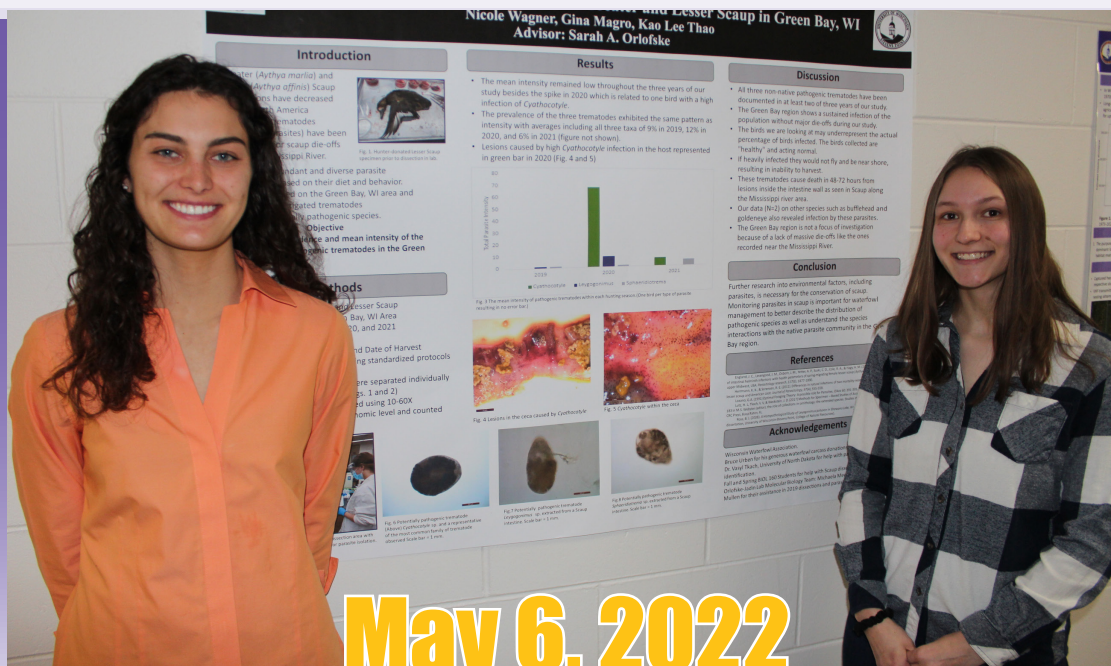


23rd Annual
College of Letters and Science
Undergraduate
Research Symposium



May 6, 2022



College of Letters and Science
University of Wisconsin - Stevens Point

Reception in Collins Classroom Center, Room 101

1:45 p.m. Welcome | 2:15 p.m. Presentations Begin

Welcome

Room 101, CCC

1:45 – 2:15 p.m.

Opening remarks: **Dean Joshua Hagen**
College of Letters and Science

Ancestors Buried Below Us project overview:
History professor Rob Harper, coordinator of
Native American and Indigenous Studies

UWSP Students: **Dylan Potter**
(English: Writing, Editing, and Publishing)
Jarita Bavido (History, International Studies,
Philosophy and Religious Studies)

Presentations

1st and 2nd floor of CCC*

***Individual room locations and
times inside**

.....

2:15 – 3:30 p.m.

Oral Presentations

3:30 – 4:30 p.m.

Poster Presentations

*We encourage participants to attend both oral and poster presentations
at the times designated above. Posters are on display all afternoon.*



May 6, 2022

Welcome to the 23rd Annual College of Letters and Science Undergraduate Research Symposium! You are about to participate in a rich tradition at the University of Wisconsin-Stevens Point, one that is both an educational experience and an academic celebration.

Student participants—I hope you will find the symposium to be one of your most memorable learning experiences. There is little question your research will enhance the academic value of your overall education at the University of Wisconsin-Stevens Point. You have gained a greater understanding of the world around you, a deeper learning of the subject matter taught in your classes and possibly the opening of new opportunities beyond college.

Attendees and observers, please join me in applauding the drive and initiative of these students. Their work represents exactly what our university means when we encourage our students to "Discover Your Purpose."

Whether you are here to make a presentation or to witness them, you will be participating in the celebration of these academic achievements. This is a special opportunity for students to share the results of their hard work participating in investigations, projects, and research activities. This year's event features an outstanding group of student researchers representing projects from across COLS majors, a fitting tribute to the level of faculty and student collaboration in and out of the classroom at UW-Stevens Point. Thank you to the faculty members for their mentorship to our students.

Welcome, and congratulations to all of you! I wish you success in presenting your work today and at future symposiums and conferences.

Sincerely,

A handwritten signature in black ink, appearing to read "Thomas Gibson". The signature is fluid and cursive, with a long horizontal stroke at the beginning.

Thomas Gibson
Chancellor

ABOUT US

As the largest college of the University of Wisconsin-Stevens Point, The College of Letters and Science offers more than 70 majors and minors among 13 academic departments – in academic disciplines ranging from biology to world languages—housed in four schools.

School of Behavioral and Social Sciences

Geography/Geology ▪ Political Science ▪ Psychology ▪ Sociology/Social Work

School of Biology, Chemistry, and Biochemistry

Biology ▪ Chemistry ▪ Biochemistry

School of Humanities and Global Studies

English ▪ History and International Studies ▪ Philosophy and Religious Studies ▪ World Languages and Literatures

School of Mathematics, Computing, Physics, and Astronomy

Mathematical Sciences ▪ Computing and New Media Technologies
Physics and Astronomy

Our college structure highlights shared research interests and teaching approaches, as well as common perspectives on career pathways for students. The college features a student-centered curriculum built around high-impact learning opportunities that prepare students for success in the future. The college includes:

- More than 220 faculty and staff, across three campuses
- Labs with state-of-the-art instrumentation
- Study abroad programs in over 25 countries
- Planetarium and Observatory welcome 5,000 visitors annually
- More than 20,000 yearly visits to Museum of Natural History

Please consider joining the thousands of donors who help ensure that UW-Stevens Point students are ready to face the challenges of the future. **To make a gift visit: give.uwsp.edu/cols-give-now**

The University of Wisconsin-Stevens Point occupies lands of the Ho-Chunk and Menominee people. Please take a moment to acknowledge and honor the ancestral Ho-Chunk and Menominee land and the sacred land of all indigenous peoples.

*Added Oral Presentation 2:15 - 3:30 p.m.
Group 6 Room 323

Small-Town Wisconsin Jewry: Community Development, Interconnectedness, and Vulnerability Throughout the Twentieth Century (History and International Studies)

By: Loske

Faculty Mentor: Rob Harper

A case study focused on Jewish communities of Stevens Point and Wausau, Wisconsin, between the end of the 19th century and the late 20th century. Using the framework established by Walter Ehrlich, examining organizational history, community building, and the relationships between communities throughout the state. This work is built upon the extensive work of late UW–Stevens Point professor Mark Seiler, incorporating the histories of external Jewish communities and institutions to better understand how these people and places are linked across time and space. This research has also demonstrated that there is a history of antisemitism in Central Wisconsin that had previously gone unrecorded in Seiler's research and other historical accounts of the twentieth century.

**Added Poster Presentation 3:30 - 4:30 p.m.

Gender and God (Sociology and Social Work)

By: Lizzy Novak

Faculty Mentor: David Barry

Feminist theologians argue that the way a person conceptualizes God has a direct impact on the social and political authority of a society. It is argued that masculine conceptualizations of God may inherently reinforce gender inequality between men and women. In other words, the way that we perceive the gender concept of God, whether it be male, female, or otherwise, influences the foundation of our gender strata. This study seeks to uncover this feminist argument further through a sociological lens. Using the Baylor Religion Survey, I analyze different social demographics to determine what kinds of different attitudes lead toward different perceptions of God. I will be examining different ideological beliefs, such as politics, feminism, gender inequality, prayer, religious identity, and religiosity, as well as demographics such as marital status, education, and gender via a bivariate analysis in association with variables regarding God imagery and God-language.

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Dear Students, Faculty, Staff, Parents, and Friends of the College,

It is my pleasure and honor to welcome you to the 23rd annual College of Letters and Science Undergraduate Research Symposium! During its 23-year history, over 1,600 students across all COLS majors have participated in the symposium. As one of the college's signature events, the symposium provides a vivid example of collaboration between students, faculty, and staff to advance the mission, vision, and values of the college and university.

This year's symposium features approximately 84 student research projects, including 77 poster presentations and seven oral presentations, drawn from across the college's four schools and 13 departments. Ranging from the humanities and social and behavioral sciences to the STEM disciplines of science, technology, engineering, and mathematics, these presentations and posters highlight the curiosity, dedication, and passion of our students to pursue research and intellectual development in close partnership with faculty mentors.

Please join me in congratulating our students for all the demanding work they have invested to reach this point. I hope you have an opportunity to join us in celebrating our students' achievements and appreciating the key role played by faculty as they inspire and mentor undergraduate research.

Finally, special thanks are due to the students, faculty, and staff who have helped organize this event. I am especially thankful for the willingness of Dr. Rob Harper, professor of history and coordinator of Native American Studies, and students Dylan Potter and Jarita Bavido to share their work related to the Native American Burial Site on campus. And I would be remiss if I did not recognize the efforts of the symposium organizing committee and the college office staff in making this wonderful celebration possible.

Sincerely,

A handwritten signature in black ink, appearing to read "Joshua Hagen". The signature is fluid and cursive, with a long horizontal stroke at the end.

Joshua Hagen

Dean, College of Letters and Science

Oral Presentations 2:15- 3:30 p.m.

Collins Classroom Center 1st and 2nd Floors

Group 1
Room 227

Parasite Communities in Populations of Greater and Lesser Scaup in Green Bay, WI - (Biology)

By: Nicole Wagner
Faculty Mentor: Sarah Orlofske
Moderator:

Greater and Lesser Scaup populations in the U.S. have been declining since the 1980s. Our research goal is to survey parasites of scaup, including potentially pathogenic trematodes (flatworms), in Green Bay, WI area. We obtained waterfowl carcasses donated from hunters during the 2019-2021 seasons. Birds were dissected, separating their major organs and each organ was inspected for parasites using standardized protocols. Any parasites we found were separated, counted, and identified to the lowest taxonomic level possible using morphological traits. We found a diverse parasite community with cestodes (tapeworms) being the most abundant endoparasites. Specimens from 16 parasite genera were identified. Among the trematodes, we found all three of the pathogenic introduced genera. Monitoring parasites in scaup is important for waterfowl management to better describe the distribution of pathogenic species as well as understand the species interactions with the native parasite community.

Group 2

Presented in Room 224 via Zoom

The Spanish Lexicon: A Chronicled Account of Language Influence (218 B.C.-1492) - (English)

By: Rachel Lueder

Faculty Mentor: James Berry

Moderator: James Berry

Language change and lexical borrowing can be brought about by a variety of factors, most notably through contact with surrounding languages or invading forces. In all instances of lexical borrowing, there is a donor language and a recipient language. The introduction, integration, and circulation of loanwords can be split into two distinct sides: the process of borrowing itself and the consequences on the lexical structure of the recipient language. This study assessed unique cases of word borrowings stemming from historical and linguistic effects of lexical changes in the Spanish language. In addition, this study evaluated if the donor and recipient language had equal footing in their social, economic, political, and cultural relationship, or if one was believed to be superior in regards to sociolinguistic status. My research findings reveal fascinating ways that words travel across languages and time. Further, my research indicates that the extralinguistic relationship between the donor language and the recipient language is instrumental in understanding the borrowing process as well as taking into account structural or typological similarities.

Group 3
Room 212

Deep Ecology and Heidegger's Philosophy of Technology -
(Philosophy)

By: Anthony Martynski
Faculty Mentor: Chris Diehm
Moderator: Chris Diehm

Deep Ecology is a field of environmental ethics that promotes the inherent worth of all living organisms regardless of their utility to humans. Martin Heidegger, a 19th century German philosopher, has been tied to deep ecology. This presentation analyzes Heidegger's biocentric attitude and his approach to how we should act with/towards nature based on his philosophy of technology. Heidegger's position regarding technology offers ideas about technology, anthropocentrism, letting things be, and the interrelatedness of the natural environment that can help shape deep ecological views.

Finding our Place with Being There - (Philosophy)

By: Lillian Johnson
Faculty Mentor: Chris Diehm
Moderator: Chris Diehm

Martin Heidegger's concept of Dasein, quite literally, "Being there," is remarkably similar to the core values of deep ecology. By understanding our Beingness within the framework of Heideggerian philosophy, we can better understand that our Being is the same as all Beings around us and thus conceptualize a world that is non-Anthropocentric as we are all the same Being. The presence of "hyper objects"--things that we can conceptualize but are unable to comprehend fully--play into this greater sense of Being-in-the-world, as one can conceptualize one's role in an ecosystem, but struggle to understand why Being-in an ecosystem is so important as well.

