Operating in the Middle East - (History)

By: William Robbins
Faculty mentor(s): Valerie Barske

In this research project, I evaluate the different factors that may play a role in fostering support for terrorist organizations operating in the Middle East. I examine U.S. foreign policy, especially the 2003 invasion of Iraq and interventions since, levels of poverty and unemployment in the region, and several case studies focusing on the recruitment and approval of terror organizations such as Al-Qaeda and ISIS. In particular, I argue that foreign intervention coupled with poverty, unemployment, underdevelopment, and government corruption, contributes to the support of terrorist organizations. Using Pew Research Center polls and official hearings documents from U.S. Congress commissions on national and homeland security, I explore correlations between these trends and the growth of terrorist organizations. It is necessary to understand what factors determine non-combatant support for terrorist organizations in order to slow the growth of terrorism in the Middle East and the world.

Dancing Colombian Identities: History, War, and Roles of Women - (History)

By: Kaitlin Piette
Faculty mentor(s): Valerie Barske

In this research project, I examine scholarly works and primary sources on Colombian cultural dances through the analytical intersection of gender, identity, and embodiment. I demonstrate how the beginnings of the traditional dance Cumbia and the guerrilla war group known as FARC both appropriate specific gender roles for women. Historians demonstrate the significance of these dances in terms of negotiating gendered identities and overcoming the assumption that masculinity dominates over feminine empowerment. I ground my work in archival research including official documents on Colombia from the foreign affairs papers of U.S. Representative David Obey, as well as the diary of female Wisconsinite Laura Kiel who served in Colombia with the Peace Corps (1963-1965). In the end, my project seeks to create new interdisciplinary intersections between dance, performance studies, cultural studies, history, and anthropology.

Dangerous Ideas or Cultural Heirlooms: The Changing Roles of Arabic Manuscripts in the Modern World - (History)

By: Diane Ray
Faculty mentor(s): Valerie Barske

In this presentation, I examine how the role and view of Arabic manuscripts has changed historically through the present-day. Arabic language manuscript traditions began in the Golden Age of Islam in the 8th to the 13th century when Arabic was the language of

academia. These books were threatened as dangerous texts to the inquisition in Spain, trophies for French colonialists, and liberal corruptions of Islam by terrorist groups. Sources such as documentaries from PBS, media reports, and historiographical papers will be examined to analyze the shifting roles of these objects. I consider what role manuscripts have played in politics, terrorist activity, cultural heritage, and views of Islam, Arabic speaking regions and Africa. I explore gaps in English-language scholarship including Orientalizing assumptions that Africa lacks academic texts as well as the notion that all Islamic states should be considered largely "conservative," intolerant and violent.

Deconstructing the Racial Democracy Myth: Impacts of Social Media on Racial and Ethnic Identity in Brazil - (History)

By: Elise Beck
Faculty mentor(s): Valerie Barske

In this research, I use a postcolonial lens to evaluate the impacts of social media on modern Brazilian racial and ethnic identification. By carefully examining the racial structure of colonial Brazil (1500-1815) as well its transformation during imperial rule, I examine the foundation of 20th century racial ideologies. I also demonstrate how the increased exposure to social media produces an ideological shift that tries to deconstruct past racial ideologies, such as the theme of "racial democracy" that dominated 20th century Brazil. My research explores theories on collective memory and postcolonialism as well as contemporary primary sources including memes, hashtag trends, wall posts, etc. I trace how social media has cultivated and reshaped the ways in which Brazilians perceive past traumatic experiences such as slavery and the treatment of indigenous populations, as well as how social media has reshaped recent political figures and their associated ideological movements.

Dubble Trouble: Defending Dublin - (History)

By: Nicholas Kositzke, Jacob Meidl, Holly Van Eperen
Faculty mentor(s): Taylor Easum, Tim Kennedy

Our project is a long-range study of the tactical development of Dublin, specifically with regard to military barracks from ca.1830 to ca.1940. The tactical development of Dublin during this period is set against the background of deep political turmoil, notably the achievement of independence for Ireland and the Second World War. Our project mainly relies on five maps, along with a number of lesser maps and historical information. We studied the development of five locations around the city of Dublin during this period, including four barracks and Dublin Castle (which housed a military contingent). Four of the maps we produced are internally-published, while the fifth comes from a series of tactical plans produced by the German High Command during World War II. From these maps, as well as historical information we were able to find, we have endeavored to paint a picture of the development of military power in Dublin over a century of monumental events.

Evolution and Globalization from Russia to the Soviet Union - (History)

By: Brett Stoeger
Faculty mentor(s): Valerie Barske

In this research project, I assess how internationalism played a role in Russia's transformation into a leading world power by the end of World War II. I focus directly on how foreign nations provided cultural and ideological influences as well as what significance nationalism played. The timeframe for my research focuses on the Russo-Japanese War, post-World War II, and then through the Cold War. In terms of sources, I analyze archival materials including official documents, private papers, and letters from diplomatic offices both in the U.S. and the U.S.S.R. I review the construction of collective memory within Russian media to assess how the people perceived the growth of the nation. As the world continues to globalize, the history of Russia becomes increasingly central to understanding contemporary issues. This research seeks to shed light on the development of power in Russia on a global stage.

Expansion and Change of the Three Heritage Canals in Amsterdam - (History)

By: Kyle Bareta, Ian Cole, Quentin Rickert
Faculty mentor(s): Taylor Easum, Tim Kennedy

This research project discusses the implementation of the Three Canals Plan and how it affected the development of Amsterdam's spatial, industrial, and functional purpose during the 17th century. Over time, as the canals were built up in stages throughout Amsterdam, the functions supported by the canals switched from emphasizing military defense to agricultural sustenance, and finally, to industrial storage and transportation. We will use maps to show how over time the canals grew and changed along with city of Amsterdam from an agricultural city to an industrial city.

Five Ks in the UK: Sikhism and Discrimination in the Modern United Kingdom - (History)

By: Ian Cole
Faculty mentor(s): Valerie Barske

In this research project, I examine the struggles of the Sikh people in the U.K. from World War I to the present. The Sikh people share a long history of military and police service in the U.K. I analyze court cases to examine Sikhs in 21st Century British police forces and their legal battles to be permitted to wear traditional turbans while in uniform. Known as the "Five Ks," the Sikh dress of kesh (uncut hair), kara (steel bracelet), kanga (wooden comb), kaccha (cotton underwear), and kirpan (steel sword) serve as crucial markers of ethnic and religious identity. Finally, through an exploration of recent media and news articles, I investigate the new phenomena of xenophobia, discrimination, and violence directed at Sikhs in the United Kingdom. I argue that the mistreatment of Sikhs may be traced to a gross misunderstanding that wrongly views Sikhs as Arab Muslims and through Islamophobic fears assumes a link between "Arab" dress and terrorist actions.

Gender Roles, Anime, and Modern Japan - (History)

By: Conner Intress
Faculty mentor(s): Valerie Barske

My research project examines gender stereotyping as represented in media, especially anime in modern Japan. As Japan becomes a fully industrialized imperial nation at the end of the 19th century, gender stereotypes reflect idealized inventions of tradition based on a hyper-masculine samurai culture or bushido and the image of women as "good wives, wise mothers" (ryōsai kenbo). I historicize my research by exploring archival sources and media representations of pre-WWII Japan. I then analyze anime examples from as early as the 1930s through contemporary times. In addition, my research explores interviews with writers and directors, archives of post-WWII cultural propaganda, and peer-reviewed gender studies articles focused on Japan. Through the medium of anime, I address a topic hotly debated by the international community, namely how gender dynamics influence the roles men and women play in an increasingly global society.

Hidden Beneath Our Feet: Moses Creek of Stevens Point, WI - (History)

By: Kathryn Vachyon, Aliyah Worzalla
Faculty mentor(s): Taylor Easum, Tim Kennedy

This project seeks to analyze how the urban development of the city of Stevens Point, along with problematic flooding, led to the diversion of Moses Creek underground. We would like to show the progression and the different methods urban developers in Stevens Point used from 1930 to the present to reroute Moses Creek. By studying maps of the changes made to the creek, developers planning notes, and records of property damages we will be able to picture where the creek once was and the significance of its diversion.

Icons of Constantinople - (History)

By: Erin McCausland, Scott Dorbert, Murphy Flynn
Faculty mentor(s): Taylor Easum, Tim Kennedy

Constantinople/Istabul is one of the greatest cities in history. It has stood since 330 AD as a center for trade, as a fortress defending the Bosporus, and a gateway to the East. The city bears the fingerprints of the past in its architecture, monuments, and layout. This project focuses on specific monuments located in the city, and asks: What made these great monuments what they are now? Traces of certain monuments that were destroyed or lost to natural erosion in the distant past can still be seen today. The once great walls defending the city from invasion have vanished, replaced by highways that transport goods from ports that have been in use since before the fall of the Roman Empire in the West. Great temples built by Constantine have been repurposed for a new god. Great palaces that stood as seats of Ottoman power for five centuries are now city gardens. The life of a city is embodied by change, and the change in Constantinople is visible for all to see.

Islam, Gender Roles, and Women's Empowerment in Egypt - (History)

By: Michelle Wilde
Faculty mentor(s): Valerie Barske

In this project, I examine scholarly works on the impacts of adhering to and deterring from "traditional" gender roles in Egypt to highlight how further research on cultural, religious and gendered stereotypes would enhance academic understanding of women's empowerment. Specifically, I investigate rape and sexual assault as weapons used during and after the 2011 Revolution. The number of documented sexual assault incidents reached 101 cases by 2013, as reported by Nazra for Feminist Studies, an Egyptian NGO. Nazra also documented incidents of gang rapes targeting women demonstrators. The Human Rights Committee stated that some women were "100 percent" responsible for being raped by being involved "in such circumstances." I conclude that the motivations behind demonstrations related to sexual assaults are difficult to establish empirically and categorically due to several factors such as lack of reporting, societal honor system and an unstable political climate in Egypt.

Italian Fascism: Colonialism and Failure in the Birthplace of Modern Fascism - (History)

By: Kyle Thurber
Faculty mentor(s): Valerie Barske

In this project, I evaluate fascism and imperialism in Italy. I examine primary sources of propaganda as well as news articles from an international perspective. Italy was a victor in WWI, but its people were dissatisfied with reparations compared to losses they sustained. The economy was in ruin in the postwar era, which created an opening for a strong nationalist, populist figure to rebuild the nation. Using the symbol of the Roman Empire and former greatness as a rallying cry, Benito Mussolini (1883-1945) and the National Fascist Party attempted to modernize and reform an overseas empire in Africa. I argue that on both counts Italian fascism failed, unable to achieve the party's goals, in contrast to analogous movements in the Third Reich and Hitler's Germany. In terms of a conceptual framework, I examine historically-grounded meanings of fascism. I conclude that what fascism proposed to accomplish in Italy, the birthplace of fascism, never really came to historical fruition.