Group 4
Room 305

Artificial Intelligence and Automation: The Erosion of Human Empathy and the Right to Work - (Political Science)

By: Dia Yang

Faculty Mentor: Jennifer Collins

Moderator: Jennifer Collins

Jobs around the globe are rapidly being replaced by automation, which raises issues of human rights and how to integrate technology into existing human rights frameworks. The human rights implications of automation have generally been thought about in terms of the erosion of the right to work, as low-wage workers in warehouses and factories often struggle to find jobs when they are replaced by machines. However, the emergence of artificial intelligence in fields that traditionally require empathy poses other questions related to human dignity. For example, the emergence of “care-bots” in response to the global nursing shortage raises ethical questions about which patients receive empathy through in-person care. This paper argues that to successfully manage these coinciding global trends of reductions in the need for labor in sectors like manufacturing and increased demands for nurses and other workers in high-empathy jobs, governments will need to experiment with solutions such as universal basic income and investments in education and job training to secure the right to work and human dignity for all.

**Group 5
Room 303**

Disproportionate Birth Disparities and Black Women - (Sociology and Social Work)

By: Sierra Smith
Faculty Mentor: David Chunyu
Moderator:

This research proposal aims to look at issues within birth and pregnancy outcomes in Black mothers. The study aims to look at the effect that doula programs, obstetric racism, and culturally educated hospitals and staff can have on the outcome of birth and pregnancy among Black mothers. The study will also examine the obstetric experiences of Black mothers and compare this to obstetric experiences of White mothers, in order to determine the amount of difference that there is within these populations in regard to birthing and pregnancy. A doula program would aim to minimize this gap as they are trained professionals who can help advocate for mothers throughout pregnancy and birth. For this reason, they will be analyzed to determine whether or not they would have an effect on a mother's obstetric experience. There is a long history of medical and obstetric racism which calls for a need to educate and inform hospital staff, who will be working with people of all races and ethnicities. This study would analyze the outcome of Black mother's birthing and pregnancy experiences within culturally educated hospitals.

Statement of Faith: The Theological Foundation of Evangelical Hegemony and its Effects on Politics - (Sociology and Social Work)

By: Jarita Bavidio
Faculty Mentor: David Barry
Moderator: David Barry

Through the content analysis of statements of faith from evangelical institutions, including churches, parachurch organizations, and private religious universities, this research explores possible correlations between how theological claims impact political outcomes for individuals. The sample was chosen from signatories of the Nashville Statement, a declaration on human gender and sexuality by the Council for Biblical Manhood and Womanhood. This population represents many prominent evangelical denominations and organizations throughout the United States. It may seem that theological statements are apolitical by design, but the hypothesis of this work is that as arbiters of evangelical hegemony, these statements correlate to political and social stances which are held by a majority of evangelicals, including support for corporal punishment, a hawkish foreign policy, and the death penalty, as well as opposition to LGBTQ rights, critical readings of history, and anti-racism movements.

Poster Presentations 3:30 - 4:30 p.m.

Collins Classroom Center 1st and 2nd Floors

School of Behavioral and Social Sciences

"La Familia Madrigal!": Gender Roles in Disney's Encanto - (Psychology)

By: Margaret Broeren, Allison Piette, Cole Thorne

Faculty Mentor: Erica Weisgram

Disney's animated film Encanto has enjoyed immense popularity this year. The film centers Madrigal family and their relationships and sense of purpose in life. Research has demonstrated that children's media has an impact gender roles and behaviors (Parsons & Penderson, 2017). In their analysis of 26 Disney films, Towbin et al. (2004) showed male characters were often aggressive, heroic, and lacking emotion, whereas the female characters performed domestic behaviors, were pretty, and relied on the male characters for protection or rescues. Research by England and colleagues (2011, Hine et al. 2018) also found that the gender-typing of the characters has decreased over time. In the present study, we utilize the methodology of England's content analysis to examine the characters in the film Encanto. We have examined masculine and feminine characteristics of the twelve members of the Madrigal family and will present results for each individual and in aggregate.

A Comparative Study of North American Indigenous Boarding Schools (Political Science)

By: Emily Stanislawski

Faculty Mentor: Jennifer Collins

This paper examines the history and human rights legacies of Native American boarding schools in the United States and Canada and considers how present-day governments in both countries are reckoning with such legacies. With their origins in the late-nineteenth century, these schools represented deliberate attempts to destroy native cultures and disempower tribes. The paper describes conditions in these schools and analyzes the injury they inflicted on native cultures and languages as well as the physical and sexual abuse and assault many children suffered while enrolled therein. The litany of human rights abuses committed by these schools resulted in injury, death, destruction of cultures, loss of native languages, and generational trauma. After exploring these harms, the paper then compares how the present-day governments of the United States and Canada have responded to demands from native communities for acknowledgement of and reparation for the damage done by these schools, including formal apologies and other steps to reckon with these past abuses. The research suggests that Canada's response has been more robust than that of the United States.

A Jump Or A Hurdle: The 'Push' Factors for Latin American Immigrants - (Political Science)

By: Kyle Beyersdorf

Faculty Mentor: Saemyi Park

This research aims to investigate the root causes of the unauthorized immigration of Latin American immigrants while emphasizing the push factors that drive so many migrants out of their homelands. While immigrants view America as a nation built upon the principles of freedom and equality, many immigrants are met with restrictive immigration policies that have historically been the norm, whether it be in the form of a border wall, immigration quotas, refugee policy, or deportation. Using various literature reviews of immigration scholarship, data analysis, and government reports, push and pull factors that result in migration are explored. In particular, the continuing and exacerbating effects of the push factors of immigration such as poverty and inequality, political instability, and violence are identified. Granted, crossing the border illegally poses undeniable risk, it is far more risky for those who are willing to cross illegally as their situations are more dangerous than to even compare. Understanding these factors proves critical, as, although immigration remains at the forefront of modern political debate, the U.S. approach to the ongoing crisis at the nation's border remains the same. The conclusion of this study points to policy implications that the United States needs to target financial and logistical support to Latin American countries instead of strengthening the nation's militaristic border and policy to address poverty and inequality and end the pervasive gang violence that fuels migration.

Does Socioeconomic Status Influence Delinquent behavior? - (Sociology and Social Work)

By: Samantha Zblewski

Faculty Mentor: David Chunyu

This research investigates the relationship between socioeconomic status, economic stress, and delinquent behavior through the analysis of the General Social Survey (GSS) data. The GSS data have been analyzed mainly using crosstabulations between the specified variables, with race being used as the control variable. The following are some preliminary results. 1) Respondents' income level may affect their access to stress management; but race may affect this, as well. 2) Respondents' social class may influence if they have ever been convicted of a crime, and race has not been found to have a significant role in this relationship. 3) On the other hand, respondents' total family income might impact if they have ever been convicted of a crime, and race may affect this relationship. 4) Respondents' social class and total family income may affect whether they have ever been arrested by police, and race does not seem to have a significant role in these relationships. Overall, this research finds that individuals with low socioeconomic status tend to have higher amount of economic stress and increased risk of deviant behaviors, and the role of race needs further examination.

Explaining Mass Atrocity: Factors Contributing to Human Rights Violations in the Soviet Union - (Political Science)

By: Conner Hakenjos

Faculty Mentor: Jennifer Collins

The level of human rights abuses that occurred in the Soviet Union, and especially under Stalin, were staggering. This paper seeks to analyze and understand the causes of such monumental and extensive atrocities. The paper considers multiple variables and explanations for this pattern of pervasive human rights violations from structural and institutional to cultural and individual factors. The paper highlights the role played by communist ideology in suppressing religious values, Stalin's personality and idiosyncrasies, the government's authoritarian structure, and the psychological impacts of fear and terror. Drawing on scholarly studies of Stalinism and the Soviet Union generally, this paper asserts that these four variables worked in tandem to create an environment in which atrocity was not only possible but perhaps even probable.

Group Membership and Health Risk Perceptions: Do Salient Social Identities Predict Risky Health Behaviors? - (Psychology)

By: Cole Thorne, Leah Hollander, Esme Reinders, Zach Mikkelson, Olivia Voge, Gladys Lara, Allie Waite, Rachel Kaminski

Faculty Mentor: Mark Ferguson

Risk perceptions are thought to be grounded in the objective properties of hazards. However, social identity perspective suggests that risk perceptions reflect underlying group membership. This study examines whether increasing the salience of shared group membership influences risk perceptions and behaviors across five types of health-related hazards (transportation, body, relationship, alcohol, and drugs). We manipulated salient group membership in an online survey. Participants then completed measures of group identification, health risk perceptions (likelihood and severity of harm), and willingness to perform risky health behaviors. We hypothesized that some social identities will increase certain health risk perceptions and behaviors, whereas others will decrease them.

How do parenting styles impact family violence across religions? - (Sociology and Social Work)

By: Allyana Marx

Faculty Mentor: Maggie Bohm-Jordan

This research examined the relationship between family violence and religious affiliations. It is important to understand how various parenting styles driven by religious beliefs can increase the likelihood of violence occurring within the family unit. The fundamentalist theory was utilized because throughout history, religion and violence have had a complicated relationship and while there is little evidence supporting the idea that one affects the other, there are specific instances that allow for that conclusion to be made. A Qualtrics survey (N=959) focused predominantly on the parents' religious

affiliation and the parenting styles. Findings showed a positive correlation between Christianity and physical and verbal abuse. Fathers who have a strong or very strong religious affiliation and used authoritarian (disciplinarian) parenting styles were more likely to be physically and/or verbally abusive. Conversely, findings for mothers' similar religious affiliation but with an authoritative parenting styles to be more neglectful. Future implications and limitations were addressed in the study.

How Mental Health Impacts Students Academic Success and College Retention - (Sociology and Social Work)

By: Julia Beres

Faculty Mentor: Maggie Bohm-Jordan

This research examined UWSP students' mental health (depression and anxiety) during Covid-19 and how it affected their academic success and college retention. Some factors observed in this study were Covid-19, burnout, the levels of classes, GPA, part-time vs full-time student, and course modality transition from in-person to online. Three theoretical frameworks were used 1) Assimilation theory, 2) Development of College Students Theory, and 3) Behavioral Theory. A Qualtrics survey of 13-questions were used to analyze (N = 1,000) the research questions. Results showed students' anxiety and depression increased during Covid-19, but depression was much more significant when comparing anxiety and depression before and during Covid-19. Also, First-year students (30%) and Third-year students (35%) never felt burnt out whereas, Second-year students (23%) and Fourth-year students (23%) felt burnt out all the time. There are limitations and future implications that were discussed within the study such as, counseling center, faculty advising, and commuters.

Let's Play!: Gender-Typed Toy Preferences in Toddlers - (Psychology)

By: Margaret Broeren, Allison Piette, Cole Thorne

Faculty Mentor: Erica Weisgram

Gender-typed toy differences are among the largest in the psychological literature (Hyde, 2005). An extensive amount of research has been conducted with preschool children and older children; however relatively little research has been conducted with younger age groups such as toddlers (Zulous & Ruble, 2018). This developmental time period is of interest given that children begin identifying their own gender and the gender of others (often through superficial cues) between the ages of two and three and also children's gender-typed color preferences increase significantly after the age of 2.5 (LoBue & Deloache, 2011). In the present study, we conducted a survey of 159 parents of toddlers between the ages of 2 and 3 in which we asked about their children's preference for 16 gender-typed toys. We predict that older children would demonstrate greater gender-typed preferences than younger children. We also investigate whether parent factors may impact children's gender-typed preferences.

Nursery Program for Incarcerated Mothers and Newborns in Wisconsin Prisons - (Sociology and Social Work)

By: Allison Tabor

Faculty Mentor: Maggie Bohm-Jordan

This program policy proposal focuses on implementing prison nursery programs in Wisconsin Department of Corrections. The rate of women incarcerated has risen at a fifty percent higher rate than that of males incarcerated. Furthermore, 1 in 25 women entering the criminal justice system are pregnant, leading to around 2,000 infants born each year to incarcerated mothers. Currently, only nine states provide prison nursery programs that allow mothers to care for their newborn in a secure location on prison grounds until they are released. The Wisconsin Department of Corrections is one of the 41 states that does not offer any nursery program for mothers who are pregnant and give birth while incarcerated. As for policy and procedure written up by Wisconsin DOC (2020), Infant (IV) states: (A) “The placement of the infant will be decided by the patient with the DOC Social Worker if this hasn’t been identified with the county prior to being admitted to DOC” and (B) “The DOC facility Social Worker shall act as the liaison with the appropriate community contacts such as the hospital Social Worker and the county Human Services involved in this case.” The goal of these nursery programs is to give incarcerated mothers a chance to bond with their newborn and to promote a better lifelong decisions. Future implications and limitations are addressed in the research.

The Academic and Social Impacts of EDI Work on High School BIPOC Students - (Sociology and Social Work)

By: Cassandra Xiong

Faculty Mentor: David Barry

Moderator:

The purpose of this research is to investigate how high school BIPOC students in the Stevens Point Area Public School District (SPAPSD) have been impacted by the district’s approval and hiring of two Equity, Diversity, and Inclusion (EDI) staff positions. In a predominantly white school district, studying how BIPOC students have been impacted is one valuable aspect of evaluating the district’s EDI work. One reason I want study this topic is because the school board faced serious opposition from the community about creating two EDI staff positions for the school district. The persistent opposition to EDI work in the school district makes it even more necessary for EDI work to be done in this community. Furthermore, I examine academic and social impacts by using both quantitative and qualitative methods. For the academic impacts I will be looking at students’ GPA. For the social impacts I will be looking at students’ extracurricular involvement, their relationships with peers and staff at school, and their general feelings about being a BIPOC student in a predominantly white school. The first method of data collection is a focus group to gather the qualitative data and the second method of data collection is a paper survey to gather the quantitative data. I hope to find results that show specific ways that the EDI Coordinator and Program Specialist have been successful in uplifting BIPOC students, and how they can improve their work based on results that show stagnation or decrease in academic and social outcomes.

The Apathy of Great Power Politics: R2P and the Future of Atrocity Crimes - (Political Science)

By: Logan FischerBuchli

Faculty Mentor: Jennifer Collins

The words “never again” are practically a cliché, as are reminders of the numerous genocides and other humanitarian disasters that have been perpetrated despite the phrase’s repeated invocation. In response to historical failures to prevent atrocity crimes, there has been an ostensible shifting of international norms away from state sovereignty and towards humanitarian intervention, culminating in the widespread adoption of the Responsibility to Protect doctrine (R2P) in the early 21st century. Although some greeted this development with optimism, the following decades have revealed that brazen atrocity crimes are not yet behind us despite the adoption of R2P. Various obstacles characteristic of the pre-R2P era remain intractable. Conflicting interests ensure that states continue to maximize their own gains at the expense of human rights, while structural features of institutions like the UN Security Council exacerbate this tendency. Various epistemic problems also work to delegitimize R2P. In combination these problems will likely continue to render the implementation and enforcement of R2P exceptionally difficult with no clear solution in sight.

The Benefits of Animal Assisted Therapy and Horticultural Therapy on Long Term Care Residents - (Sociology and Social Work)

By: Jessica Dottl, Heidi Swan

Faculty Mentor: Maggie Bohm-Jordan

The field of mental health has undergone incredible change in the past hundred years: from institutions operating on unpaid ‘work therapy’ to inhumane methods of submission to today’s least-restrictive standards. However, many western-style methods still lack the necessary spiritual aspect of connectedness that carries over into the outpatient setting. Studies throughout the world today are measuring the effectiveness of Horticultural Therapy (HT) and Animal Assisted Therapy (AAT) to provide another level to therapeutic care. While the specifics of both therapies can vary, HT focuses on building a sense of purpose and connectedness through nature and AAT focuses on emotional regulation and connectedness through animals. The benefits of these therapies are supported by theories such as Biophilia (instinctual attraction to nature) and Cognitive Behavioral Theory (awareness of emotion assists in regulation of emotion). We have developed a study that could be used to determine the comparative effectiveness of HT, AAT, and a combination of both. Future implications and limitations are addressed in the study.

The Emergent Ingroup Model: Does Perception of Future Change Matter? - (Psychology)

By: Rachel Kaminski, Leah Hollander, Gladys Lara, Zach Mikkelson, Esme Reinders, Cole Thorne, Olivia Voge, Allie Waite

Faculty Mentor: Mark Ferguson

Researchers are interested in the formation of novel social identities and their potential for creating social change. The emergent ingroup model (Ferguson et al., 2019) offers a social identity perspective on the formation and maintenance of stability and change in society—with emergent ingroup members working together against emergent outgroup resistance as a catalyst for social change. This study tests whether 245 social groups are seen as emergent or established ingroups, and emergent or established outgroups in American society. Participants completed a digital card sorting task about how these groups will be viewed in society over the next 50 years: 1) always negative (established outgroup), 2) more negative (emergent outgroup), 3) more positive (emergent ingroup), 4) always positive (established ingroup), or 5) not sure. We predicted that emergent ingroup members will represent the targets of prejudice studied in social psychology (based on ethnicity, gender, sexuality, etc.), as well as the eco-friendly groups studied in environmental psychology (environmentalists, animal rights activists, vegans, etc.). We also predicted that emergent outgroup members will represent their opponents in society (racists, homophobic people, climate change skeptics, etc.).

The Impact of Christian Organizations on African LGBT Movements - (Political Science)

By: Sara Kalkhoff

Faculty Mentor: Jennifer Collins

This research project explores the impact of Christian organizations on the success of LGBT (Lesbian, Gay, Bisexual, and Transgender) movements in Africa. While many Christian organizations have promoted homophobic legislation in Africa, pro-LGBT Christian organizations have been integral to the promotion of LGBT rights across the continent. In fact, Christian activists and organizations have been at the forefront of the most successful LGBT movements in Africa, including the 2006 South African movement for same-sex marriage. This project examines this phenomenon through a post-colonial lens, rejecting the notion that LGBT movements in the Global South should apply the same methods of organization as Western movements. Ultimately, this research suggests that by applying the methods of successful African LGBT movements and acknowledging the contributions of Christian activists, LGBT organizations can more effectively organize across Southern Africa and other majority-Christian regions.

The Impacts of Deforestation on the Indigenous Communities of the Brazilian Amazon - (Political Science)

By: Becca Thiem

Faculty Mentor: Jennifer Collins

Over the past two decades, the Brazilian Amazon has experienced a significant increase in deforestation, which in turn has had devastating impacts on indigenous populations who once numbered more than 100 distinct tribal groups in the Brazilian rainforest. My research examines the impact of deforestation on Brazilian Amazonian indigenous communities. Research was conducted using secondary sources, including scholarly and credible online sources. The paper identifies numerous negative impacts on indigenous populations resulting from forest clearing, including mass displacement, worsening health, increasing violence against indigenous peoples, and threats to cultural survival. Although Brazil has laws designed to help and protect indigenous peoples, they are often inadequate, incomplete, and packed with underfunded mandates. Furthermore, the situation has worsened markedly under the current administration of President Jair Bolsonaro, who has brazenly undermined environmental laws and regulations thus further jeopardizing the survival of indigenous peoples.

The Relationship Between Insurance Knowledge, Guilt, and Willingness to Pay for Additional Insurance Coverage - (Psychology)

By: Leah Hollander

Faculty Mentor: Mark Ferguson

Many people may not understand the seriousness of choosing the optimal insurance coverage limit; however, without sufficient limits, a car accident could leave someone with large medical and property bills. Research suggests that an increase of insurance knowledge increases someone's willingness to pay for additional insurance coverage. This effect may be explained through emotions such as regret and worry. This study examines the role of guilt about insufficient coverage limits on the relationship between car insurance knowledge and willingness to pay for car insurance. We manipulated car insurance knowledge and then measured willingness to pay for car insurance and feelings of guilt in an online study. We hypothesized that greater knowledge of car insurance increases willingness to pay for insurance due to increases in guilt.

Victim Impact Statements: Do They Influence Recidivism Rates for Domestic Violence Offenders? - (Sociology and Social Work)

By: Mara Timm

Faculty Mentor: David Chunyu

The primary purpose of this research proposal is to examine the relationship between victim impact statements and recidivism rates of domestic violence offenders. Looking into this relationship is important for multiple reasons. First, the number of domestic violence cases remains high. It is known that these offenders experience high recidivism rates in comparison to other types of offenders. Second, there is a gap in literature and program intervention that discusses the use of victims in the intervention process. The

goal of this research is to determine what that relationship looks like and ultimately provide insight on effective intervention programs and methods that could help decrease the number of cases. To study this, the proposal evaluates current literature. The research design includes a longitudinal study, more specifically, a panel study, which is necessary to assess recidivism rates. Probability sampling and stratification methods will be used to draw a sample from the state of Wisconsin for the study. The sample would consist of 366 domestic violence offenders and 366 domestic violence victims. Data on the selected subjects will be collected by questionnaires, which will be sent via mail. After the questionnaires are returned, researchers will have access to a criminal justice database for the duration of the study, which is three years. Such access will allow researchers to determine recidivism rates. Following these methods will allow researchers to limit reliability and validity concerns, as well as to produce data that will support or refute the hypotheses identified.

School of Biology, Chemistry, and Biochemistry

A comparative analysis of Wisconsin feral hemp (Cannabis sativa) populations and modern day industrial hemp - (Biology)

By: Ashlie Albrecht, Mike Mensah-Ayensu, Madison Haumschild, Christian Howerton, Tyler Jolin, Max Kindschuh, Jacob Ollarzabal, Kira Petersen, Skylar Pulera, Zach Tower, Mackenzie Wisdom

Faculty Mentor: Brian Barringer

From 1920 through 1957, Wisconsin was the largest producer of hemp (*Cannabis sativa*) in the United States. Due to cultural changes and punitive legislation, the last hemp crop in Wisconsin was harvested in 1957 while national production stopped completely in 1970 after the Controlled Substances Act was passed. Since the decline of industrial hemp production in Wisconsin, feral hemp populations have persisted without human intervention. With the passage of the 2018 Farm Bill, farmers have regained the opportunity to grow hemp legally, and following the 60+ year hemp hiatus, feral populations are of interest to farmers due to their persistence in the wild amongst pests, pollutants, and competition with native species. This persistence may have brought on morphological, physiological, phytochemical, and genetic changes that could be useful to modern day hemp farmers.

In Spring 2022, plants from the industrial hemp cultivar Colorado Cherry Wine along with plants from five feral Wisconsin populations were grown in the University of Wisconsin-Stevens Point greenhouse. We explored questions related to how natural selection and environmental factors have affected phenological and morphological features of feral hemp after generations of growth in the wild. Prior to harvest, germination rates, sex ratios, leaf size, and trichome densities of leaves were quantified.

After harvesting, vegetative, axillary and apical flower biomass, height and stem diameter were recorded.

Our results highlight significant implications for Wisconsin state hemp farmers, suggesting future directions for research focused on this economically important crop. Contributing to existing information on the phenological and morphological characteristics of feral hemp represents a welcome addition to our agronomic knowledge base.

Analysis of Flavor Compounds in Beer by Gas Chromatography-Mass Spectrometry - (Chemistry)

By: Jacob Solis

Faculty Mentor(s): Shannon Riha, Therese Barta

Beer connoisseurs and brewers are consistently seeking new brews with unique flavor profiles and sensory appeal. A class of chemical compounds, called esters, that give rise to fruity/floral flavors and aromas in beer are actively synthesized by yeast during the beer fermentation process. The types and quantities of esters produced are based on many fermentation parameters (e.g., yeast strain, temperature, oxygen content). This study aims to correlate fermenting temperature with the ester types and concentrations in beer. Multiple 1-gallon batches were brewed, and portions of each batch were fermented at varying temperatures from 16-22 °C, until a final gravity of 0.9 Brix was achieved. Esters were extracted and subsequently analyzed by Gas Chromatography-Mass Spectrometry. Additionally, samples were analyzed in subsequent weeks to understand the effects of aging on ester concentrations. Understanding the relationship between fermenting temperature, ester production, and aging, will help brewers further customize the flavor profile of their beer in an efficient and systematic way.

Assessing the utility of mitochondrial phylogenomics of freshwater mussels (Mollusca: Unionoida): Phase I - (Biology)

By: Mara Nehring

Faculty Mentor: Dan Graf

Various studies have been conducted to gather data on the mitochondrial genomes of freshwater mussels. A primary objective of many of these studies has been the reconstruction of freshwater mussel phylogeny. We set out to assess the utility of using mitochondrial genomes for that purpose. These studies, however, have a substantial number of differences among them regarding the way both the data were analyzed and the results were obtained. Our objective for Phase I of this continuing research project was a comprehensive review of the results to date. We did this by reading the articles published on mitochondrial DNA, gathering the data about the nature of the data used to estimate freshwater phylogeny, the methods applied, and the topology of the phylogenetic tree. Our poster summarizes our findings so far, which will guide our future research.

Behind closed doors: Digitizing the Steven J. Taft parasite collection - (Biology)

By: Hannah Osgood, Roiya Meyer, Jason Leon, Itzel Cayetano, Conrad Gausmann

Faculty Mentor: Sarah Orlofske

Museum collections have historically been used for research and education, although restricted to nearby locations as physical specimens are fragile and irreplaceable. With technology, it is possible to share data about museum specimens on a high scale. Terrestrial Parasite Tracker (TPT) is an NSF-funded project aiming to increase access to parasitic and vector arthropod collections around the United States through digitization and assemblage to data aggregators. This allows researchers and educators to study specimens they would otherwise not have access to physically. UWSP's parasitology collection received a grant to contribute toward this project with the goal of digitizing 9280 records to the Symbiota Collections of Arthropods Network (SCAN) while students expand skills in museum curation and data management. Our student team is faced with unique challenges and opportunities because our parasitology collection mostly comes from not-yet-standardized research and student specimens.

Comparing transcriptomic profiles from seven cell lines to elucidate liver metastatic potential - (Biology)

By: Kirby Kuehn

Faculty Mentor: Lindsay Dresang

The liver is a vital organ, performing over 500 functions. Metastasis to the liver disrupts these functions, resulting in poor prognoses. It is not always clear why liver metastasis arises in one case but not another involving the same cancer type. We sought to understand which transcripts and cellular pathways are dysregulated in (human) cell lines shown to metastasize substantially to the liver in a NOD-Scid-Gamma (NSG) mouse-xenograft model. Cancer cell lines of the same type not observed to metastasize to the liver were used for comparison, reducing cell type-specific changes or general pathways associated with cancer not linked to liver metastasis. Three metastatic versus non-metastatic pairs of diverse origin: 1) Merkel cell, 2) colorectal, and 3) pancreatic carcinomas (as well as a normal fibroblast control) were used for deep sequencing and transcriptome analysis with subsequent pathway identification.