Keeping International Education Alive: Diplomacy in a Time of Isolationism and Fear - (History)

By: Tyler Stilp
Faculty mentor(s): Valerie Barske

In this research, I analyze diplomatic policies and institutional ideologies of International Relations to construct a framework of how to keep international educational exchanges from becoming obsolete in times of increasing isolationism. I examine how nations, through the employment of fearmongering and power plays, "use" their citizens as ambassadors. I consider study abroad participants over the last 150 years during specific moments of isolationism to understand how international educators have fostered continued exchange throughout international turmoil. Specifically, I assess individual moments of isolationism through diplomatic and postcolonial lenses by analyzing student

journals and personal accounts. I explore how nationalism impacts individuals who are either currently participating in an international exchange or those that hope to participate in one in the future, particularly in areas that have conflicting relations with their state of origin.

Lights, [Censored], Action: Russian Film as a Vehicle for Propaganda and Exacerbating the Mythical Persona of Totalitarian Leaders - (History)

By: Corrine Schultz
Faculty mentor(s): Valerie Barske

In this project, I evaluate critically film as a tool for propaganda and the censorship of artistic minds in Stalinist Russia. Furthermore, I explore self-censorship by directors, screen writers, producers, and actors in the burgeoning film industry of Russia immediately following the Bolshevik revolution. I reference films released during the jubilee celebration on the 20th anniversary of the 1917 revolution, as well as films broadcast in subsequent years. I analyze feature length films and mandatory short works that circulated in public schools of the Soviet era, particularly to highlight subtle and overt instances of indoctrination of the "Stalin myth" in Russia's youth. I contend that past methods of censoring and propaganda within Soviet Russia are consistent with practices employed by government media under President Vladimir Putin today.

Like, Comment, Share: The "Fake News" Phenomenon of Social Media and its Ramifications in Contemporary Germany - (History)

By: Ashley Watzig
Faculty mentor(s): Valerie Barske

In this project, I examine the manipulation of social media websites to spread "fake news" by Germany's far-right political parties. A form of propaganda, these inflammatory Facebook posts spread like wildfire and are a free resource through which far-right groups spread their message. Historically, the Third Reich circulated propaganda through media sources to influence German opinion about Jews and other non-Aryan groups. I argue that fake news postings about refugees influence how people perceive "the other," aggravating issues of xenophobia and racism among the voting population of Germany. Led by false reports, voter support for anti-immigrant groups such as Alternativ für Deutschland (AfD) has risen, promoting policies directly targeting new refugees in Germany. From the 1940s to 2016, I analyze propaganda in Germany through the frameworks of globalization and collective memory to determine how far-right groups capitalize on events such as the refugee crisis to spread fake news.

Music and All that Jazz: The Formations of New Orleans as a Diverse Music Center - (History)

By: Lucas Jagodzinski, Joshua Zahl
Faculty mentor(s): Taylor Easum, Tim Kennedy

This project examines the unique and diverse musical culture of the city of New Orleans. The project covers the well-known roots of the city's jazz tradition, while looking into

the city's lesser known influences; like classical and opera music. With the assistance of historical maps and GIS software, we attempt to demonstrate the overall history of musical trends in the city of New Orleans. This concept is demonstrated in the historical music maps we have created. The maps show various locations of musical performance throughout the city of New Orleans, across its history. The locations are then categorized and given a genre classification. The same process has been used for each map we have produced. Included, are maps spanning form the beginnings of the city of New Orleans, to the present day. The genre classifications and locations of prominent music venues in the city of New Orleans over time, present a unique look at a complex musical culture.

Over There: Portage County in the Great War - (History)

By: Madeline Abbatacola, Emily Gostonczik, Lucas Jagodzinski, Charity Hentges, Caitlin Stathus
Faculty mentor(s): Sarah Scripps

Students in "Advanced Museum Studies" edited and designed an exhibit for the Portage County Historical Society (PCHS) to be installed at Heritage Park. The exhibit, Over There: World War I in Portage County, builds on the work of students from previous semesters by examining local contributions to the war effort of World War I. Students also designed and installed a window display in the Portage County Library promoting the World War I exhibition. By collaborating with members of PCHS, the students were able to execute the exhibit and help the community members of Portage County better understand the effects of the Great War on central Wisconsin.

Post-WWII Education in Germany: From Ruins to Riches while Covering up the Stiches - (History)

By: Zachary Rosado
Faculty mentor(s): Valerie Barske

In this research, I examine changes in the German education system post-WWII. In order to historicize the post-WWII era, I consider archival sources that depict the transition from the Third Reich to the Allied occupation. More specifically, I analyze images and media articles representing German youth in transition and how the "educational front" becomes a focus in the immediate postwar environment. While occupying Western Germany, the Allied powers seized an opportunity to "fix" German education using democratic principles. However, educational reforms failed to realize that the German educational problem related less to curricular issues and more to social concerns. I argue that the misunderstandings of the Allies in restructuring German education proved detrimental to the Allied occupation, which created a sense of confusion and frustration that resulted in a very different understanding of democratic education.

Remembering East Germany After Reunification - (History)

By: Vince Helgerson
Faculty mentor(s): Valerie Barske

In this research project, I examine East German nostalgia post-1990 in reunified Germany. From 1961 to 1989, East and West Germany developed separate cultural practices. After the fall of the Berlin Wall, the East was expected to seamlessly integrate

into Western culture, but many East Germans wanted to hold onto their own sense of culture. I challenge the idea that all East Germans were happy to integrate into West Germany. I argue that many East Germans felt that they were being forced to forget their past and embrace the West, which created a counter nostalgia for the East or "Ostalgie" to combat what they viewed as forced assimilation. I analyze music, film, and literature from East German artists such as the film *Good Bye, Lenin!* (2004) and the band Rammstein to discuss what cultural elements continue to be remembered in collective memory. This research highlights the perspective of East Germans as a lens for complicating standard narratives of German history.

Rethinking Hungarian Identity: A Response to Changes in Migration - (History)

By: Nicole Yedica
Faculty mentor(s): Valerie Barske

In this project, I examine what it means to be Hungarian and how expressions of nationalist identity shift due to changes in migration as well as increased globalization. In 1965, Hungarians fleeing Communism found themselves as refugees looking for assistance from other countries. In 2015, Hungary began building a fence on its southern border to keep out Syrian refugees. I argue that increased globalization and changes in migration have challenged the notion of "Hungarian" as a homogeneous identity. Backlash to this diversification includes attempts to limit population movements, defined in the new Hungarian nationality law of 2011 and Hungary's reaction to the refugee crisis, including increasing support for the "radical right-wing" political party Jobbik. Using critiques of neoliberalism and social identity theory, I analyze how media portrayals of Hungarian identity have changed in newspaper, television, and film.

Risk-Taking Beauty of the New Circus - (World Languages)

By: Sophia Wonser
Faculty mentor(s): Vera Klekovkina

In the New Circus, everything is possible; everything one imagines can become real. It is a world where art and dance, passion and perseverance intertwine to create a unique act of deeply personal and artistic expression. It is a worldwide community, which is endlessly creating, growing, and learning together through personal connections and social media, in studios and in circus tents, on the streets or in public parks. The New Circus is a place where pain lives alongside pride, and where every success overcomes fear; every challenge tests determination and heightens expression; every move displays the body's kinesthetic potential and its natural beauty. I will examine the transformation of the traditional, side-show aerial circus act into a creative unraveling of ideas, methods, and techniques – the New Circus – a global community which welcomes hybrid genres of dance, glorifies the artistic process and the creativity of performers, and values artists' prowess of an apparatus.

Shifting Cultural Identities, Separatist Ideals, and Contemporary Ramifications of a Fascist Past in Spain - (History)

By: Derek Lock
Faculty mentor(s): Valerie Barske

In this research, I analyze the past, current, and future ramifications of the Franco era on contemporary Spain. Under General Francisco Franco 1936-1975, this era is characterized by political turmoil, flourishing nationalism, and overt tones of fascist ideals. I examine how this regime shaped changing gender roles within Spain, promoted a strong anarchist resistance, and created a great divide in the Spanish sense of unity in terms of what it truly means to be a "Spanish nationalist." My research focuses on primary and secondary sources that examine the influential roles of women, anarchist ideologies, and civic initiatives, such as the Rosa Sensat institution, a movement led by anarchist women that empowered hundreds of teachers to rebel against Franco with pedagogical reforms. More specifically, I consider anarchist movements that continue to grapple with issues of neoliberalism, dictatorial nationalism, and positive embodied action against the exploitation of Spanish communities.

Spanish of the Caribbean: A Glimpse of the Gemination Process in Cartagena de Indias - (World Languages)

By: Carlui Pimentel
Faculty mentor(s): Michael Olsen

The documentation of Caribbean Spanish has revealed a broad range of linguistic phenomena, including gemination. This process is defined as the elongation of a phoneme within a word, in which two consecutive consonant sounds are pronounced as one. In Spanish, this can happen after the liquids /l/ or /r/ in syllable-final position (Delattre, 1971). Gemination has been documented in Spanish of the Caribbean; however, as far as I am aware, there are no studies thoroughly documenting gemination in Cartagena, Colombia. In this pilot study, I demonstrate the existence of Gemination in Cartagena. Using Praat, acoustic analysis software, an adult male Spanish speaker from Cartagena was recorded pronouncing a word list targeting the context for gemination. The analysis revealed a correlation between the environment in which liquids are present before plosive and nasal consonants and gemination, suggesting that a greater study of the Spanish of Cartagena within a Caribbean framework is needed.

Spatializing the Floating World - (History)

By: Quinn Swanson, Alan Bustamante
Faculty mentor(s): Taylor Easum, Tim Kennedy

This project aims to represent the "floating world", Ukiyo (a reference to the Buddhist ideologies of state of being in which people were encouraged to take advantage of worldly pleasures), spatially as well as use maps to highlight its pivotal role in post-Tokugawa Japan. By anchoring our research on nearby temples and shrines, we can bring Ukiyo into a larger analysis of space and politics, as well as religion and tourism. We are also interested in spatializing the developmental change in the Japanese city of Asakusa and its relation to Ukiyo life in contemporary tourism and spirituality. Using artworks, geographical studies, and maps we will spatially analyze the Ukiyo. One example of a

source that we will be incorporating into this is the book, Yoshiwara: The Glittering World of the Japanese Courtesan, by Cecilia Segawa Seigle. This book closely examines the pleasure houses of the Yoshiwara district during the Edo period, and as such connects very well to what we seek to research.