Transcriptional profiles clustered in largely expected patterns, with some surprises. Profiles were compiled with "UseGalaxy.org"; differentially-expressed genes were analyzed. Approximately 2500 genes changed ± 5 -fold in one or more metastatically-favorable cell line; approximately 550 transcripts changed ± 5 -fold across all three metastatically-favorable cell lines. Dysregulated pathways identified using the DAVID database reflect include: Cancer-Specific Pathways, Cell Survival Pathways, Cell Migration Pathways, and Mitosis/Proliferation Pathways. A subset of transcripts & pathways may explain the liver metastasis-specificity. Specifically, Peroxisome Proliferator-Activated Receptor (PPAR) signaling is linked to lipid metabolism vs. lipid biogenesis, important pathways for cancer cells with high lipid demands.

Cellular behavior in culture matches what was observed in the pathway analyses, but would otherwise mix adherence and wound healing properties on their own. PPAR dysregulation influences the forkhead box A2 (FOXA2) transcription factor, which regulates liver cell differentiation; FOXA2 further regulates anterior gradient 2 (AGR2). FOXA2 & AGR2 levels are normally elevated in cancer cells, but they both then tend to decline as cells become more aggressive, consistent with recent clinical prognostic analyses. If FOXA2 is downregulated endogenously & exogenously, it may favor liver met. LOXL2 is related to Epithelial-to-Mesenchymal-Transition (EMT) and other pathways associated with migration, attachment, & malignancy. LOXL2 levels are lower in cancer cell lines compared to normal fibroblasts; the latter cells are known to have high levels of LOXL2, making them a poor control. Meanwhile, LOXL2 levels are substantially elevated in cell lines which supported liver metastasis relative to paired cancer cell lines which did not metastasize to the liver.

Our findings correlate well with newer clinical data and reinforce biomarkers of disease progression with AGR2 & FOXA2. Many pathways were identified linked to migration, proliferation, and other malignancy pathways, but not if our analysis focused solely on transcripts identically altered in all 3 metastatic cell lines. PPAR signaling related to lipid metabolism and a potential link to liver de-differentiation may point toward liver metastasis-specificity; this pathway would not have been identified without looking at transcripts identically altered in all 3 metastatic cell lines. We plan to compare these profiles to other known metastatic routes to confirm liver metastatic specificity and/or overlap with other metastatic routes (i.e., lung metastases). The dysregulated genes and pathways highlight potential targets to slow disease progression, particularly related to lipid metabolism, migration, and liver cell differentiation

The information provided here was recently published in the journal *Advances in Cancer Biology-Metastasis*, Vol. 4 (100018).

Effects of host tree size and canopy cover on epiphytic fern abundance and diversity in a Hawaiian cloud forest - (Biology)

By: Lauren Bonavia, Ellen Hamilton, Connie Misfeldt, Annika Perez
Faculty Mentor: Stephanie Lyon

Epiphytes are plants that grow on the surfaces of other plants, relying solely on water and nutrients from rainfall and canopy runoff. Because epiphytes grow in little to no soil, they are often quite sensitive to subtle differences in microclimate. The goal of our study was to identify environmental factors influencing local distributions of epiphytic fern species in Hawaiian cloud forests. We surveyed epiphytic fern abundance and diversity with quadrats placed at breast height (1.35 m) on all mature trees (min. 15 cm DBH) within a 10' radius of sample points located at regular intervals along a primitive trail in the Kahauale'a natural area reserve. Canopy coverage was measured in the center of each sample point using the Canopy app, and the size (DBH) and species of each host tree was recorded. Of the five epiphytic fern species encountered in our sampling, *Hymenophyllum lanceolatum* was the most abundant. Regression analysis indicated a significant negative relationship between canopy coverage and *H. lanceolatum* abundance, and a significant negative relationship between canopy coverage and total species richness of epiphytic ferns. We detected no relationship between tree

size and epiphyte abundance or diversity. We were unable to evaluate the importance of host tree species due to our limited sample size. Our results suggest that distributions of epiphytic ferns within mature cloud forests may primarily be limited by light availability.

Emergence of Three Tick-Borne Diseases Around Lake Joanis In Schmeckle Reserve: A 20-Year Surveillance - (Biology)

By: McKenzi Fernholz, Cody Korth, Olivia Culver

Faculty Mentor: Diane Caporale

In the United States, the blacklegged tick (*Ixodes scapularis*) harbors three major pathogens in Wisconsin: *Borrelia burgdorferi sensu stricto*, *Anaplasma phagocytophilum*, and *Babesia microti*, the causative agents of Lyme disease (LD), human granulocytic anaplasmosis (HGA), and babesiosis, respectively. In Wisconsin, the range of *I. scapularis* is expanding, and incidence of zoonoses transmitted by the tick continues to rise. Since many biotic and abiotic factors influence the dynamics of the zoonotic cycle, changes in the relative risk of exposure to tick-borne pathogens are expected over time. From years 2000 – 2020, close to 500 students enrolled in Molecular Biology from UWSP performed molecular testing to determine the prevalence of *B. burgdorferi*, *A. phagocytophilum*, and *Ba. microti* pathogens in blacklegged ticks collected around the perimeter of Lake Joanis in Schmeckle Reserve, WI. Here we report the results of this 20-year surveillance documenting the emergence of tick-borne pathogens within a microgeographic region. A linear trend of increasing prevalence was observed around the lake for each pathogen, with the presence of co-infected ticks increasing over time. This study provides a unique lens into the emergence and maintenance of tick-borne disease, wherein we present two decades of observations at a microgeographic scale and discuss potential biotic and abiotic factors contributing to the rise of *I. scapularis*-borne zoonoses.

Feasibility of Green Chemistry Synthesis Methods for Chalcogenide Perovskites - (Chemistry)

By: Ethan Kowalczyk, Jacob Schattner, Yuxuan Yang, Quinn Goetsch

Faculty Mentor: Shannon Riha

Chalcogenide perovskites are materials with the chemical formula, ABX_3 , where elements A and B are cations with a +2 or +4 charge, respectively, and element X represents S, Se, or Te. Theoretical studies suggest that chalcogenide perovskites are ideal thin film solar cells absorber materials. Comparing to traditional and emerging thin film solar absorbers, chalcogenide perovskites offer advantages, including lower toxicity, earth abundant elements, and high thermal and moisture stability. However, to date, chalcogenide perovskites have only been synthesized using traditional solid-state methods that come with a high energy penalty (e.g., high temperatures, lengthy reactions, etc.), which are not ideal for developing the next generation of thin film solar cells. Therefore, this research aims to design solution-phase synthetic routes based on low reaction temperatures and/or short reaction times. Here we present a one-pot colloidal synthesis approach, a molecular precursors approach, and a rapid solid-state conversion approach in an effort to synthesize one chalcogenide perovskite, $BaZrS_3$.

How are the rtx2 and wceo genes of Pantoea stewartii involved in the pathogen's spread and biofilm formation in sweet corn - (Biology)

By: Kade Fink

Faculty Mentor: Qiang Sun

Stewart's wilt caused by the bacterial pathogen, *Pantoea stewartii* (Ps), is posing a potential threat to the corn industry in the US. The disease symptom development of infected corn plants depends largely on the pathogen's spread in the host plants. This study uses a wild-type Ps strain and its two mutants (Δ rtx2 and Δ wceo, either of which presumably has an impaired production of exopolysaccharide) to investigate how the rtx2 and wceo genes may affect the pathogen's spread in sweet corn and its in-vivo biofilm formation. Our results have indicated that the spread of the pathogen occurred differently among the three Ps genotypes with the wild-type Ps occurring fastest and Δ wceo mutant slowest. The wild-type Ps were found to be localized both inside and outside of vascular bundles while the Δ rtx2 Ps were restricted within vascular bundles. The three Ps genotypes also showed significant differences in quantity in host plants. In terms of biofilm formation, the wild-type Ps cells often occurred in largest clusters, which are mostly embedded in biofilm. Δ rtx2 mutant cells aggregated into much smaller clusters of various sizes. As a conclusion, we believe that the rtx2 and wceo genes may facilitate the pathogen's spread and biofilm production in host corn plants. This information is essential to understand Ps-corn plant interactions, contributing to the analysis of the susceptibility mechanism of corn plants.

Impact of DSS induced colitis on mouse brain morphology - (Biology)

By: Ruth Philips, Chloë Gulbranson

Faculty Mentor(s): Michael Steury, Jennifer Bray

Inflammatory Bowel Disease damages the epithelial barrier of the intestinal tract creating a dysregulated environment impacting immune cells in the gut, causing them to become hyperactive and release inflammatory cytokines. Vascular imaging experiments revealed altered brain morphology and reduced vasculature in colitis-affected mice. As a result, it was hypothesized that inflammatory cytokines from the colon were being transported to the brain, through the blood, where it altered its morphology. To identify potential cytokines related to these observations, qPCR was performed measuring cytokines known to be dysregulated in colitis-affected mice. Expanding on those results, this experiment aimed to quantify protein concentrations of these dysregulated cytokines in both the colon tissue as well as the blood as a potential mechanism to affect brain morphology. In these experiments, the experiment group was treated with 3% DSS for 9 days to induce colitis while the control was treated with water. Protein concentrations of IL2, IL6, and TNF cytokines were measured by ELISA in the colon tissue and blood. The vascular imaging confirmed that colitis affected mice showed altered brain morphology. Early results show a clear increase in pro-inflammatory IL2 and IL6 in the colitis-affected mice. On the other hand, the concentration of TNF remains unchanged. This suggests the potential involvement of cytokines IL2 and IL6 in altering brain morphology of colitis-affected mice.

Mapping Wisconsin Typha species distributions using herbarium records and pollen analysis - (Biology)

By: Arua de Castro Ferreira, Kai Schmitt

Faculty Mentor: Stephanie Lyon

Aggressive species that invade and dramatically alter plant community composition are an ongoing issue in wetland ecosystems. North American wetland have experienced significant increases in the abundance of cattails (genus *Typha*) over the last century, driven by changes in hydrology and nutrient inputs as well as the spread of introduced genotypes. The primary goal of this study was to utilize herbarium records of *Typha* to examine trends in species distribution patterns in Wisconsin over time, particularly focusing on the spread of the introduced *T. angustifolia* and the hybrid (*T. x glauca*) it forms with the native *T. latifolia*. However, *Typha* shows a high degree of phenotypic plasticity, making accurate field identification difficult. Research has indicated that hybrid formation may be more common than previously realized. The native and introduced cattail species are known to differ in pollen structure (monads vs tetrads, with the hybrid *T. x glauca* showing an intermediate phenotype), which can be assessed using standard light microscopy. We examined pollen structure using light microscopy for total of 158 specimens at the Freckmann Herbarium at the University of Wisconsin-Stevens Point: 56 *T. angustifolia*, 89 *T. latifolia* L., and 13 *T. X glauca* collections. Our analyses indicate that several specimens are likely misidentified. We report on correlations between pollen structure and other morphological characters used to differentiate species including leaf width, spacing between male and female flower spikes, and female flower structure. The revised herbarium data set is used to map distributions of *Typha* in hydrologic units over time and identify primary regions of hybridization in the state.

Modulator Dependent PFAS Adsorption within a Porous Solid - (Chemistry)

By: Trevor Rottiger

Faculty Mentor: Joe Mondloch

Per- and poly-fluoroalkyl substances (PFAS) are a class of man-made chemicals containing at least one -CF₃ moiety. Thousands of unique PFAS have been manufactured because they exhibit properties (including non-stick behavior as well as heat-, stain-, and water-resistance) that are desirable for a wide variety of practical applications. Unfortunately, these properties make PFAS extremely stable and persistent in the environment, and, as such, PFAS have been linked to adverse human health effects. Strategies are therefore needed to remove these compounds from point sources and the environment. One promising strategy is called adsorption—a phenomenon that relies on a pollutant (e.g., PFAS) sticking to the surface of a solid. Porous solids are particularly attractive for adsorption because they contain void spaces, and therefore large internal surface areas, which significantly increases their adsorptive capacity. Here we describe how one component of the porous solid, an anionic modulator, can have a significant effect on the adsorption of PFAS within a porous solid.

Nitrogen manipulation of algal composition in Bromeliad phytotelmata - (Biology)

By: Lillian Johnson

Faculty Mentor(s): Stephanie Lyon, Robert Bell

Bromeliads have naturally occurring pools of water held in their upper leaf axles called phytotelmata that are important freshwater ecosystems in terrestrial or aerial systems especially for invertebrates and algae. Algal community composition in tank bromeliad species is typically studied in the natural environment with little to no manipulation of samples. Two individual plants of the genus *Neoregelia* grown in a greenhouse were sampled for an initial community survey. Initial findings showed high abundance of the nitrogen-fixing cyanobacteria species *Gloeotricha*, *Ankistrodesmus* and *Chlorella* both in Chlorophyta (green algae) were found in high abundance as well. 30 pellets of 3:1:2 ratio fertilizer were added to one of the sample plants to increase the nitrogen present in the system and to see if the abundance of heterocysts (nitrogen-fixing cells) declined in *Gloeotricha*. While no changes in species composition and heterocyst abundance were detected after one week, individuals continue to be sampled weekly thereafter and will report on the longer-term effects of nitrogen addition to bromeliad phytotelmata.