Stevens Point Food Markets - (History)

By: Mikaela Franson, Dan Krommenakker, Caitlin Stathus
Faculty mentor(s): Taylor Easum, Tim Kennedy

How have markets changed with the development of the city, and how have they shaped the city itself? What is the relationship between the city and its markets? Using three to four maps of Stevens Point, Wisconsin, we will pinpoint the fresh food markets that sold fruits, vegetables, and meats as the city grew in population. We will explore how the fresh food markets moved and how food deserts appeared/disappeared. The specific maps we will produce will showcase where these individual markets were located based on color coordinated identifiers (ex. Buildings marked with red are fresh meat, green are fresh vegetables, and fruits could be blue). We will also explore the fresh food markets in Stevens Point between the years of the late 1800s, World War Era (Pre- and Post-), and the 1970s/modern era to give a good scope with the maps we have available.

Strains of Segregation in Shanghai - (History)

By: Jesset Bernhagen, Brett Stoeger, Andrew Voss
Faculty mentor(s): Taylor Easum, Tim Kennedy

We will be creating one poster dealing with the connection between the concessions created after the Opium Wars, and how the concessions eventually created the segregation that is seen in today's Shanghai. The Opium wars will form the background to the later segregation of the city, with specific concessions established north of the Chinese walled city. Our goal will be to connect the locations of the concessions and the segregated areas in later years. Our poster should be something with two or three maps showing the concessions, the segregation that developed between western and Chinese sections of the city, and perhaps a final map comparing the historical period with Shanghai in the present. The poster will also include a descriptive history of how much the city has grown over the time period in question, how segregation has changed over time, and how this urban development compares to the larger phenomenon of segregation around the world.

The Commodification of Women in Southeast Asia: U.S. Occupation, Media Images, and the Vietnam Wars - (History)

By: Alexis Blaschke
Faculty mentor(s): Valerie Barske

For my research, I examine the U.S. occupation in Southeast Asia during the Vietnam War and how this presence spurred the sexual commodification of local women. A key primary source from UWSP's archives is the publication of The Vietnam Grunt (1968-1971) a recreational magazine for U.S. Soldiers serving in Vietnam. This publication highlights the fantasies and realities of the interactions between American military and local populations based on gender and race. My research weaves the past into

contemporary issues by considering media sources on the collective memory of women during the period of U.S. occupation as well as current media preferences through views of prostitution, beauty pageants, and idealizations of the female body. This study is critical to the way that women in Southeast Asia may engage in cultural change, and in what way female agency remains limited or at least structured by historical power dynamics.

The Desert Fox: Erwin Rommel, Strategies and Conspiracies - (History)

By: Quinn Quinn
Faculty mentor(s): Valerie Barske

This research project examines the career of Field Marshall Erwin Rommel (b. 1891) from the beginning of WWII to his untimely demise in 1944. I investigate the conspiracies that surround him in terms of betraying Adolf Hitler. I argue that Rommel was not actually against Hitler, but rather he was simply framed with an assassination attempt and Hitler had him killed. I use records of the battles that he participated in on the African front along with personal accounts of the soldiers who served under him. From the archives, I examine accounts by John MacVane, a radio announcer who covered Rommel's campaign in Africa, as well as newspaper articles and books that cover his military presence in WWII. I will also consider accounts from Rommel's son Manfred, a politician in Germany years after his father's death. My research seeks to challenge the American historical views on the Rommel myth by highlighting evidence that complicates the narratives of the past.

The Effects of Colorism in Latin America: Who is Black? - (History)

By: Carlui Pimentel-Aguilar
Faculty mentor(s): Valerie Barske

In this research project, I address the current racial difficulties that many Latinos of African descent face in society, due to the huge impact of "colorism" in Latin America and the Caribbean. Colorism fosters the belief that certain European features are regarded as "better" and more "acceptable." Since the existence of slavery in the Americas, colorism has been present, where lighter-skinned slaves were more valuable for slave owners and were given less arduous work to do, creating tensions among other slaves. Thus, many people have been ashamed of their origins, creating an aversion to "Afro" identities. Examining the problematic One Drop Rule in the U.S., I compare the different ways that other societies organize people racially. Finally, I analyze the various definitions of what "Black" is and how these ideas are negotiated among Latin American and Caribbean populations.

Tightening the Dress on Gender Embodiment in Japan - (History)

By: Alan Bustamante
Faculty mentor(s): Valerie Barske

This research unpacks the complex nature of gender in 20th Century Japan, including localized concepts of gender non-conforming identities. Beginning with the Meiji era (1868-1912), modern Japan witnessed a wave of change in national self, body, and

gender. Complex performances of personhood including the kabuki-based onnagata (men in women's roles), okama (effeminate gay man), x-jenda (x-gender) challenge eugenics projects that sought to produce a racially hygienic imperial nation in pre-WWII Japan. My research historicizes media representations of gender and Japan in sources such as the Literary Digest (1890-1938) and Scribner's Magazine (1887-1939). In contemporary Japan, I analyze gender expressions in the manga/anime Princess Jellyfish (2008/2010). My analysis includes a theoretical critique of neoliberal notions of marketing personal identities and how this aspect of gender problematizes public versus private assumptions in a global context.

Tragedy of the Violent Trade: Sex-Trafficking in El Salvador - (History)

By: Kerra Conrad
Faculty mentor(s): Valerie Barske

In this research project, I will consider the struggles that women in El Salvador face in terms of ongoing sex-trafficking by examining collective memory through cultural representations and theories of trauma. My research will be grounded in archival sources including official documents from the Hearings on the Committee of Foreign Affairs, Women's Association of El Salvador (AMES) Committee. In addition, I examine more broadly how confronting human rights issues from the 1990s to the present has enabled diverse responses to sex-trafficking. Additional sources that I will analyze include policy decisions including the Victims of Trafficking and Violence Protection Act (2000), court cases, and activist movements. In the end, this research seeks to understand more about human rights and anti-violence policies that are striving to improve the harsh realities of sex-trafficking intensified by both national policies and global neoliberal economic structures.

Urbanization of Beijing - (History)

By: Stacey Javier, Deanna Heinichen, Cassady Wyman
Faculty mentor(s): Taylor Easum, Tim Kennedy

The city of Beijing, the capital of China with a massive population of 21.5 million today, has a long history of construction and destruction, from after the Chinese defeat of the Mongols, to reconstruction during the Ming Dynasty, to the destruction of many traditional structures during the 1940s to make way for the modernization of China. One of Beijing's most notable features is the Forbidden City located in the center of the city. This was the Imperial palace where many Emperors resided and carried out the laws. Once the Cultural Revolution began Chairman Mao ordered these historical structures to be torn down. During the 1950's Beijing was transformed into a major industrial city causing a major population growth expanding the city outwards. This poster will use text and maps to show how Beijing was transformed after the decision to modernize and urbanize the country.

Utamaro and the Consumption of Women: Art History, Gender, and Early Modern Japan - (History)

By: Heather Carroll
Faculty mentor(s): Valerie Barske

In this research, I examine woodblock prints by Kitagawa Utamaro (ca. 1753-1806), a renowned artist in Japan's Edo Period (1603-1868). His best-known works focus on "beautiful women" or bijin-ga (images of beauties). Utamaro's prints also depict the complex everyday lives of courtesans in the licensed pleasure district of Yoshiwara in Edo. Through a discussion of the licensed quarters and the historical figure of Utamaro himself, I contextualize his prints in the historical context of early modern Japan. I analyze works such as Fudekashi-mono (The Inept One or The Bumbling Type). I employ primary source texts such as Onna daigaku (The Great Learning for Women) by Kaibara Ekkiken (1630-1714) to situate Utamaro's representation of women. Finally, I will add new theoretical frameworks from contemporary gender scholars to analyze further the role of male artists and scholars representing women as part of defining expectations for gender roles in early modern Japan.

Vietnam and Beyond: How Agent Orange Affects Cultural Ecosystems - (History)

By: Tracy Works
Faculty mentor(s): Valerie Barske

In this research, I evaluate the use of Agent Orange in Southeast Asia (1961-1972) and lasting effects on cultural ecosystems through the present-day. Agent Orange was the chemical herbicide used by the US during the Vietnam War to expose the enemy by destroying foliage. My research begins with archival materials that discuss the known side effects of this chemical in the 1960-70s. I also examine before/after photos of landscapes to show the immediate after effects. In addition, lingering side effects such as birth defects and cancer have already been demonstrated in research conducted by scientists and scholars. I argue that the use of Agent Orange in herbicidal warfare poses as an enormous threat to cultural ecosystems. I employ theoretical frameworks such as recent scholarly works on "compound trauma." My research brings awareness to the harmful effects of Agent Orange and lingering trans-national, trans-generational effects of herbicide warfare.

The Social and Behavioral Sciences

A Content Analysis of Cat Petfinder Profiles in Wisconsin - (Psychology)

By: Natalie Klusendorf
Faculty mentor(s): Jody Lewis

Thousands of rescue groups advertise animals online to promote adoptions. Petfinder contains profiles of over 200,000 animals from more than 13,000 rescue groups across the United States. The purpose of this study was to conduct a descriptive study examining feline Petfinder profiles. We saved Petfinder profiles from shelters in Wisconsin between

November and December 2016. We then conducted a content analysis examining the three main aspects of a pet profile, which included basic animal characteristics, a detailed description, and photos. We hypothesized that shelters will not significantly differ in the number of basic characteristics listed in shelter profiles. However, we hypothesized that shelters will differ in the number of words used in descriptions, the number of personality and behavioral adjectives used in descriptions, and the number of photos used in their pet profiles. This study will lay a foundation for future research regarding online adoptions and their efficacy.

An Assessment of the Diverse Roles, Strengths, and Challenges of Wisconsin School Social Workers in Rural and Urban Settings - (Sociology and Social Work)

By: Michael Topping
Faculty mentor(s): Jessica Bowers

In Wisconsin, school social workers are masters-prepared and must have a pupil services licenses through the Wisconsin Department of Public Instruction. As our districts have faced budget constraints and funding cuts, some districts have also experienced cuts to pupil services staff. In addition, the number of social workers in districts varies across the state, and their roles are diverse depending on district needs and demographics. The purpose of this research project is to survey Wisconsin school social workers to assess the differences in practice settings between urban and rural schools, roles, responsibilities, social worker/student ratios, adequate support and training, and overall job satisfaction. Our data will be collected through a qualtrics survey distributed to school social workers through the Wisconsin School Social Work Association (WSSWA). Data is currently being collected, and our poster presentation will represent the responses related to the factors listed above.

Commercials Past and Present: Examining Gender-Roles - (Sociology and Social Work)

By: Rilee Newell
Faculty mentor(s): Sue Bailey

This research examines whether there is a noticeable difference between the presence of gender roles in commercials from the past compared to today. Initial research displayed that gender stereotyping based on gender roles is still alive and well despite the overall changes in gender roles within our society (Koll, Eisend, Steinhagen, 2011). Gender stereotyping in advertisements could be harmful to our society; especially in the workplace. As an ever-changing society, it is important that we change our advertisement strategies to meet the needs of the population. By using content analyses and viewing commercials from the past and today, this research will be able to examine if the presence of gender-roles has increased or decreased overtime. Although there is a difference in today's commercials promoting gender-role-specific products than in the past, there was not as large of a difference as originally expected.

Is the Francis Effect Always Positive? How Self-Categorization, Religious Leadership, and the U.S. Presidential Election Influenced Catholics' Willingness to Act Sustainably - (Psychology)

By: Amber Edwards, Sarah Turner, Megan Patterson
Faculty mentor(s): Mark Ferguson

Past work has shown that Pope Francis' leadership on the environment is positively related to Catholics' support for sustainability. Our work examines whether this "Francis Effect" holds up in an experiment for Catholics induced to self-categorize as religious. Catholic participants were asked to list their similarities to religious or secular people. They then read a summary of the Pope's speech to the United Nations, which emphasized protecting the environment or reducing poverty. Afterwards, participants completed measures of willingness to act sustainably. Interestingly, we found significant three-way interactions. Participants in the secular-environment group reported more willingness to act sustainably after the election than before it, whereas participants in the religious-environment group reported less willingness to act sustainably after the election than before it. Our work suggests that the Francis Effect can be positive or negative depending on the social context.

Princesses and Pirates? An Examination of Children's Gender-Typed Clothing - (Psychology)

By: Laura Dickenson, Miranda Morrison, Samantha Shepard, Teresa Glodosky
Faculty mentor(s): Erica Weisgram

In the U.S., there is a vast number of gender-typed products marketed towards children and their parents. The aim of this study was to investigate gender-typing in children's clothing options that are labeled as "for boys" and "for girls" via a content analysis. We specifically examined tops marketed specifically as for boys or for girls from the websites of five popular children's clothing retailers. Photos of the first 25 tops listed in size 2T for each gender represented were taken from each website and were analyzed for various characteristics. The characteristics examined included color scheme, overall color, and the symbols represented on each top. Color scheme was either bold or pastel colors while overall color was the most predominant color portrayed on the shirt. Symbols were analyzed by 10 categories (e.g., superheroes, vehicles, animated/cartoon). Results indicates a moderate to high level of gender stereotyping in children's clothing.

The Central American Child Migrant Crisis: Its Origins in War and Violence - (Political Science)

By: Samantha Thiel
Faculty mentor(s): Jennifer Collins

Annually tens of thousands of Central American children cross into the United States from Mexico seeking refuge. My research discusses the causes behind the crisis. It examines the recent political history of El Salvador, Guatemala, and Honduras in order to explain how the conditions of violence propelling this migration came to be. I consider how the civil wars of the 1970s and 1980s disrupted the social and political fabric of these countries, contributing to impunity, weak institutions and rule of law, corruption,

and crime. Given that the majority of these children are fleeing situations of intense violence, this paper argues for the importance of recognizing and classifying them not as migrants but as refugees. Included are stories and experiences from journalist Sonia Nazario, who completed the terrifying journey taken by these children. It also discusses the future of this issue in light of the election of President Trump and his strict immigration policy proposals.

Validation of Exemplars of Emotions in Dance Choreography - (Psychology)

By: Emily Goonan, Marcus Kubichek, Hanna Rausch, Whitney Schroeder, Glorian Konieczny, Jessica Hanson
Faculty mentor(s): Amy Gervasio

The psychology of dance aesthetics is an emerging field that may have implications for understanding the representation of emotion through non-verbal behavior. Based on hypotheses in the literature, we choreographed six brief exemplars of the three universal emotions of sadness, happiness, and anger, as well as neutral movement. For example, sadness should be conveyed by slow, low to the ground movement with rounded shoulders. Happiness would be exemplified by lighter movement, jumps, and open arms. Anger should be sharp and angular, with forceful leg movement. Through an OSCAR grant, a professional videographer filmed the exemplars as performed by seven male and female dance majors. Over 40 versions of the stimuli are being used in a study to validate differences in the identification and intensity of emotion among male and female dancers and between solos and duets.

The Natural Sciences/Math and Computing

A 65-year Perspective on Age, Growth and Body Condition of Iowa Darter (Etheostoma exile) Populations from Across Wisconsin - (Biology)

By: Noah Daun, Justin Kowalski
Faculty mentor(s): Justin Sipiorski

We are constructing a dataset from all specimens of the Becker Memorial Ichthyology Collection (BMIC) (UW-Stevens Point College of Letters and Science Museum of Natural History) and the Milwaukee Public Museum Collection for the Iowa Darter (Etheostoma exile). Specimens have been collected from throughout the State of Wisconsin over the past 60 years. Our accessioning and cataloging is ongoing, and to date we have currently gathered data from over 500 specimens. For each specimen cataloged, we recorded total length (mm), preserved mass (g), and estimated age. Multiple regression analyses will be calculated to evaluate the relationships among location, time of year, latitude, length, and weight. The results will be compared to that of other, similar studies done with Iowa darters, most notability that of Gary Lutterbie, whose work included similar measurements to those we conducted, but on a small subset of individuals in the BMIC. We will see if the large data set affects trends in the measurements.

A Breast Cancer Gene (BRCA2) Mutation May Cause Increased Lung Cancer Susceptibility - (Biology)

By: Adrian Stameski
Faculty mentor(s): Diane Caporale

Lung cancer has two forms, Small-Cell (SCLC) and Non-Small Cell (NSCLC), commonly associated with cigarette smoke exposure. If it mutates both copies of a gene associated with the cell cycle, then cancer can result. However, if a person inherits one mutated copy from a parent, they would have a higher susceptibility to lung cancer. In a previous study on breast cancer (BC), a two-base deletion in one copy of a BC patient's Breast Cancer 2 (BRCA2) gene was found, which she inherited from one of her parents. Over 10 years later, a tissue biopsy of her left lung revealed the presence of aggressive SCLC. A portion of her lung cancer biopsy was obtained to determine if a mutation occurred in the other copy of her BRCA2 gene. DNA sequencing results revealed a mutation found in her BRCA2 gene that was different from her inherited form. This suggests that a gene typically known for causing breast cancer may also increase one's susceptibility to lung cancer.

Genotypes Associated with Phenotypes: A Human Genetics Laboratory Exercise - (Biology)

By: Emily Wojahn, Alyssa Pritchard
Faculty mentor(s): Diane Caporale

In humans, genes can have strong associations with certain traits. Previous studies show an APOA2 allele associated with weight gain when consuming saturated fats; a polymorphism near the NR2F2 gene associated with sneezing when first exposed to sunlight; a TENM2 allele associated with feeling rage when listening to someone chew; and alleles of the FGF21 and FTO genes are associated with a person's preference towards sweet or salty foods. As a new Human Genetics (Biol 312) lab, we designed allele-specific primers to amplify students' genotypes. PRIMER BLAST (NCBI) program was used to design primers and the Fisher Scientific primer design tool was used to determine the Tm compatibilities among the four primers needed for each assay. Primer conditions were optimized, then performed by students. Here we report the results of the class to demonstrate the success of the assays and to illustrate the genetic diversity of these genes in the class.

A Photomultiplier Tube Coupled to a Double Spectrometer for High Resolution Optical Spectroscopy - (Physics and Astronomy)

By: Matthew Lanke
Faculty mentor(s): Palash Banerjee

Atomic transitions involve the emission of electromagnetic radiation whose wavelength can be used to calculate the internal energy level structure of the atom. We describe an initial attempt to construct a high resolution spectrometer to measure the small spectral splitting between two closely spaced wavelengths. The spectrometer consists of two diffraction gratings and four mirrors coupled to a photomultiplier tube via a narrow aperture. The two gratings rotate simultaneously under the control of a stepper motor. The current resolution of the instrument is 0.4 nm at a wavelength of 600 nm which is

sufficient to resolve the sodium doublet. The photomultiplier tube can be operated in a single photon mode for improved resolution although diffraction effects at the exit aperture limit the resolution to 0.2 nm. We discuss possible future efforts at building a higher resolution spectrometer with the goal of observing small magnetic field induced shifts in the atomic energy levels.

A Survey of Adult Mosquitoes from the Glacial Lake Sand Plain - (Biology)

By: Ashley Otto
Faculty mentor(s): Jamee Hubbard

Wisconsin's many landscapes provide ideal habitat for many types of mosquitoes, and Wisconsin is home to over 56 species with varying life habitats. Mosquito surveillance primarily focuses on mosquitoes of medical and veterinary importance, thus few recent surveys have centered on differences in species based on habitat. For this research, mosquitoes were identified and tallied from four different habitats (urban, forested, cattail marsh, wetland stream), in Portage County, WI, which is situated in the Glacial Lake Wisconsin Sand Plain ecoregion. Well-drained sandy or water-holding wetland soils, woodlands, agricultural sites, cranberry bogs, and a variety of broad-leaf and conifer trees characterize this region. The data presented will provide insight into ecologically and medically important mosquitoes in Central Wisconsin, their ecological contributions, and the health of forests and waterways in which they live.

A Survey of Mosquitoes of Stevens Point, Wis., that Influence Public Health - (Biology)

By: Kathy Beadle, Matthew Duzell
Faculty mentor(s): Jamee Hubbard

Data acquired from mosquito surveillance is useful for monitoring the ecological and public health of an environment. Dr. Jamee Hubbard has been researching the mosquito ecology of Wisconsin, which gives insight into the mosquito species distribution within various Wisconsin habitats. To continue the data collection for her research, during the spring semester of 2017, we identified adult mosquitoes collected in July 2013 and compared our specimens with previously identified specimens from the 2013 collections. From the data, we identified three mosquitoes of interest - Ochlerotatus triseriatus, Ochlerotatus canadensis canadensis, and Coquillettidia perturbans - because of their differing life history traits and their potential as vectors of disease. We will discuss these mosquitoes' life histories, the role they play in disease transmission, and the pest management techniques used to control these different types of mosquito species.