Parasite Communities in Populations of Greater and Lesser Scaup in Green Bay, WI - (Biology)

By: Nicole Wagner, Gina Magro, Kao Lee Thao

Faculty Mentor: Sarah Orlofske

Greater and Lesser Scaup populations in the U.S. have been declining since the 1980s. Our research goal is to survey parasites of scaup, including potentially pathogenic trematodes (flatworms), in Green Bay, WI area. We obtained waterfowl carcasses donated from hunters during the 2019-2021 seasons. Birds were dissected, separating their major organs and each organ was inspected for parasites using standardized protocols. Any parasites we found were separated, counted, and identified to the lowest taxonomic level possible using morphological traits. We found a diverse parasite community with cestodes (tapeworms) being the most abundant endoparasites. Specimens from 16 parasite genera were identified. Among the trematodes, we found all three of the pathogenic introduced genera. Monitoring parasites in scaup is important for waterfowl management to better describe the distribution of pathogenic species as well as understand the species interactions with the native parasite community.

PFAS Dependent Adsorption within a Porous Solid - (Chemistry)

By: Kiley Wadzinski

Faculty Mentor: Joe Mondloch

Per- and poly-fluoroalkyl substances (PFAS) are a class of man-made chemicals containing at least one -CF₃ moiety. Thousands of unique PFAS have been manufactured

because they exhibit properties (including non-stick behavior as well as heat-, stain-, and water-resistance) that are desirable for a wide variety of practical applications. Unfortunately, these properties make PFAS extremely stable and persistent in the environment, and, as such, PFAS have been linked to adverse human health effects. Strategies are therefore needed to remove these compounds from point sources and the environment. One promising strategy is called adsorption—a phenomenon that relies on a pollutant (e.g., PFAS) sticking to the surface of a solid. Porous solids are particularly attractive for adsorption because they contain void spaces, and therefore large internal surface areas, which significantly increases their adsorptive capacity. Here we describe how PFAS of varying chain length and head group adsorb within a porous solid.

Phytoremediation in hemp (Cannabis sativa) – using an alternative crop to diversify Wisconsin agriculture and clean-up the environment
- (Biology)

By: Mike Mensah-Ayensu, Madison Haumschild, Christian Howerton, Adam Laehn, Lauren Meunier, Barbara Miller, Sydney Polich, Ashley Prebeg, Sophia Risch, Meghan Schimka, Halle Tallitsch, Mackenzie Wisdom

Faculty Mentor(s): Brian Barringer, Ann Impullitti, Shannon Riha, Bryant Scharenbroch

Hemp (*Cannabis sativa*) has many industrial uses, including phytoremediation (using plants to extract and remove pollutants from soil). However, a lack of institutional research over the past 70 years has left modern-day hemp farmers with relatively little foundational agronomic knowledge. This project aims to evaluate how soil and nutrient conditions affect plant morphology, physiology, and phytochemistry, and to what extent hemp can be used as an effective phytoremediator. In Fall 2021, 120 hemp plants (Colorado Cherry Wine cultivar) were grown in the UW-Stevens Point greenhouse using six soil treatments with different combinations of fertilizer and heavy metals.

Phytochemistry and photosynthetic rates were assessed on the newest, fully expanded apical leaf, and plant morphology and biomass were quantified after the plants were mature. After harvest, additional phytochemistry analysis was performed on floral tissue and the extent to which the plants acted as phytoremediators was quantified. Our results could have significant implications for Wisconsin state hemp farmers and will inform future directions for research focused on this economically important and environmentally friendly crop.

Rapid Synthesis of a MOF for PFAS Removal: An Undergraduate Laboratory Experience - (Chemistry)

By: Tyler VanOursouw, Trevor Rottiger

Faculty Mentor: Joe Mondloch

Metal-organic frameworks (MOFs) are a rapidly growing class of solid-state materials. Their highly porous nature and structural variability have garnered attention from both academics and industry. While several elegant examples incorporating MOF chemistry into the undergraduate curriculum exist, in most instances their synthetic procedures are

lengthy or they lack a connection to real-world applications that inspire undergraduate students. Here we've coupled the rapid aqueous-based synthesis of a MOF with its use as a sorbent for removing perfluorobutane sulfonate (PFBS, a prototypical PFAS) from aqueous solution into an undergraduate laboratory exercise.

Restricted rotation in molecular turnstiles - (Chemistry)

By: Noah Grinde

Faculty Mentor: Nate Bowling

Molecular turnstiles are an interesting branch of compounds with diverse applications. The compounds synthesized here consist of a hexagonal cage that holds a covalently tethered arene in its center. Small central arenes are free to rotate within the cage, but as larger central arenes are used rotation becomes restricted. Presented here is the synthesis and preliminary characterization of these molecular turnstiles with special attention to large central arenes. Sonogashira coupling was used to assemble the turnstile with metal complexation as the ring closing step. Metal complexation is an important advance since it avoids the low yields of a strictly covalent approach. ¹H NMR studies have been used to identify the formation of the turnstiles and to characterize the rotational behavior. Restricted rotation introduces complexity in the coupling patterns not seen in free rotation. Currently, focus has been directed toward developing an asymmetric hexagonal cage containing a central arene that induces restricted rotation.

Texture Based Modeling Approach for Predicting Soil Organic Matter Using Portable X-Ray Fluorescence Spectroscopy - (Chemistry)

By: Mark Cook

Faculty Mentor(s): Dave Snyder, Bryant Scharenbroch

Soil organic matter (SOM) is an important soil characteristic that affects many things including water/nutrient storage, carbon sequestration, and increases in crop yields. Currently used methodology requires either harmful chemical reagents or high temperature combustion which limits their uses to only a lab setting. Here we propose a possible field-based method for quantifying SOM in soils using portable X-Ray Fluorescence (PXRF). SOM was calculated in the lab using loss on ignition analysis. Elemental data measured by the PXRF was stratified by texture and used to build statistical models for SOM prediction. An all-texture model was built along with five others for the different texture classes established (mineral, sandy, loamy, clayey, and organic). Partial least square regression models for each texture were constructed in JMP statistics program. To compare the model's ability to predict SOM we used the r-squared (R²), and the root mean square error (RMSE) of the five models. We hypothesize two things, one being that prediction of SOM with PXRF data is possible and two that prediction will improve with texture stratification. If these hypotheses are supported, we can both easily take spectral data and measure texture in the field leading to further development of a field-based SOM prediction with PXRF.

The Correlation of Parasites between Ducks and Snails Collected from Mead Wildlife Area - (Biology)

By: Elizabeth VanDomelen, Roiya Meyer, Nicole Wagner, Gina Magro, Kao Lee Thao

Faculty Mentor: Sarah Orlofske

Trematodes, or flatworms, have complex life cycles involving snails, a variety of intermediate hosts, and vertebrate final hosts. These parasites infect their hosts through consumption, so infections can provide evidence of host diet and long-term evidence of host presence in the habitat. We compared parasite communities between 76 snails and 11 waterfowl samples collected from Mead State Wildlife Area. We observed 2-5 parasite morphotypes (prevalence 36-40%) in the snails. Waterfowl had 1-5 parasite morphotypes and all were infected with at least one species of flatworm. Our study revealed an overlap in the parasite communities. Echinostomes and Ribeiroia were found in both snails and waterfowl at two sites. The differences in parasite communities could be due to the presence of other final hosts at the site and waterfowl migration. Species level Identification of parasites will allow us to detect species that could be used as potential biological indicators of host communities.

Water chemistry and algal community change in lakes in the US using NEON data - (Biology)

By: Reece Garrigan

Faculty Mentor: Krista Slemmons

Globally lakes have experienced significant changes in nitrogen deposition, surface temperatures and ice on/off dates. Diatoms, one of the main primary producers in lakes are particularly sensitive to these environment changes and can be indicators of larger ecosystem shifts. Changes in chemical and physical lake characteristics have been shown to alter diatom community structure and diversity. I analyzed diatom communities and chemistry composition in lakes within the National Ecological Observatory Network (NEON) dataset over the last six years. Preliminary data indicates a direct relationship between lake chemistry, particularly nitrogen and the shifts in algal diversity over time. I also identified dominant diatom species found at each NEON site. Analyzing shifts in diatom communities allows a better understanding of how climate and lake chemistry interacts with the aquatic communities over the course of several years and may provide researchers with tools to predict future shifts in algal diversity as well as lake structure and function.

π - π Stacking in Novel Arylene Ethynylene Molecules - (Chemistry)

By: Megan Rammer, Marcie Nelson

Faculty Mentor: Nate Bowling

Arylene ethynylene (AE) molecules are a class of compounds that contain uniquely impressive optical and electronic properties due to their conjugated backbone. The AE molecules synthesized in this research are designed to contain overlapping aromatic

branches that create intramolecular π - π stacking and forced axial chirality through steric restraints within the molecule. These structural properties— which are relatively unstudied in conjugated organic molecules— can be used to induce charge transfer interactions in solution that can be studied using NMR and UV-vis spectroscopies. Reported here is the synthesis and preliminary characterization of novel AE molecules that were prepared using Sonogashira coupling reactions utilizing various alkyne components. Currently, these molecules are being designed to have opposing electron withdrawing and electron donating branches that are theorized to create unique electronic properties and intermolecular stabilization.

School of Humanities and Global Studies

A Europe Divided: Contrasting European Centenary Commemorations of World War I (2014-2018)- (History and International Studies)

By: Graeme Gross

Faculty Mentor: Valerie Barske

In this research project, I examine responses to the 2014-2018 Centenary World War I Commemorations. I consider the role of specific political, social, or emotional vehicles that shape modern remembrance practices related to WWI. At the same time, a general loss of primary sources to time, war guilt, and societal shame continue to impact collective remembrance of the war. I identify how the British Heritage Lottery Fund supported new remembrance activities across Europe and led meaningful collective awareness events one hundred years after key historical moments. My research highlights intersectional issues such as nationalism, racism, populism, and poverty. I unpack how nationalism and discrimination framed many events that failed to address contributions of Muslim soldiers, ethnic Africans, and other excluded populations across Europe. Finally, I compare British and German responses to World War I commemorations and provide cultural background to their commemorative events.

Alsace-Lorraine, Collective Identity, and Human Rights: An Examination of Europe's Most Contested Territory and the Work of Rene Cassin (1914-2021) - (History and International Studies)

By: Anthony Fannin

Faculty Mentor: Valerie Barske

In this research project, I examine the development of cultural identity and the significance of spatial memory in the Alsace-Lorraine region of France between 1914 and 1960. I analyze the relevant works of French jurist Rene Cassin (1887-1976) in the areas of human rights, education and awareness starting in 1948, as well as exploring his global impact today. My research focuses on Alsace-Lorraine, in particular the city of Strasbourg, France, and its historical and cultural impact. I examine modern

commemorative monuments such as the UNESCO World Heritage Site of Grande-Ile & Neustadt, documents including the Universal Declaration of Human Rights, and human rights educational seminars established by Rene Cassin. My research highlights the concepts of collective identity and spatial memory in Alsace-Lorraine during World War I and today, and the impact of cultural differences of German and French citizens. In contemporary times, institutions such as the Rene Cassin Foundation and the European Court of Human Rights remain impactful globally. During historical moments when conflict appears omnipresent and inflicts widespread burden, the need for education and awareness of human rights continues to resonate within Europe and the world.

Beheading Anne Boleyn's Lasting Memory: Inspecting the Portrayals and Cultural Remembrance of the Infamous Queen (1500-2022) -
(History and International Studies)

By: Kelsey Zdziarski

Faculty Mentor: Valerie Barske

In my research, I examine the collective remembrance of Anne Boleyn (?-1536). I argue that specific commemorative practices create contradicting fictionalized representations of Boleyn, King Henry the 8th's second queen from 1533 until her beheading in 1536. Boleyn stands as a figure who influenced England to break from the Roman Church. Views of Anne have drastically changed as time progresses. I consider various academic arguments including the work of British historian John Foxe who promotes an exemplary yet perhaps overexaggerated view of Boleyn. In addition, I discuss the inconsistent depictions and commemorations of Boleyn's character including portrayals of a promiscuous Anne in 21st century films such as *The Other Boleyn Girl* (2008) along with the strong feminist adaptation made for teens in novels such as *The Dead Queens Club* (2009). The usage of primary letters, literature, media, public forums, and physical monuments all amplify the paradoxical approaches taken to assemble the image of Boleyn through time. The dissection of Boleyn's many fabricated identities exposes a gradual push towards an innovated and a refined Anne, but the victimization narrative that has been set in place remains relevant. Anne Boleyn's remembrance relates to the interdisciplinary discourse revolving around the altering of women through history. The act of altering women, even in a positive light, may in the end weaken and lessen the impact of unveiling feminine narratives.