Advance Reconnaissance for a Total Solar Eclipse - (Geography and Geology)

By: Jesse E. Jahn, John A. White
Faculty mentor(s): N. C. Heywood, Art Stevenson

We must precisely locate, and evaluate the viability of, nine Wyoming and Nebraska observation sites for an August 2017 eclipse. Astronomical data will consist of corona measurements at shadow path center and Bailey's Beads path edge timings. Biological

data will be audio-visual recordings of any transition between diurnal and nocturnal plants and animals during this rare mid-day darkening. We therefore must survey in advance the precise Global Positioning System (GPS) observer locations accurate to within 10 meters horizontally and vertically, using a Trimble Nomad receiver with ProXH antennae, during a May 2017 visit.

An Apparatus to Measure the Electrical Properties of Thin Semiconductor Films - (Physics and Astronomy)

By: Calvin Klesmith, Adam Opperman, Evan Yokers, Thomas Meronek
Faculty mentor(s): Palash Banerjee, Shannon Riha

Semiconducting thin films are often used to convert sunlight into electricity. The most popular material for these applications is silicon although newer materials with better optical and electrical properties are also being explored. We describe an apparatus to measure the electrical properties of metal-organic thin films for their potential use in solar cell applications. The apparatus is based on the Hall effect in which charge carriers experience a force in the presence of a magnetic field which leads to a potential difference across the thin film. By measuring this potential difference as a function of electric current and magnetic field, several important electrical properties of the film can be obtained. These properties include the resistivity, charge carrier density and mobility. Our apparatus is calibrated against a standard semiconductor sample and then used to measure the charge carrier density in a metal organic thin film sample.

Analysis of CuSbS2 Nanoparticle Inks for Their Use in Thin Film Solar Panels - (Chemistry)

By: Thomas Meronek, Evan Yokers, Michelle Kienow, Isabella Weekly
Faculty mentor(s): Shannon Riha

Nanoparticle inks — colloidal solutions containing nanometer sized particles suspended in a solvent — are used in many technologically-relevant applications, including revolutionizing the solar energy market. Here we take a closer look at the use of CuSbS2 nanoparticle inks in thin and flexible solar panels given the material's ability to absorb sunlight, its elemental abundance, and non-toxicity. Nanoparticles inks were prepared using long chain organic molecules that prevent the nanoparticles from forming a bulk solid. After preparing the CuSbS2 inks, thin films were made by spin-casting, drop-casting, or dip-coating. The films were subsequently characterized by X-ray diffraction, scanning electron microscopy, and UV-vis spectroscopy. Finally, post-deposition methods were explored to replace or completely remove the long-chain organic molecules from the CuSbS2 thin films in an effort to improve their electronic performance.

Antimicrobial Properties of the Oil and Husk Extracts from Hazelnut (Corylus avellana) - (Biology)

By: Gontkovic Anna, Sophie Moll
Faculty mentor(s): Terese Barta, Michael Demchik

The goal of this project is to investigate the antimicrobial properties of oil and husk extracts from hazelnut (*Corylus avellana*). The oil and husk extracts were tested against

the bacteria *Escherichia coli* and *Staphylococcus aureus* using the disk diffusion assay on Mueller Hinton medium. Oil was mixed 1:1 with 10% dimethyl sulfoxide (DMSO) and 0.5% Tween 80 to increase solubility. Antimicrobial assays were also performed by placing the oil or husk extract into a well of Mueller Hinton medium into which bacteria were suspended. Although the oil did not show inhibition greater than the DMSO controls, zones of inhibition were observed with the husk extracts. The potential antimicrobial properties of husk extracts could provide growers with a use for hazelnut crop residues.

Black Spot Parasitism of Luxilus cornutus (Cyprinidae: Actinopterygii) in Wisconsin: A Statewide, 65-year Perspective - (Biology)

By: Andrew Zabel, Richard Mahoney, Erik Halverson
Faculty mentor(s): Justin Sipiorski, Todd Huspeni

We are constructing a dataset comprising all specimens of the Becker Memorial Ichthyology Collection (BMIC) for the Common Shiner (Luxilus cornutus). Specimens have been collected from throughout the State over the past 65 years. Our accessioning and cataloging is ongoing, and to date we have currently gathered data from over 15,000 specimens. This represents approximately 40% of the total individuals in this collection. For each specimen, we recorded total length, preserved mass, gonad mass and estimated age. We also recorded the number of individual Black Spot parasites (metacercariae of Uvilifer ambloplites) on the left side of specimens. Prevalence (% individuals with at least one parasite) varied across populations from 100% to 25%. Considering similar size classes and sample sizes, average intensities (average number of parasites on the left side of infested individuals) varied from 0 to 213. Separate analyses were conducted for each sex for individuals ranging from 30 – 80 mm.

Characterization of Disulfide Linkages in a Sustainable Thermoset- (Chemistry)

By: Luis A. Camacho III
Faculty mentor(s): John P. Droske

Thermosets, such as phenol-formaldehye or epoxy plastics, are commonly used polymeric materials. They are high strength, insoluble materials that generally have long lifetimes and high softening temperatures. Because of these physical properties, thermosets are difficult to recycle. Our group has prepared a class of “sustainable” thermoset materials that can be broken down at end-of-life via hydrolysis. Elucidation of the proposed thiol to disulfide crosslinking reactions in these thermosets is of particular interest. However, due to poor solubility of the cured resins, characterization methods are limited. This poster will present spectroscopic and other methods we have used to gain better understanding of the crosslinking reactions in these resins.

Chemically-Uniform Dilatant Materials - (Chemistry)

By: Brian M. Karl
Faculty mentor(s): John P. Droske

Dilatant materials exhibit non-Newtonian fluid properties that are dependent upon shear rate. These materials typically are soft and flexible but harden upon impact. They are of

particular interest due to their potential use in body armor and protective sports equipment. Few dilatant materials have been reported and they usually are two component systems such as cornstarch and water, polyethylene glycol with nanosilicates, or polydimethylsiloxanes in castol oil derivatives (e.g., Silly Putty). This poster will report the synthesis of resins prepared in our lab that exhibit single chemical component dilatant properties. These resins show varying degrees of dilatancy depending on the composition and structure of the resins. Preliminary characterization of the dilatant properties also will be presented.

Comparing Diatom Communities of the Plover River via Gut Content Analysis of the Central Stoneroller (Campostoma anomalum) - (Biology)

By: Markie Rodgers, Caysha Fleischman, Milo Whitenack
Faculty mentor(s): Justin Sipiorski, Krista Slemmons

Wisconsin waterways have experienced environmental change over the last 50 years due to climate and land use influences. Using specimens from the Becker Memorial Ichthyological Collection, we assess this ecological change over time by examining the gut contents, specifically diatoms, from stonerollers collected from the Plover River. Diatoms are important ecological indicators as they respond to environmental or land use changes relatively quickly compared to other species. We outline a novel method to extract and examine gut contents from stonerollers to assay for potential aquatic community change. Fish guts from 1967, 1989, 1990 were examined via scanning electron microscopy. Preliminary results indicate differences in diatom species richness and community turnover among the sampled times. Shifts in primary producers have important implications for food web dynamics and food quality for fish and wildlife and may influence the structure and function of these aquatic ecosystems.

Comparing Tax Revenue Over Time and Residential Revenue Generation of Parcels in Portage County - (Geography and Geology)

By: Yoon Bin Bae
Faculty mentor(s): Christine Koeller, Ismaila Odogba

Studies show that per capita cost of goods and services increases as population density decreases, leading to costlier rural suburbs compared to denser urban areas(Puget Sound Regional Council 2005). A 3-D display of tax parcel revenue per acre generated in Portage County over three time periods (2001, 2007, 2015), provides a spatial perspective to countywide development trends of urban sprawl. Parcel revenue (per acre) in Stevens Point generated by single-family developments were compared between alderman districts to determine if revenue differences exist between city center and rural areas. Results show district revenues differ significantly ($p=0.05$) between the city center and rural areas. The results of this study can be used to efficiently shape the future of land use development in the City of Stevens Point and Portage County.

Crevice Orientation and Retreat-Site Choice in Lizards - (Biology)

By: Mitchell Shallwani
Faculty mentor(s): Pete Zani

Crevice selection is a significant factor in many organisms' ecology as it influences an organism's interaction with biotic (predators, territoriality) and abiotic (temperature) environments. Recording use of crevices by side-blotched lizards within a controlled environment allows for deeper understanding of crevice selection in relation to crevice orientation. Photos were analyzed for emergence and retreat events into established vertical and horizontal crevices. We hypothesized that vertical crevices would be preferentially selected by the lizard population. We found that males preferentially selected for vertical crevices, however females didn't prefer either horizontal or vertical crevices. As such, males may be experiencing unknown factors influencing their behavior like interspecific male-male competition. Further understanding of crevice selection may yield future discoveries of behavioral differences between sexes.

Development of a Case Study Examining the Diagnosis of Amyotrophic Lateral Sclerosis (ALS) - (Biology)

By: Kelly Liss
Faculty mentor(s): Krista Slemmons

ALS (Amyotrophic Lateral Sclerosis) is a motor neuron disease that affects the cells responsible for relaying messages from the brain to the body. Not much is known about the causes or treatments for ALS, and what is known is based on relatively small, short-term scientific studies. There are no known causes, cures or treatments for ALS and diagnosis proves to be difficult. ALS is a disease that effects the cells in the motor neuron region and the signs and symptoms of ALS resemble a multitude of different diseases. Consequently, ALS is considered a rare disease and is often misdiagnosed. We created a case study to be used at multiple levels of a biological education to introduce students to this disease, the diagnosis and potential treatment. Integrating a case study on ALS into class material is not only a creative way to introduce course content, but it can also help connect course content to real life situations.

Effect of CCL2 on Ovarian Histology and Follicular Populations - (Biology)

By: Cali Hagen, Amarra Zehms, Amarpreet Brar
Faculty mentor(s): Karin Bodensteiner

Chemokine ligand 2 (CCL2) mediates inflammatory processes and may act as a neuroendocrine modulator. Mice transgenic for CCL2 under the control of the human glial fibrillary acidic protein (GFAP) promoter overexpress CCL2 in astrocytes and develop encephalopathy with impaired blood brain barrier function. GFAP is also expressed in hypothalamic cells, suggesting a possible influence of this transgene on reproductive function. To examine reproductive parameters in female mice transgenic for CCL2, experimenters blind to genotype examined ovarian histology and follicular populations of transgenic (n = 6) and non-transgenic mice (n = 8). Tissue fixed in 10% neutral buffered formalin (SARL Scientific, Kalamazoo, MI) was embedded in paraffin, serially sectioned at 5-8 µm, and stained with Hematoxylin and Eosin. Preliminary

findings suggest that while there may be histological differences between transgenic and non-transgenic females, populations of small follicles do not differ.

Effects of Alcohol on Behavior and Metabolites in a Transgenic Mouse Model - (Biology)

By: Rachel Smith, Samantha Wilson, Calvin Berndt, Peter Schumann, Brandon Simonis
Faculty mentor(s): Jennifer Bray

Alcohol impairs memory formation by activating the brain's immune response and altering the levels of neuroinflammatory factors in the brain. One important factor that is altered by alcohol is the chemokine CCL2.Increased CCL2 levels are observed in the hippocampus of human alcoholics, a brain region that plays a vital role in learning and memory formation. To assess whether elevated levels of CCL2 affect the actions of alcohol, CCL2-tg mice that overexpress CCL2 underwent both the Barnes maze and Y-maze. These tests rely on the functioning of the hippocampus and determined if the actions of alcohol on hippocampal functioning are affected by elevated levels of CCL2. The signaling cascade initiated by CCL2 is currently unknown. Elucidation of the pathway is possible through Q-TOF LC/MS. Using this technique hippocampal metabolites we can compare the fingerprint of non-tg mice with that of CCL2-tg mice to identify dysregulated metabolites in the absence and presence of alcohol.

Elliptical Galaxies in Different Environments - Isolated Versus Group Environment - (Physics and Astronomy)

By: Sarah Parker
Faculty mentor(s): Adriana Durbala

We explore the properties of elliptical galaxies in different environments (isolated galaxies versus crowded environments, i.e., groups with 4-10 galaxy members). Using a Fortran code (BUDDA – Bulge Disk Decomposition Analysis), we model the photometric parameters that describe each elliptical galaxy in terms of size and light profile. We then compare the derived model-dependent measures between the two samples of galaxies to test if they are statistically different, which would hint at gravitational influences of the neighbors. This process would allow us to gain more insight into the formation and evolution of elliptical galaxies.

Energetic Manipulation and Activity Patterns in Side-Blotched Lizards - (Biology)

By: Mara Hathaway, Ben Milzer, Jessica Corning, Chun Huai Luo, Caleb Fleischman
Faculty mentor(s): Pete Zani

We tested whether storage molecules, lipids and glycogen, impact the overwintering survival of ectotherms via dietary manipulation of common side-blotched lizards. Animals were split into low-and high-calorie feeding groups, which were implemented in fall once animals had switched from growth to storage. We performed lipid and glycogen assays on sacrificed animals to ascertain the energy concentration and verify that our treatment groups had been established. Both the lipid and glycogen results were used to conclude whether dietary manipulation resulted in animals that entered winter with

higher or lower energy storage. In addition, we tested the treatment groups by releasing animals to semi-natural enclosures. Data were collected on emergence to determine if activity would be altered by the manipulated diets. These data should reveal the impact of pre-winter dormancy diets of ectotherms on their winter survival and activity.

Exploring "Nature Versus Nurture" in a Fourier Photometric Analysis of Spiral Arms in Early-Type Spiral Galaxies - (Physics and Astronomy)

By: Logan Hess
Faculty mentor(s): Adriana Durbala

For this project, we explore the properties of the spiral arms in disk galaxies as a function of environmental density. Two samples of spiral galaxies of morphological classification S0a/Sa/Sab (aka "early-type spiral galaxies," galaxies with large bulges and tightly wound spiral arms) are considered. These galaxies are drawn from two populations found in vastly different environments: isolated versus loose groups of 4-10 members. We measure and model the spiral arms' properties using Fourier photometric decomposition/analysis. We investigate the effect environmental density has on the formation and evolution of early-type spiral galaxies.

Exploring the Utility of Halogen Bonding in the Creation of Abiotic Helices - (Chemistry)

By: Ashley Schneider
Faculty mentor(s): Nathan Bowling

The purpose of this project is to investigate the use of halogen bonding in the formation of abiotic, unsaturated helices with the combined goals of creating novel supramolecular structures and expanding the utility of halogen bond interactions in solution. Fundamentally, the objective is to see if intramolecular halogen bonding, in concert with strong π-π stacking attractions, can provide a driving force for helix formation. The compounds of interest can be derived from commercially available 3-bromo-4-iodobenzoic acid through esterification and several Sonogashira Coupling and terminal acetylene deprotection reactions. Appending a fluorinated haloarene on the end of the arylene ethynylene structure via coupling with 1,2-iodo-3,4,5,6-fluorobenzene provides the greatest possibility of intramolecular halogen bonding.

Field Analysis of the Midwest Gravity Anomaly - (Geography and Geology)

By: Robert Sorgel, John White
Faculty mentor(s): Kevin Hefferan, Keith Rice, Lisa Theo, Neil Heywood

Differences in crustal density are responsible for variations in gravity. The Midcontinent Rift basin is composed primarily of high-density basalt and gabbro. The Wolf River Igneous Batholith Complex is composed of lower-density granitic rock. We used a Lacoste & Romberg model G gravimeter to take relative gravity measurements along two traverses: 1. a 60-mile cross section of the Midcontinent Rift in Iowa; and 2. in the Portage County portion of the Wolf River Granite Batholith in Wisconsin. We adjusted our results to an absolute gravity base station and applied several corrections that allowed us to obtain absolute gravity measurements. We used a Trimble Nomad GPS receiver

with a ProXH antennae to record the exact latitude, longitude, and elevation coordinates of our measurements. We created gravity maps of each study site based on the corrected absolute gravity measurements and onsite locations. Our data confirmed the role that variations in crustal density play on gravity.

Homing Patterns Related to Hibernacula in Side-Blotched Lizards - (Biology)

By: Aaron Kopydlowski
Faculty mentor(s): Pete Zani

For winter, many species seek out a hibernaculum outside of their home range to survive the severe cold. Side-blotched lizards gather at a protective hibernaculum during fall for the entirety of the winter months. The summer home range of these lizards is vacated to return to these sites, which suggests an extension of homing behavior. With three hibernacula within a 150-meter span, we predicted that the majority of lizards will return to their original hibernaculum after being displaced. Photos were taken hourly at each hibernaculum and scored based on which marked lizard appeared at any one hibernaculum after displacement of 40 or 90 meters, which is thought to be within the homing distance for most lizards. Side-blotched lizards appear to seek protection from their original hibernaculum rather than remain at a hibernaculum unknown to them. For this species, homing back to a specific hibernaculum may play an important role in the overwintering routine to survive the harsh weather.

Identification of Compounds in Atmospheric Fine Particulate Matter (PM2.5) Collected During Prescribed Burns by Gas Chromatography/Mass Spectroscopy (GC/MS) - (Chemistry)

By: Christian Krause, Wyatt Beyers
Faculty mentor(s): Dave Snyder

Samples of fine particle air pollution (PM2.5) were collected using a personal exposure sampler during controlled burns conducted by the UWSP Fire Crew at Treehaven. These samples were extracted using Soxhlet extraction and analyzed via gas chromatography/mass spectroscopy (GC/MS) in order to identify air toxics and molecular markers of biomass combustion. Numerous compounds were identified via the NIST Mass Spectral Library, including fatty acids commonly found in plants. Confirmation of the presence of these compounds in samples was accomplished by running standard solutions on the GC/MS and comparing retention times and mass spectra. The presence of free fatty acids in the GC/MS data was unexpected as their low volatility typically make them difficult to analyze via GC without derivitization.

Identification of Endophytic Fungi From the Liverwort Conocephalum Conicum - (Biology)

By: Caleb Fleischman
Faculty mentor(s): Terese Barta

Endophytes are microbes that live within a host plant and are thought to influence plant growth and ability to adapt to stress. Some bryophytes (simple plants including liverworts

and mosses) have been shown to have medicinal properties and their endophytes may contribute to their medicinal nature. The purpose of this study was to perform antimicrobial assays of thirteen endophytic fungi isolated from the liverwort *Conocephalum conicum*. Fungi were grown in potato dextrose broth for two weeks. The supernatants were added to wells in agar media into which test bacteria were embedded. Sterile potato dextrose broth was used as a control. Six fungi produced zones of inhibition, indicating antimicrobial substances. To identify the fungi, DNA was isolated in order to amplify the interspatial region of the small subunit rRNA gene. DNA is being sequenced and will be analyzed using the Geneious Program and BLAST to compare sequences to those of known organisms present in the database.

Intramolecular Halogen Bonding and Non-Conventional Hydrogen Bonding in Arylene Ethynylene Oligomers - (Chemistry)

By: Zachary Kehoe
Faculty mentor(s): Nathan Bowling

Intermolecular attractions between two parts within an arylene ethynylene molecule are of interest to our research, specifically with respect to electronic properties that can be monitored via UV-vis spectroscopy. Each system in this study was designed around a pyrazine free-rotor placed between two groups that might restrict rotation of the central benzene ring via halogen or hydrogen bonding. Compound A, an intermediate in the synthesis of B and C, exhibits interesting electronic properties when analyzed using UV-vis spectroscopy due to conventional hydrogen bonding. This compound displays differing λmaxshifts depending on solvent choice. Compound B is expected to demonstrate similar λmax shifting behavior due to halogen bonding between the electropositive region of X and the electron dense nitrogen on the pyrazine.

Intramolecular Halogen Bonding of 2,1,3-Benzothiadiazole Containing Molecules - (Chemistry)

By: Lucas Mancheski
Faculty mentor(s): Nathan Bowling

Previous studies have shown that intramolecular halogen bonding within highly conjugated systems can provide a bathochromic, or red shift, of the UV-vis spectrum, potentially indicating enhanced conjugation in systems where rotation is restricted by halogen bonding. This study looked into the possibility of moving the electronic spectra more into the visible region with the introduction of 2,1,3-benzothiadiazole as a bridging unit between two pendant rings; one ring containing iodine and the other a pyridine. As with prior systems, the position of the pendant aromatic rings creates an opportunity for intramolecular halogen bonding. The potential for changing the effective conjugation around the benzothiadiazole bridge might provide an avenue for visible, halogen bond-induced color changes. A similar structure was also constructed using hydrogen in place of the iodine to utilize unconventional hydrogen bonding for this purpose.