Changing Government Stance on Religion in post-Mao China -
(Philosophy and Religious Studies)

By: Miles Curnutt

Faculty Mentor: Luke Whitmore

After the death of Mao Zedong in 1976, the People's Republic of China significantly changed its policies on religious regulation, and no longer persecuted organized religion as it had from the time of the cultural revolution until the death of Mao. Among the theories as to why this change in policy happened, there is the idea that this was done for the purpose of exerting more control over organized religion. Merle Goldman's writing on the situation provides one of the best understandings of the shift. The belief is that the PRC felt that if the religions were sanctioned and under the umbrella of the People's

Republic of China as institutional religious organizations, they would not retreat underground where they would be beyond the watchful eye of the state. This was quite common during the Cultural Revolution when there was an attempt to snuff out religion in its entirety because of the vicious persecution of religion by the state, which showed that even with the most dire circumstances religion will persist. In turn, this seemed to lead to a level of understanding for the Chinese state that stable rule over a relatively content populace required some level of religious freedom. This is the most useful way of explaining the phenomenon, as it seems to be the most well-rounded and realistic explanation. The theory considers China's religious history before the rise of communism, international affairs, economic factors, and particularly the changing culture. It seems that the center of power in China came to an understanding that the only way to maintain stable power over the populace was to allow more religious practice and general freedom of the populace. The theory emphasizes important points to focus on in order to help describe the change.

Changing the Trajectory of Education: Remembering the Determination of Maria Montessori (1870-2022) - (History and International Studies)

By: Anna Goldbach

Faculty Mentor: Valerie Barske

In this research project I argue that Maria Montessori (1877-1952) contested the norms of the early 20th century and historically changed the trajectory of educational systems on an international level. I analyze her achievements from the late 1800s to the late 1940s. I also assess contemporary academic articles that focus on the impact of Montessori on Chinese educational systems and African-American students to highlight her global impact. Collectively, scholars emphasize her significance on a multicultural level. In addition, I consider professional writing and primary sources from the following areas of study to make my claims: history, psychology, pedagogy, commemoration studies, and international studies. Many commemorative works remember Montessori as a selfless woman who challenged the ideologies of those in charge during her time; her work remains daring and continues to impact education on a global scale.

Christian Communion as Commemorative Practice: Cenacle Tourism, Embodied Memory, and Historical Analysis of the Last Supper (2012-2022) - (History and International Studies)

By: Joan Radtke

Faculty Mentor: Valerie Barske

In this research project, I examine the historical and symbolic practices of Christian communion as a commemoration of the death and the resurrection of Jesus Christ. I draw from the works of historian Leopold Scholtz who considers scriptural and archival evidence to approach the crucifixion and resurrection through a relatively neutral lens. In addition to a variety of interdisciplinary academic sources, I consider reviews posted by tourists on TripAdvisor about their experiences visiting the Cenacle in Jerusalem from 2012-2022. Also known as the "Upper Room" in Mount Zion, the Cenacle serves as a

key memorial site for Christians as the place traditionally promoted as the location of the "Last Supper." Through the theoretical framework of "embodied memory," I analyze how witnesses express specific embodied experiences at this site, either as participants in international heritage tourism or as Christian religious pilgrims. In the end, I discuss how contemporary communion rituals function as a form of culturally specific and religiously significant commemorative practice.

Christopher Columbus Statue Removal in Latin American Countries: The Symbol of Genocide, Discrimination, and Colonial Oppression (2020-2022) - (History and International Studies)

By: Arlene Salmeron

Faculty Mentor: Valerie Barske

During the Covid-19 pandemic in 2020 and after the sad death of George Floyd at the hand of the police, protesters defending human rights around the world started raising their voices. They began demanding that statues or monuments of individuals connected to historic acts of racism, discrimination, genocide, or slavery needed to be removed. In particular, activists in Latin American countries targeted images of Christopher Columbus as symbols of colonial oppression and racism against minorities and groups of people who suffered because of his actions. I focus my research project on specific countries such as Mexico, Columbia, and Argentina. I examine why leaving racist memorials in place, specifically the Christopher Columbus monument, may be considered disrespectful. In maintaining memorial sites that honor or memorialize historically racist acts, these forms of commemoration may be viewed as condoning or even celebrating racism. More specifically, my research analyzes qualitative data sources such as videos of testimonies from descendants of colonized peoples affected by Columbus. In the end, my research highlights interdisciplinary research and academic articles from different international scholars as well as blogs of activists who continue to defend human rights.

Commemorating the Chinese Cultural Revolution: National Remembrance Practices and Cultural Transformation (1966-2022) - (History and International Studies)

By: Natsumi Iwamoto

Faculty Mentor: Valerie Barske

In this research project, I examine the Chinese Cultural Revolution (1966-1976) to compare commemorative practices of this historical period created by the Chinese Communist Party (CCP) versus examples of contemporary collective memory. More specifically, I analyze the intersection of gender, race, class, and national identity to unpack the complexities of remembering an historical era defined by competing experiences of cultural trauma. My evidence includes primary sources such as archival images, photographs, Chinese newspapers and propaganda posters from the 1970s, as well as official CCP museums and memorial websites. In addition, I consider TripAdvisor reviews posted by tourists visiting the "The Military Museum of The Chinese People's Revolution." Ultimately, my research highlights contradicting commemorative

practices of official CCP historical narratives versus new forms of articulating cultural transformations.

Commemorating the Historical 1666 Fire: The Great London Fire Monument and the London's Burning Festival (1671-2016) - (History and International Studies)

By: Amanda Momont

Faculty Mentor: Valerie Barske

In this research project, I examine the ways in which the Great London Fire Monument and the London's Burning Festival serve to commemorate the 1666 London Fire, a historically devastating disaster that shaped urban reforms and fire safety policies. My research considers developments in commemorative practices related to this fire over the course of history. I analyze the pros and cons of utilizing monuments and festivals to commemorate this complex historical event. More specifically, I consider the example of the London's Burning Festival, held from August 30-September 4, 2016, to remember the 350th anniversary. This festival included exhibitions, art installations, performances, walks, talks, lectures, etc. that responded to the significance of the historic fire and considered modern threats faced by world cities today from climate change to violent conflict.

Commemoration and Collective Memory in Post-Genocide Bosnia (1996-2022) - (History and International Studies)

By: Alex Jones

Faculty Mentor: Valerie Barske

In this research project, I unpack the commemorative practices and effects of collective memory in Bosnia after the Bosnian Genocide (1996-2022). This project employs interdisciplinary research from the fields of history, gender studies and theories of nationalism to analyze the long-term impact of a genocide on a cultural group. More specifically, I consider how collective violence shapes religious practices, folklore, and narrative re-tellings of history. This analysis examines first-hand testimony from survivors, memorial sites such as the Srebrenica Genocide Memorial, and complex views of contemporary Serbians whose ancestors may have participated in the violence. I also consider how the legacy of these mass killings shapes the collective Bosnian memory and culture. I articulate how trans-generational trauma impacts a cultural group for decades and the kinds of trends witnessed in post-genocide folklore and storytelling around the world. This analysis draws conclusions about how these specific international cultural studies examples relate to the prevention of genocide in the future and throughout the world.

Comparative Commemorations of Hiroshima and Nagasaki (1945-2020) - (History and International Studies)

By: Nicolas Granados Rodriguez

Faculty Mentor: Valerie Barske

In this research, I examine two specific memorial places and historical sites central to commemorative practices produced to raise global awareness of the bombings of Hiroshima and Nagasaki. The UNESCO World Heritage Site of the Hiroshima Peace Memorial features the Genbaku Dome in reference to the bombed shell of the prewar Hiroshima Prefectural Industrial Promotion Hall. These ruins of the only structure left standing after the bomb on August 6, 1945, serve as a symbolic place for remembering loss and representing the immense destructive power of atomic bombs. On the other hand, the Nagasaki National Peace Memorial Hall focuses more specifically on commemorating the victims of the atomic bombings. By examining official Japanese government statements, commemorative anniversaries, survivor testimonies and artwork as well as multi-lingual tourist websites, I argue that these sites function as vital places of enacting commemoration and reinventing remembrance culture. I analyze how national identities intersect with collective memory and the production of historical narratives. In the end, this research continues to resonate as scholars and activists consider the long-term effects of “first world nations” using atomic bombs on civilian populations.

Contemporary Italian Commemorative Practices on the Istrian Exodus and Foibe Massacre (2004-2022) - (History and International Studies)

By: Noah Bunge

Faculty Mentor: Valerie Barske

In this research project, I examine the significance of commemoration and collective memory of the Foibe Massacre and the Istrian-Dalmatian Exodus within Italian remembrance culture. These mass killings and subsequent fleeing of ethnic Italians from Yugoslav Partisans occurred before and beyond WWII (1943-1956). Formal commemorative practices related to these events began in 2004 when the Italian government established February 10th as the National Memorial Day of the Exiles and Foibe. I analyze primary sources from multiple media such as archival documents, newspapers, songs, and photos. I also use TripAdvisor reviews to examine how international tourists respond to the memorial site linked to these events. I consider how these reviews address whether the government “is doing enough” to remember the victims. Since some historians classify the massacre as an act of “ethnic cleansing,” I utilize intersectional concepts of race and nation in my analysis. This research remains significant in highlighting how “forgotten” trauma continues to affect the lives of people for generations.

Dwellers of the Pine: Ho-Chunk Survivance and the Paac Cíinąk (Wittenberg) Community, 1874-1894 - (History and International Studies)

By: Jarita Bavido

Faculty Mentor: Rob Harper

After the forced removal of 1873, the Wisconsin Ho-Chunk, known as Dwellers of the Pine or Waaziiija Hači, claimed homesteads and built a community in Paac Cíinąk (Wittenberg) with close ties to Stevens Point and the parcel of land that is our campus today. While maintaining ancient traditions around migration, subsistence, and ritual, they also used institutions, industry, commerce, and even entertainment to forge new patterns for survivance. From 1874-1894, Ho-Chunk and other Native communities in the northeastern quadrant of the Central Sand Plains often gathered in Stevens Point, sited as it was at the confluence of the Plover and Wisconsin Rivers, at the intersection of railways and roads, and as the gateway to both the pineries and cranberry bogs. After the Normal School was built, this locus shifted elsewhere. This research project explores the active presence of the Paac Cíinąk community in the place story of Stevens Point.

Heroism or Terrorism? Collective Memory and Commemoration of the Sarajevo Assassination (2014-2022) - (History and International Studies)

By: Addie Schmoll

Faculty Mentor: Valerie Barske

In this research project, I examine the conflicting commemorative practices surrounding the 1914 Sarajevo assassination in Austria, Serbia, and Bosnia and Herzegovina from 2014 to the present. The assassination of Austro-Hungarian Archduke Franz Ferdinand and his wife by 19-year-old Bosnian Serb Gavrilo Princip effectively sparked the global catastrophe that became known as World War I. One hundred years later, controversy struck between Serbians and Bosnians over the tone in which the centenary commemoration of the event in Sarajevo should be held. Still today, landmarks such as museums and statues represent the contrasting collective memories of the assassination and its actors. In my evaluation of how differently Ferdinand, Princip, and the assassination have been commemorated since 2014, I rely on academic journals and news articles as well as websites and travel sites of commemorative locations. Additionally, I highlight how scholars connect this matter to the overarching concepts of commemoration and collective memory. My research presents a study of why such an historically significant event may be remembered so differently depending on competing national and cultural perspectives.

Historical Statecraft Among Stateless People: Selective Memory and the Commemoration of General Vang Pao (1955–2022) - (History and International Studies)

By: Stephanie Vang

Faculty Mentor: Valerie Barske

In this research project, I explore how Hmong Americans commemorate the Hmong General Vang Pao, a central figure supported by CIA operations in Laos from 1955–1975. General Vang Pao is commemorated in monuments and through performing arts at Hmong holidays and festival events as a “fatherly” and historic figure. My sources include local oral history interviews, archived media articles, current debates, as well as official documents from the CIA and U.S. governmental publications. My research focuses on the intersections of nation, ethnicity, gender, and socio-economic class within the context of Hmong society. I utilize the theoretical framework of “historical statecraft” to examine selective memory, along with the psychological framework of “psychological inflexibility” to analyze the maintenance of historical trauma through expressions of detachment, withdrawn systems, secrecy, silence, shame, and unresolved grief.

Hmong Commemorative Art Forms and Their Legacy Among Hmong Americans Post-Vietnam Wars (1970s–Present) - (History and International Studies)

By: Cassandra Xiong

Faculty Mentor: Valerie Barske

In this research, I examine how cultural loss shapes commemorative practices for Hmong Americans by focusing on two specific art forms. The Hmong represent an ethnic group who originated in southern China as early as the Han Dynasty (202BCE– 220CE). After experiencing genocide and persecution from the Chinese, they fled en masse to the mountains in Southeast Asia. Before the Vietnam Wars, the Hmong were pulled into the 1961 Secret War in Laos to aid the CIA in preventing the North Vietnamese from invading South Vietnam. Hmong refugees then sought asylum around the world, many resettling in Minnesota, Wisconsin, and California during the 1970s–1980s. However, a growing concern is that Hmong Americans, especially younger generations, are losing Hmong culture as a result of assimilation. This concern includes the loss of commemorative art forms such as kwv txhij (goo-TSEE-uh) and paj ntaub (ba-nthow). Kwv txhij is a vocal art style often improvised and performed to express and process emotions, such as love, sadness, and grief. Paj ntaub, sometimes called a Story Cloth, serves as a form of historical storytelling through a cloth hand-embroidered often with Hmong tribal patterns. However, after the Secret War, women embroidered images that depicted the realities of Hmong wartime experiences. In my research, I examine how Hmong Americans engage in these commemorative art forms online and at public events. The loss of these commemorative art forms would be tragic for Hmong Americans as they would lose these ways of sharing their narratives and processing historical trauma that are unique to Hmong culture.