Is it Getting Tight in Here? A Study on Hibernaculum Choice of Side-Blotched Lizards (Uta stansburiana) - (Biology)

By: Alex Thomas, Abigail Pendergast
Faculty mentor(s): Peter Zani

In ectotherm prey species it is unclear what is the dominant factor influencing overwinter site selection. Temperature is often cited as a dominant factor for overwinter site selection but less is known of the role of spatial cues. To identify the role of spatial cues and to quantify what cues have an influence on site selection, side-blotched lizards were placed in artificial hibernacula in the field. Each crevice entrance lead into a shallow or deep crevice, which varied by both crevice height and width of the entrance. This created eight crevice options for lizard choice, with factors for width of entrance, crevice depth, and crevice height. Lizards were placed in the hibernacula in late fall and allowed to overwinter. Using camera traps, photos were taken on the hour and lizard position was compiled to determine crevice usage. Usage of each crevice was then analyzed using ANOVA to determine preference of each of the varying factors.

Isotopic Signatures and Diatom Community Change in Swedish Lakes - (Biology)

By: Jennifer Schimanski, Daniel Soderlund
Faculty mentor(s): Krista Slemmons

Globally atmospheric nitrogen has increased dramatically in the last 150 years, and while the effects of other nutrients on lakes are well known, the ecological impact of atmospheric nitrogen over time is still uncertain. Increases in nitrogen have been associated with rapid transformations in primary producers, particularly in high latitude regions. Due to the environmental sensitivity of diatoms, lake sediments can provide clues as to past conditions and offer predictions for future climate regimes. We observed fossil diatoms from Swedish lakes along a nitrogen gradient to determine the effect of nitrogen on lakes. We quantified species diversity, community turnover and nitrogen isotope concentrations to determine if diatom communities shifts correlate with isotopic change. These results may provide insight into the trajectory in which lake communities may proceed under a changing environment and may be applicable to other freshwater ecosystems experiencing nutrient shifts.

Measuring the Quantum Tunneling of Electrons Across a Small Gap - (Physics and Astronomy)

By: Alex Holmes
Faculty mentor(s): Palash Banerjee

When the gap between two metallic electrodes becomes small enough, the probability that electrons will tunnel from one electrode to the other may become non-negligible and result in a measurable tunneling current. We report on the construction and working of an apparatus to measure this tunneling current between a sharp metallic tip and an atomically flat graphite surface. Tunneling currents in the range of 10 pA to 10 nA are measured when the gap between the tip and the surface is 2 nanometers or less. Important features of our apparatus include the ability to change the gap in sub-nm steps and the use of an ultra low noise current amplifier. The tunneling current increases exponentially as

the gap decreases and exhibits non-linear behavior as a function of bias voltage between the tip and the surface. We analyze these results using the quantum mechanical theory of tunneling through a one dimensional barrier and find the experimental results consistent with our theoretical model.

Mechanistic Studies of Linker Exchange in a Metal-Organic Framework - (Chemistry)

By: Dominion Fredericks, Ross Petersen
Faculty mentor(s): Joseph Mondloch

Porous solid-state materials are ubiquitous in everyday society. Unfortunately the rational design of porous solid-state materials is often fraught with challenges. Metal–organic frameworks are an emerging class of porous solid-state materials built up from inorganic (metal-containing) nodes and organic linkers. Using a synthetic strategy termed solvent-assisted linker exchange we found that the linker 4-Br-imidazolate can be incorporated into a Zn-imidazolate based metal-organic framework. Kinetic studies conducted via proton NMR spectroscopy offer mechanistic insights into the role that the identity of the linker plays in solvent-assisted linker exchange. Mechanistic studies are expected to provide insights into the rational design of new and improved porous solid-state materials.

Modeling Dynamics in the D-Amino Acid Oxidase Protein - (Chemistry)

By: Lauren Kueffer, Wyatt Beyers
Faculty mentor(s): Amanda Jonsson

In human brains the enzyme D-amino acid oxidase (hDAAO) is involved in the degradation of the signaling molecule D-serine. The deregulation of D-serine has been linked to schizophrenia susceptibility and certain mutations in the hDAAO enzyme itself are associated with familial amyotrophic lateral sclerosis (ALS). We compare apo-enzyme simulations to FAD bound simulations of the wild-type hDAAO enzyme, a wild-type pig kidney D-amino acid oxidase enzyme (pkDAAO), and two mutant hDAAO enzymes (D31H and R279A). Even though there is 85% sequence identity between the two species, hDAAO binds FAD weaker and shows a slower rate of flavin reduction compared to pkDAAO. The D31H and R279A mutations increase the enzyme's binding affinity for FAD. We use molecular dynamic simulations to study how the protein structure changes over time to help determine how each mutation can have different effects on enzyme stability or activity.

Modeling Fluid Flow using Lattice Gas Cellular Automata - (Physics and Astronomy)

By: Eddy Doering
Faculty mentor(s): Brad Hinaus

Physics based modeling of the flow of fluid-like particles has been computationally programed for some time now. We use the computational method of Lattice Gas Cellular Automata (LGCA) to calculate the flow of fluid particles through a tube. In LGCA, discrete fluid particles flow through a series of nodes. When particles collide at a node, their final state is determined by a simple set of rules that conserve both momentum and

energy. We then repeatedly apply these collision rules to simulate fluid flow patterns through and around various obstacles. We will compare our output to known results of velocity profiles.

Nitrogen Isotopic Signatures in Lakes Within the Great Lakes Basin: Implications for Diatom Community Change - (Biology)

By: Markie Rodgers
Faculty mentor(s): Krista Slemmons

Atmospheric deposition of nitrogen is the primary source for nitrogen for many lakes within the Northern Great Lakes regions. Over time, an increase in nitrogen can elicit stark changes in primary producers, particularly diatom communities, and can push these communities across an ecological threshold. This is apparent in regions where elevated levels of nitrogen are associated with ecological shifts.We examined sediment cores from Wisconsin Lakes as well as Michipicoten Island Lakes in Lake Superior, Canada, along a nitrogen gradient to identify temporal shifts in diatom communities. We conducted nitrogen isotopic analysis to determine ifdN signatures were correlated with diatom community change. We present our preliminary findings from Crampton and Michi Lakes. These results have direct implications to the wise management of the water resources on which we depend and can lend suggestions to the establishment of critical nitrogen thresholds to diminish ecological change.

Phase I: Mesoamerican Freshwater Mussels (Bivalvia: Unionidae) - (Biology)

By: Elena Hausmann
Faculty mentor(s): Daniel Graf

The freshwater mussels of Mexico and Central America have not been revised in almost 100 years, and as a result patterns of species richness in the region are poorly understood. The objective of this project is to document freshwater mussel species diversity in the region based on museum specimens. Specimen records were obtained from 17 major museum collections in North America and Europe. The current analysis is limited to Mexico and adjacent Guatemala. All records were digitally photographed, a preliminary identification was attempted, and specimens were georeferenced as precisely as possible based on original locality data. Each record was also assigned to an ecoregion (when possible). To-date, 963 records have been georeferenced from 17 ecoregions; 78 species are represented. Sixty-one species (78%) are endemic to 1 or 2 ecoregions. These data will be used as the basis for conservation assessments and a modern revision of the Mesoamerican freshwater mussels.

Reptilian Behavior in the Trainer Natural Resources Vivarium at the University of Wisconsin-Stevens Point - (Biology)

By: Jillian Demus, Grant Waala
Faculty mentor(s): Jaimie Klemish

The UW-Stevens Point Vivarium offers habitat variability for the coexistence of five reptilian species: Chinese water dragon (Physignathus cocincinus), green iguana (Iguana iguana), ornate box turtle (Terrapene ornate), three-toed box turtles (Terrapene carolina

triunguis), and red-eared slider (Trachemys scripta). The vivarium provides students an excellent opportunity to study the behavior, relationships, and microhabitats that may be preferred by the animals. We recorded the location, microhabitat and behavior for each reptile at every hour from 8 am to 5 pm Monday through Friday for over two months. From the information gathered, we can conclude behaviors, social interactions, abiotic and biotic relationships, and microhabitat preferences at different times of the day. This will give a better understanding of how these animals utilize their environment in captivity and provide information about caring for each species.

Seasonal Variation in River Otter (Lontra canadensis) Diet in Sandhill Wildlife Area of Central Wisconsin - (Biology)

By: Cole Walli
Faculty mentor(s): Justin Sipiorski

River Otters are a keystone predator in North American aquatic ecosystems, and understanding their diet is crucial to measuring their season-to-season impact in the surrounding community. River Otter scat was collected approximately once per month from 2014 to 2016 from Sandhill Wildlife Area in southern Wood County, Wisconsin. Scat was processed to assess seasonal variation in river otter fish consumption. We counted cleithra (the major bone in the pectoral girdle of fish) from feces and used a recently published guide on cleithra to identify fish remains to species. Analysis of 83 scat samples shows Salmo trutta composing the largest portion (37.48%) of river otter diet, while Umbra limi (30.83%) and Lepomis gibbosus (21.12%) were second and third largest contributors. The presence of Salmo trutta in the scat samples suggests either larger-than-anticipated Otter ranges or currently undocumented trout populations in closer proximity to Sandhill Wildlife Area than previously found.

Simple Method for Determining Oxidation States of Transition Metal Centers - (Chemistry)

By: Mary Heili
Faculty mentor(s): Jason D'Acchioli, Erin Speetzen

A simple method will be presented for determining the oxidation states (if such a thing exists) of transition metal centers using Natural Bond Orbital (NBO) theory. The results of both "straightforward" (transition metals with strong σ-donor halide ligands) and "ambiguous" (transition metals with strong π-acid ligands) cases will be shown. Initial results for metal-metal multiply bonded systems will be presented, with an eye towards looking at mixed-valency and electronic coupling.

Solvent Effects of Linker Exchange in a Metal-Organic Framework - (Chemistry)

By: Austin Schlechta
Faculty mentor(s): Joseph Mondloch

Porous solid-state materials are ubiquitous in everyday society. Unfortunately the rational design of these materials is often fraught with challenges. Metal-organic frameworks are an emerging class of porous solid-state materials built up from inorganic (metal-containing) nodes and organic linkers. Using a Zn-imidazolate based metal-organic

framework, the mechanism of a synthetic strategy termed solvent-assisted linker exchange was studied using proton NMR spectroscopy. By varying the identity of the solvent we have extracted quantitative mechanistic information regarding the role that solvent plays in this process. Mechanistic studies are expected to provide insights into the rational design of new and improved porous solid-state materials.

Spatial Vascular Occlusions and Pathogen Distribution in Cabernet Sauvignon Vines Infected with Pierce's Disease - (Biology)

By: Bailey Boudreau, Matthew Whitley
Faculty mentor(s): Qiang Sun

Understanding the spatial vascular occlusion and pathogen distribution in grapevines infected with Pierce's disease (PD) is essential to reveal vine's PD susceptibility mechanism. This current study focused on vascular occlusion in symptomatic Cabernet Sauvignon vines inoculated with ΔEngXCA1, a mutant of the PD causal pathogen. Our results have indicated that vascular occlusion may partially or completely occlude vessels. Vascular occlusion occurred throughout infected vines.The percentage of vessels with occlusions was progressively lower with increasing distance upward a vine from the inoculation site, ranging from 52% to 27%. At any internodes investigated, at least 66% of all the vessels with occlusions were fully occluded. This information will be combined with the information of the spatial pathogen distribution in the vines to determine any possible functional roles of the vascular occlusion in the disease susceptibility of grapevines.