How Commemoration is Shaped by Collective Memory of Communism and the Soviet Union 1991-Present - (History and International Studies)

By: Navis Brennan

Faculty Mentor: Valerie Barske

In this research project, I examine the collective memory of the USSR in post-communist states and nations from 1991 to the present. More specifically, I consider forms of commemoration that incorporate and tackle the frameworks of class, nationality, culture, and gender as well as intersectional connections between these identities. I analyze how the USSR inflicted wide influence on countless cultures such as the Nation of Transnistria, which maintains Soviet identity and culture through the celebration of Soviet holidays. I also explore oral testimonies of citizens who resist the idea of Soviet monuments as oppressive and instead view them as part of their collective memory. This research matters because the commemoration of life under Soviet communism for some cultural groups may be more important than the vilification of the phenomenon of communism. The collective memory and commemoration of communism and the USSR is significantly different between the public and the governments that have succeeded former communist governments. Until we recognize these differences, the sociological impacts of the USSR cannot be truly grappled with, hindering important awareness of human experiences and the ways that these cultural groups attempt to commemorate their Soviet pasts.

Immersive Theatre as a Means of Commemorating Afghan Immigration (1979-2022) - (History and International Studies)

By: Abigail Loria

Faculty Mentor: Valerie Barske

In my research project, I combine two of my greatest passions to examine how immersive theatre functions as a commemorative practice for refugee stories and movements. I consider Afghan immigration post the Saur Revolution (1978) to the present-day. With the recent reclaim to power by the Taliban in August of 2021, the Afghan refugee crisis reached an all-time level of urgency and influx. In order to grapple with the realities of refugee experiences, British playwright Clare Bayley created the immersive play *The Container* (2007), which features a group of Afghan, Somali and Turkish refugees being smuggled into England. Originally performed in London outside of the Young Vic Theatre, an audience of approximately 20 people are brought inside a 40-foot shipping container right along with 5 actors. Through a raw and painfully honest experience, *The Container* reveals the power of immersive theatre and its ability to combine history with performance to educate and to commemorate.

International Women's Day and Gendered Commemorations of Chinese Women (1922-2022) - (History and International Studies)

By: Brielle Lueck

Faculty Mentor: Valerie Barske

In this project, I examine the importance of International Women's Day (IWD) as a gendered commemorative practice for women in modern and contemporary China. Building on events in the U.S. and Germany ca. 1909-1910, Chinese communist supporters first celebrated a version of IWD as early as 1922. I analyze specific intersectional identities of gender, nationality, class, and political ideology to consider the impact and significance of IWD on Chinese celebrations of women. By examining primary sources such as propaganda throughout different time periods and current media, I contend that various stakeholders including the Chinese Communist Party (CCP) employed IWD to promote particular political ideologies about the role of women. The CCP created milestones for recognizing women and hosted the 1995 UN World Conference on Women in Beijing. In this research, I explore the issue of gendered cultures of remembrance in China and the specific significance of an international holiday for local national political agendas.

Jane Goodall and Steve Irwin: Pop Culture, Commemoration, and Conservation (1996-2022) - (History and International Studies)

By: Shannon Doherty

Faculty Mentor: Valerie Barske

With the changing face of environmental conservation in a neoliberal society becoming obsessed with celebrity and image, many well-known iconic conservationists have become pop culture figures. Two of the most popular conservationists include Jane Goodall (b.1934) and Steve Irwin (1962-2006). Depicted as "heroes" and "role models," their work influenced not only the scientific world, but also their strong personalities created large fanbases inspired by their actions. In this project, I examine commemorations of the two conservationists and their work through the lens of pop culture, collective memory, celebrity and elitism, national identity, and gender. More specifically, I consider how new modern forms of commemoration include the creation of unique merchandise such as the recently produced "Jane Goodall Tribute Lego Set" (2022) and the Wild Republic "Steve Irwin Talking Crocodile Rescue Action Figure" (2007). The commemoration of these conservationists includes a form of capitalist "hero worship," but also shows the possibility for meaningful influence on new generations of nature enthusiasts.

Power and Politics in Commemorating “Comfort Women”: Analyzing Gender, Class, and National Identities (1946-2022) - (History and International Studies)

By: Sophia Mclean

Faculty Mentor: Valerie Barske

In this research project, I explore the politics surrounding contemporary commemorations of “comfort women” in Korea, Japan, and the U.S. The euphemistic term “comfort women” refers to an estimated 200,000 women forced into imperial Japan’s system of institutionalized sexual slavery (ca. 1932-1945). I analyze collective memory and competing commemorative practices through the lens of intersectional identities of gender, class, and nation. I examine evidence such as survivor testimonies from women who participated in the Asian Women’s Fund Atonement Project and official Japanese government statements by PM Shinzo Abe including his “letter of apology” in 2001. In addition, I unpack the contemporary academic controversy of 2021 in which Harvard law professor J. Mark Ramseyer published a peer-reviewed paper alleging that these women were paid sex workers with legitimate contracts rather than coerced sexual slaves. His unfounded statements and lack of evidence created an international outcry by academics and activists. In the end, I argue that this attempt to dismiss survivor experiences not only ignores gender-based colonial violence but also re-ignites historical trauma that limits the voices of female survivors.

Reconciling History: An Analysis of Hungarian Holocaust and Communist Museums (2002-2022) - (History and International Studies)

By: Briana Walker

Faculty Mentor: Valerie Barske

In this research project, I examine Hungary’s collective memory since World War II. The legacy of the Holocaust (1941-1945) and Soviet occupation (1922-1991) remain inescapable chapters in Hungary’s reconciliation of a complicated past as a former Soviet satellite country. More specifically, I utilize media studies and ethnographic research to analyze qualitative data, including Hungarian museum exhibits and visitor feedback. Thus, I demonstrate that creating a national narrative impeded sensitivity and inclusion of marginalized groups. In doing so, fusing Holocaust and Soviet era traumas has diminished the distinction and importance of both issues that continue resonate to the present-day and demonstrate trans-generational significance.

Religious Rituals, Conceptions of Death, and Mourning in Mexico (1950-2022) - (History and International Studies)

By: Seth Smith

Faculty Mentor: Valerie Barske

In this research project, I investigate the relationship between religious rituals and the commemoration of the dead in Mexico City. The colonial era in Mexico ranges from the 16th to 19th centuries and commemorative culture developed from a syncretism of

Catholic and Indigenous beliefs. I examine this cultural blend through the intersection of religion, death culture, and re-invented traditions as well as the framework of social reactions to celebrity death. I analyze the death of the Mexican actor Pedro Infante (1917-1957) through an investigation of his grave and footage of his funeral. I also consider private remembrance culture by exploring published images of local family-based Day of the Dead altars or ofrenda (offering place) and testimonies from mourners in Mexico City. I also compare cultural differences between Mexican funerary practices and funeral culture in the contemporary U.S. My research acknowledges how colonial pasts continue to permeate one of the most emotionally charged aspects of cultural rituals and individual lives centuries after the initial colonization.

Remembering “Operation Condor”: Examining a Campaign of Terror in South America (1970-2022) - (History and International Studies)

By: Shalea Frandsen

Faculty Mentor: Valerie Barske

In this research project, I assess crimes against humanity, authoritarian regimes responsible, and collective memories of “Operation Condor” (OC) in Paraguay, Uruguay, Brazil, Argentina, and Chile. OC enabled radicalized views that led to the political persecution of hundreds of thousands of civilians across South America throughout the 1970s. In my analysis, I utilize interdisciplinary theoretical frameworks on commemorative practices and collective memory. I examine intersectional political and national identities in historical evidence including primary source declassified government documents, former detention centers such as Punta Carretas and El Mueso De Memorias, commemorative multimedia studies, and oral testimonies. I analyze the sources through their importance, effectiveness, and consequences they give to my topic. I examine the lack of education and commemorative practices surrounding the operation in both national and regional collective memories throughout the Americas. Through my research, I illustrate how the United States and specific South American governments worked together to create a campaign of violence to instill fear and eliminate the freedoms of political speech in South America.

The Central Wisconsin Railroad and the Growth of Wisconsin Communities - (History)

By: Lucas Makaryk

Faculty Mentor: Nancy LoPatin-Lummis

The purpose of this project is to analyze the correlation between railroad development and community growth in central and north-central Wisconsin in the years following the American Civil War. This research focuses primarily on two prominent factors of early community development in Wisconsin: immigration appeal and population growth. This project aims to see how these two factors may have been impacted by Wisconsin’s railroads. This is done by analyzing the need, appeal, and subsequent impact of population growth caused by railroad development in Wisconsin. For a local perspective, this project focuses on the Wisconsin Central Railroad Company, one of the most prominent railroad companies in Wisconsin, from its founding in 1871 until its dissolution into the Soo Line Railroad in 1909. Research for this project utilized a mix of

both primary and secondary sources. Primary sources used include maps, advertisements, brochures, petitions, and census data from 1870 to 1900. Secondary sources used include individual histories and studies of the Wisconsin Central, academic essays, Wisconsin histories, and statistical analyses of railroad development and population growth. This project utilizes and introduces the arguments of previous historians of Wisconsin's railroads to build an understanding of the link between population growth and railroad development in Wisconsin. This research is relevant today because it illustrates one of many ways that railroad development benefited the establishment of many Wisconsin communities that remain today.

School of Mathematics, Computing, Physics and Astronomy

A Detailed Photometric Analysis of Early-Type Spiral Galaxies in Pairs -(Physics and Astronomy)

By: Miranda Gorsuch

Faculty Mentor: Adriana Durbala

We explore the relative role of “nature versus nurture” (intrinsically versus environmentally driven influences) in shaping the morphology and evolution of galaxies by performing a detailed photometric analysis of early-type spiral galaxies found in galaxy pairs. We use Fourier analysis to model the properties of the spiral arms and bulge/disk/bar decomposition analysis to find the properties of the bulge, disk, and bar of each spiral galaxy within our sample. We investigate the effect environmental density has on the formation and evolution of early-type galaxies by comparing our results with previous work done for samples of early-type galaxies found in different environments (isolated and loose groups). This analysis will allow us to gain more insight into the formation and evolution of spiral galaxies across a range of environments.

A photon correlator for studying fluorescent emission from molecules -(Physics and Astronomy)

By: Chloë Gulbranson, Paige Bulgrin

Faculty Mentor: Palash Banerjee

Fluorescent molecules emit a burst of photons when illuminated by a laser pulse. These photons are emitted randomly but the hidden statistical correlations between these photons reveal important information about the environment surrounding the molecule. We describe the construction and operation of an experiment that is specifically designed to capture this weak fluorescent emission from small femtoliter volumes containing at most a few tens of molecules. The experiment consists of a green laser, optical filters and a high magnification objective, a single photon detector, fast electronics, and a pulse counter that records the arrival time of each photon using a 10 MHz reference clock. The experiment

is controlled by our own custom software which periodically reads out the array of photon arrival times, computes and then displays the photon correlator. We describe initial results obtained from dilute solutions of olive oil and provide details on how the photon correlator is computed and used to obtain information about the local molecular concentration and diffusion time. We also describe the experimental challenges faced and discuss future work using this hardware.

Constructing a field trap for confining a magnetic moment in space -
(Physics and Astronomy)

By: Jessica Ryun

Faculty Mentor: Palash Banerjee

We describe the construction and analysis of a trap designed to confine a magnetic moment. The trap consists of a large static field gradient along the axial direction which is provided by two large ring magnets. The gradient opposes gravity and provides the necessary levitating force; however, a trap defined by static field gradients alone is unstable. Therefore, we use time dependent ac fields to provide a confining force along the radial direction which leads to stable equilibrium. These ac fields are characterized by a large curvature and are generated by four small coils placed along the axis of the trap. The field profile leads to a trapping volume with dimensions of approximately 1 cm and is large enough to trap moments with masses of up to 100 milligrams and moment-to-mass ratios of roughly 100 Am²/kg. The dynamics of the trapped moment are described by the Mathieu differential equation. We use the solutions of this differential equation to describe the experimental challenges faced in constructing a stable trap.

Exploring Properties of Galaxies and the Baryonic Tully-Fisher Relation -
(Physics and Astronomy)

By: Emily Ziech

Faculty Mentor: Adriana Durbala

We investigate the properties of ~ 30,000 galaxies using data from the ALFALFA-SDSS Galaxy Catalog. This is a radio optical catalog based on 100% complete Arecibo Legacy Fast Arecibo L-band Feed Array (ALFALFA) survey and Sloan Digital Sky Survey (SDSS). The baryonic Tully-Fisher relation, which describes the relationship between the mass of a spiral disk galaxy and its rotational speed, is examined. Other properties explored include stellar mass, star formation rate, absolute magnitude, and color. These properties and their relationships to each other are analyzed and compared to those from previous studies found in research articles.

Exploring Quasars Through Their Broad Emission Line Shifts and Radio Morphology -
(Physics and Astronomy)

By: Nicholas Quisler

Faculty Mentor: Sebastian Zamfir

Quasars are the most energetic types of Active Galactic Nuclei, presumably powered by supermassive black holes accreting matter from their immediate vicinity. Their copious

energy output originates in a relatively small volume of space, much smaller than the distance that separates the Sun from its nearest stellar neighbor. Given their cosmological distances and their compact physical size, the only hope to resolve their structure relies on spectroscopy, rather than direct imaging. We investigate large samples of optical quasar spectra, originally acquired by the Sloan Digital Sky Survey and subsequently measured and cataloged by various professional groups. We use very recent, vetted catalogs of spectral measures (publicly available), and extract their radio morphology maps from databases produced by the Very Large Array of Radio Telescopes at 20 cm wavelength. The focus is on the shifts (relative to the internal rest-frame of the quasars) of the characteristic broad emission lines (Balmer lines, MgII2800 Å, etc.) and the extended radio-morphology driven by large-scale jets launched by the active galactic engines. We report on new insights into the fascinating world of quasars using a multi-wavelength approach.

Exploring the Most Extreme Balmer Broad Emission Line Shifts in Quasars - (Physics and Astronomy)

By: David Pagel

Faculty Mentor: Sebastian Zamfir

Quasars are some of the most energetic phenomena in the universe. Their engines are produced by super massive black holes (at the center of galaxies) which accrete matter and release the equivalent of hundreds if not thousands of times the luminosity of Milky Way. Spectroscopy is the only tool that allows us to probe the physics and structure of quasars. The use of vetted catalogs of quasars spectral measures enables us to explore two extreme subsets, quasars with extremely blueshifted and redshifted broad emission lines, respectively. We enrich our analysis with radio and infrared data also extracted from public databases. Here we report a few interesting findings of our project.

Exploring the Properties of Galaxies with Different Morphologies - (Physics and Astronomy)

By: Abigail Adams

Faculty Mentor: Adriana Durbala

We investigate the properties of galaxies using the overlap sample of ALFALFA-SDSS catalog and Galaxy Zoo 2. The ALFALFA-SDSS catalog is a radio optical catalog of ~30,000 galaxies based on 100% complete Arecibo Legacy Fast Arecibo L-band Feed Array (ALFALFA) Survey and Sloan Digital Sky Survey (SDSS). The Galaxy Zoo 2 project provides morphological classifications for ~250,000 galaxies in the SDSS. We explore the baryonic Tully-Fisher for different morphological types. The baryonic Tully-Fisher describes the relationship between the mass of a spiral disk galaxy and its rotational speed. Other properties explored include stellar mass, star formation rate, absolute magnitude, color, presence of bars, etc. We use Python programming to accomplish these tasks.

Exploring the Properties of Giant Radio Quasars Using Optical Spectra and Infrared Photometry - (Physics and Astronomy)

By: Jose Monroy

Faculty Mentor: Sebastian Zamfir

Giant Radio Quasars (GRQ) have a projected linear size greater than 2.3 million light-years, the equivalent of more than 20 Milky Way-like galaxies put together. They are powered by supermassive black holes (BH) lurking at the center of their host galaxies. The BH is accreting mass (“eating”) and launching fast-moving (relativistic) jets of plasma while producing copious amounts of energy across the entire electromagnetic spectrum. The central “engine” however would fit comfortably within the space that separates our solar system from the nearest stellar neighbor, which is about 4.2 light years away. We cannot resolve the structure of quasars with direct imaging. We must rely on spectroscopy to reveal the physics and geometry of these active galactic nuclei. We want to explore if the GRQs have special properties (e.g., BH mass, rate of accretion) relative to the general population of quasars.

PEC Water Splitting: Band Gaps and other Bands... like The Catalytic Semiconductors - (Physics and Astronomy)

By: David Coleman

Faculty Mentor(s): Ken Menningen, Shannon Riha

The challenge of greenhouse gas emissions requires innovative solutions, such as replacing fossil fuels with hydrogen as a clean, abundant fuel source. By generating electricity using solar energy, metal oxide semi-conductors can split water molecules into their fundamental elements, hydrogen and oxygen. This process is called photoelectrochemical (PEC) water splitting. Many material specifications must be considered when searching for effective semiconductors. Identifying a scalable metal-oxide semiconductor for PEC is a challenge not yet surmounted in science. This project focuses on potential hematite (Fe₂O₃) semiconductors combined with ruthenium and palladium. Solutions containing appropriate metal ions were dropped onto plates using a micropipette, allowed to dry, and then calcinated at high temperature to produce oxide semiconductors. The plates were then tested for oxygen evolution efficiency using the HARPOON experiment and photocurrent using the SEAL experiment. The results of these experiments will be described in this presentation.

Saturated Absorption Spectroscopy of Rubidium - (Physics and Astronomy)

By: Miles Borkowicz

Faculty Mentor: Chris Verzani

Scientific applications using lasers are important in the area of precision atomic and molecular spectroscopy. Spectroscopy of this type leads to better understanding of atomic and molecular structure. Spectroscopy is also used in metrology where for example, the length of one second is based on a hyperfine transition frequency in atomic cesium. Traditional methods yield doppler broadened spectra due to the Maxwellian

distribution of velocities for electrons in the valence shell of rubidium. In this method, counter-propagating light from a single diode laser is used to drive electrons from the ground state to the first excited state. A pump-beam saturates the transition, and a counter-propagating probe-beam overlaps the pump-beam. In this configuration it is possible to obtain doppler-free spectra of the hyperfine structure of rubidium.

Temperature Dependent Resistance of Copper Wires and Carbon Resistors - (Physics and Astronomy)

By: Kyle Pflug

Faculty Mentor: Brad Hinaus

The temperature dependent resistance of a metal and semiconductor are measured from room temperature to liquid nitrogen temperatures, 300K-77K. To accomplish this, a temperature dipping probe is constructed with components from a hardware store. The probe employed a four-lead measurement system and used Ohm's Law to measure the resistance of a 36-gauge copper wire and a standard 10 W carbon resistor. For the metal copper wire, the resistance increased linearly with increasing temperature, while a semi-conducting carbon resistor nonlinearly decreased resistance with increasing temperature. Both results agree with conduction theory. This work was completed as part of the First Year Research Experience Program in the Department of Physics and Astronomy.

Thermal and Electroluminescence Imaging of a High-Power Infrared LED Array - (Physics and Astronomy)

By: Felicia Kedrowski

Faculty Mentor: Maryam Farzaneh

Light Emitting Diodes(LED) are important sources of light used in various optical devices and sensors. High temperatures in high-power encapsulated LEDs can negatively effect their performance, efficiency, and reliability. In this presentation, we report on thermal imaging of a high-power infrared LED array under operating conditions using thermoreflectance microscopy technique. Thermoreflectance microscopy is based on measuring the relative change in the reflectance of the device, which is directly proportional to the change in surface temperature. The thermal images are used to analyze the temperature distribution of the LED as a function of electrical power. Additionally, we were able to separate the effects of electroluminescence (LED's light emission) from the thermal data and analyze them as a function of LED's current. Eventually, these thermal and electroluminescence studies can be used in improving the design of the LED chips and their thermal management.

WebAssembly: The Future of Web Development in a Language Agnostic Sandbox - (CNMT)

By: Michael Schneider

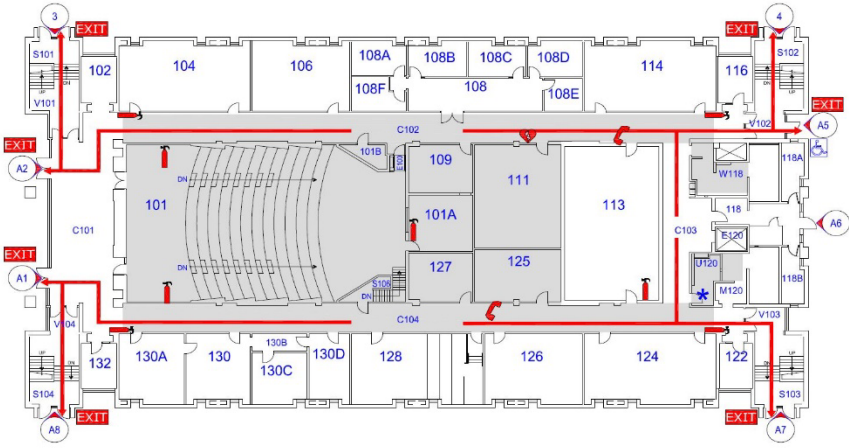
Faculty Mentor: Tomi Heimonen

The world of web development today may seem like an ever-increasing list of modern technologies, libraries, frameworks, and languages. But the only language that works directly in the web browser continues to be JavaScript. Even newer languages like TypeScript that bring valuable features such as strong types are all based off or compile to JavaScript.

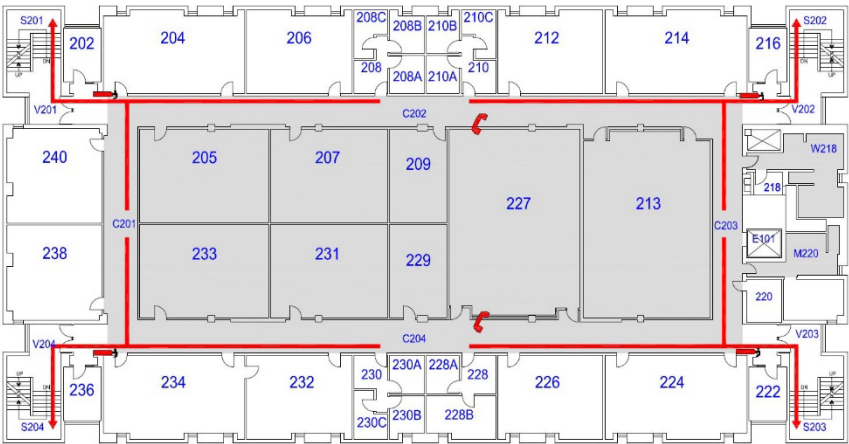
In 2017, WebAssembly was officially introduced with the main goal of providing a portable and secure compilation target for C++ that would solve some of the shortcomings of JavaScript. In my exploration of WebAssembly I investigated its history, how it is used, and where it is going.

As a more practical exploration of the topic, I then built a single page application using Microsoft's Blazor web framework, which is their implementation of WebAssembly. By building this application, I was able to explore how existing technologies can easily be used inside of the WebAssembly sandbox.

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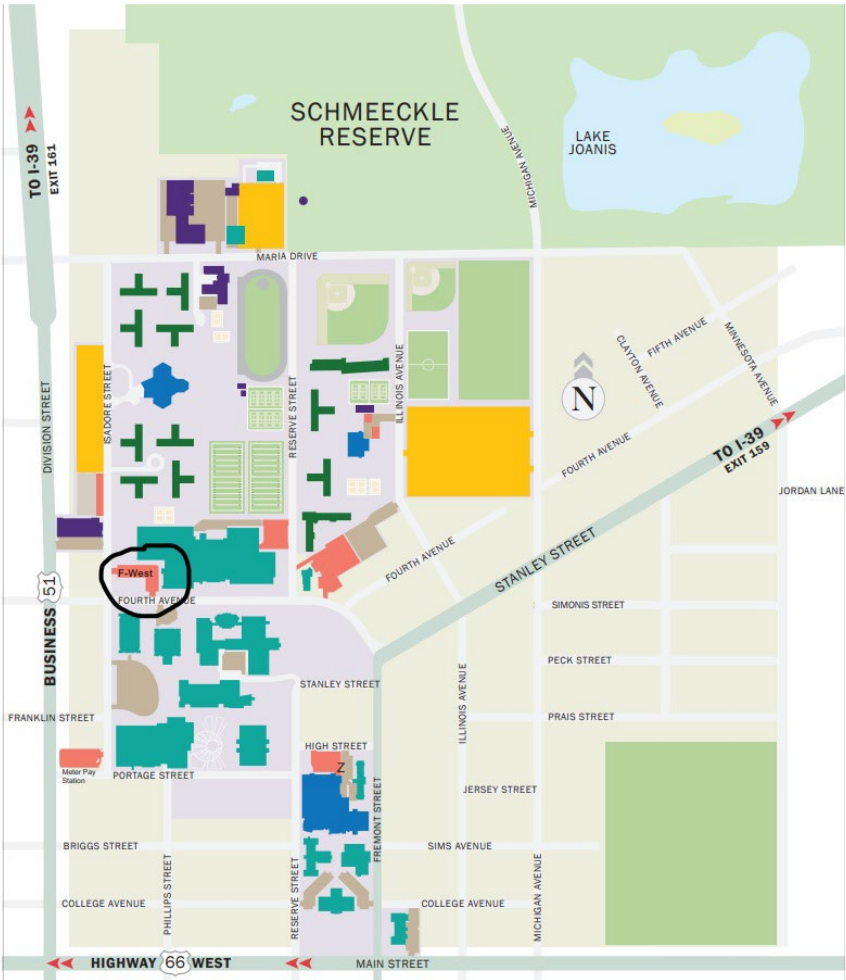
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- Metered parking is available across the street in Lot F-West or on surrounding streets.



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