The Effects of Vocal Stimulation on Fear and Anxiety Brain Regions of the Zebra Finch - (Biology)

By: Mikayla Schaalma
Faculty mentor(s): Sarah Jane Alger

Isolation and separation create fear and anxiety in pair bonded species. During separation, the amygdala (a brain region linked to fear) usually signals a lot due to the animal being afraid. Little is known about what occurs in the brain of an isolated pair bonded animal responding to recorded calls of different partners. If the animal hears a current partner's call, it may relax and the amygdala may signal less. If it hears a past partner's call, the amygdala may signal more due to anxiety. If it hears a stranger's call, the amygdala may signal a lot due to uncertainty. We exposed isolated zebra finches, monogamous songbirds, to either the recorded calls of their current partner, past partner, or stranger to see the brain reaction to the call. I indirectly measured brain activity through the staining of the immediate early gene, ZENK, in the amygdala. I will discuss the patterns of neuronal activation in the amygdala in response to recordings of different partners.

The Effects of Vocal Stimulation on Zebra Finch Sexual Behavior Brain Regions - (Biology)

By: Mackenzie Davidson
Faculty mentor(s): Sarah Jane Alger

Pair bonding is important to the success of many social species, including our own. The exposure of a monogamous animal to its mate activates many neural circuits associated

with regions of the brain that are involved in social activity and sexual arousal. There is not a lot known about how the brain of a pair bonded animal reacts while hearing its partner's signal or a previous partner's signal. We exposed zebra finches (a monogamous songbird species) to recordings of calls of their previous partners, current partners, or strangers and indirectly measured brain activity through the staining of the immediate early gene, ZENK. I measured the number of ZENK-labeled cells in the POM and VMH which are brain areas involved in sexually motivated behavior. I will discuss patterns of neural activation in the POM and VMH in response to hearing a partner's signal or a previous partner's signal.

The Peaceful Coexistence of HARPOON and SEAL - (Physics and Astronomy)

By: Garrett Bartelt, Thor Lang
Faculty mentor(s): Ken Menningen, Shannon Riha

Using sunlight to split water into oxygen and hydrogen — a clean and renewable chemical fuel — is one solution to the global energy crisis. To do this we need a material that is cheap, environmentally benign, stable, and efficient at harnessing the sun's energy to drive the chemical reaction. Mixed metal oxide semiconductors meet these criteria, however, there are millions of possible binary, ternary, and quaternary metal oxide combinations to explore. This poster will summarize a cooperative research effort between the departments of Chemistry and Physics & Astronomy at UW-Stevens Point to identify promising candidates for solar water splitting. Arrays of mixed metal oxides with up to 64 different chemical compositions are evaluated by two methods: one that measures the generation of oxygen by photoluminescence (HARPOON) and one that measures the electric photocurrent (SEAL). The results of the first few experiments in this new, cooperative effort will be presented.

Thermal Characterization of High-Power Semiconductor Laser Diodes by Thermoreflectance Microscopy - (Physics and Astronomy)

By: Kyle Meidenbauer
Faculty mentor(s): Maryam Farzaneh

Semiconductor laser diodes are coherent sources of light withapplications in fiber optic communication and in devices such as DVD players. Excess heat can have negative effects on the performance of a laser diode, including variations in the emitted wavelength and output power. Therefore, it is important to understand the heating patterns of the laser. This presentation explores the effects of temperature on the facet of a high-power semiconductor laser diode. In order to determine variations in temperature, we study thermal images obtained by thermoreflectance microscopy at different bias currents. Thermoreflectance is based on measuring the relative changes in the reflectivity of the surface of the laser, which are directly proportional to changes in surface temperature. The acquired thermal maps yield information about the spatial distribution of temperature over the laser facet. Future work explores the response of the laser diode to a heat pulse as a function of time.

To Infinity and Back: Construction and Flight of an Experimental High Altitude Rocket - (Physics and Astronomy)

By: Sarah Parker, Brent LaRue, Eddy Doering, Karsten Hintz, Chedomir Jahnke
Faculty mentor(s): Palash Banerjee

The Wisconsin Space Grant Consortium holds an annual rocket launch competition in which teams design, build and launch a high-powered rocket with a science payload that addresses an experimental challenge. This year, five physics students participated in this competition where the challenge was to design and construct an apparatus for generating on-board electrical power during flight. The team spent two semesters designing, simulating, building and programming the sub-systems that comprise the rocket. The rocket has a mass of 4 kg, is 4 feet tall and is designed to reach an altitude of 3500 feet in 15 seconds. Sensors measure the velocity, acceleration and altitude during flight and a programmable microcontroller logs the data to a memory card. On-board electrical power during flight is generated using a specially designed turbine integrated into the outer body of the rocket. The rocket includes a two stage parachute that allows the rocket and payload to be recovered safely.

Updated Assessment of the Biodiversity of Freshwater Mussels in Minnesota, Wisconsin, and the Upper Peninsula of Michigan - (Biology)

By: Mary Gertner, Ryan Dykstra, Carissa Puerzer
Faculty mentor(s): Daniel Graf

We are gathering mussel specimen distributions records into a database. The database consists of 28109 analyzed records, including 10109 newly acquired records from the Bell Museum (U of MN). These records were compiled from nine museum collections as well as observations reported by the Wisconsin DNR. Each record was georeferenced to township and placed in the drainage hierarchy.The data have been used to determine species richness by county and drainage basin. Species richness is highest in counties along the Mississippi River and its major tributaries, with a secondary hotspot in the Fox River basin. These data will be used to evaluate patterns of distributions and correct misidentifications and other errors. We can also use the data to generate hypotheses on the various species associated with theriver basins of the upper Midwest, determine species diversity among the basins, and perhaps also test hypotheses regarding post-glacial patterns of mussel species in the region.

Use of Biochar to Increase Microbial Growth from Compost Tea Inoculation

By: Alex Thomas, Lindsey Weiss
Faculty mentor(s): Bryant Scharenbroch, Robert Michitsch

Compost teas are known as plant disease suppressants and a source of microbes potentially beneficial to plants. Compost teas have gained interest in fields like agriculture, silviculture, and gardening in recent years. Despite their popularity, the mechanisms behind compost tea and its benefits have not been identified in the literature. Studies suggest the tea increases nutrients for plant growth and acts as an inoculate, spreading microbes to the soil which lead to more available carbon and other nutrients.

Identifying the effects of compost teas is important for future applications in science and in practice. Our experiment ran four treatments using a sanitized sand and potting mix substrate with two treatments amended to be 10% biochar by volume. One treatment of each substrate was inoculated with a compost tea sample, creating the four separate treatments. Wisconsin Fast Plants were analyzed for microbial respiration, microbial biomass, and plant biomass after 40 days of growth.

UWSP Paleontology Fossil Collection (PFC) - Using the Fossil Record to Demonstrate "The Present is the Key to the Past" - (Biology)

By: Alexis Hollander, Duzell Matthew, Kluge Matthew, Courtney Kazik
Faculty mentor(s): Pat Zellmer, Ray Reser

In the 1800s, Charles Lyell (Father of Geology) summarized the uniformitarian principle in Geology by stating "The present is the key to the past." Natural processes occurring today have occurred throughout time. Based on the natural history of extant species, and ongoing climate and geologic processes occurring today, scientists can use data to extrapolate and explain behavior, morphology, anatomy, and physiology for extinct species, interpret information about ancient ecology and natural history, and predict future events, including climate change and what many scientists believe to be the sixth mass extinction. The Almont fossil localehas produced 30-45 plant species from the Paleocene Epoch. UWSP curates the largest collection from Almont, including a number of holotypes (specimens used to describe new species). Data comparing the number of select identified species found in fossil-bearing strata allows for reconstruction of paleo-environments.

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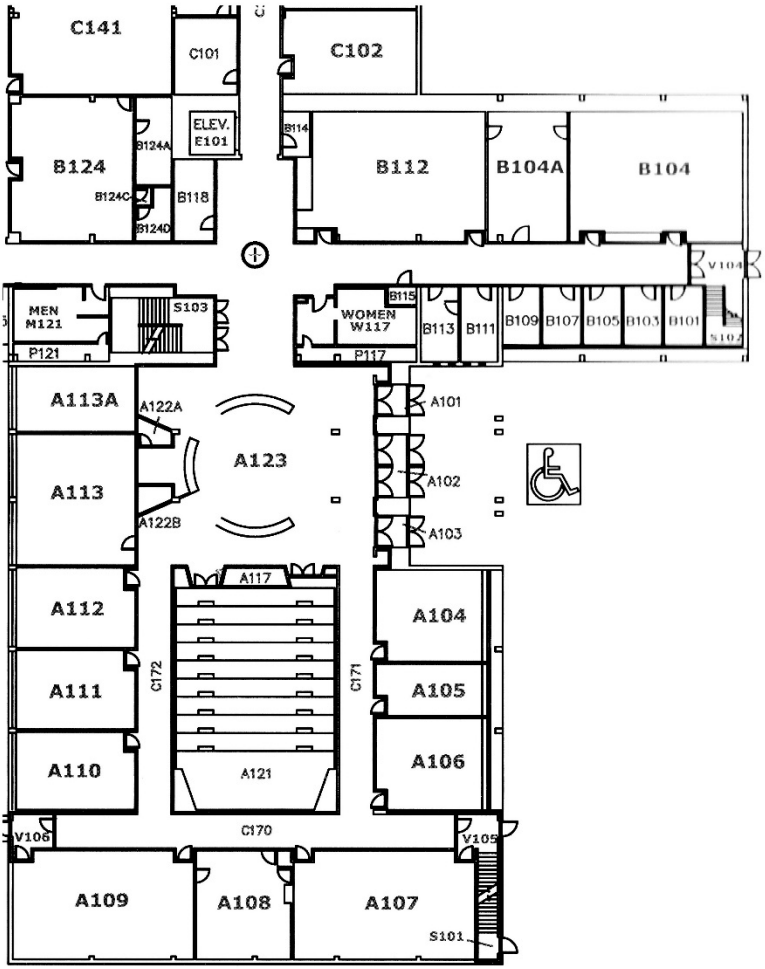

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