

$$u_0 = \sum_{k=1}^{n-1} \frac{(t-t_0)^k}{k!} u^k(t_0) + L^{-1} f$$

$$u_1 = -L^{-1}u_0 - L^{-1}A_0$$

$$u_2 = -L^{-1}u_1 - L^{-1}A_1$$

$$u_3 = -L^{-1}u_2 - L^{-1}A_2$$

$$\vdots$$

$$u_{n+1} = -L^{-1}u_n - L^{-1}A_n$$

$$\begin{aligned} & \lim_{\Delta t \rightarrow 0^+} \int_{\Delta t}^T \int_{\Omega} D(t_1, x) \frac{\varphi(t_1 - \Delta t, x) - \varphi(t_1, x)}{(-\Delta t)} dx dt_1 \\ &= \lim_{\Delta t \rightarrow 0^+} \int_{\Delta t}^T \int_{\Omega} D(t_1, x) \frac{\varphi(t_1 - \Delta t, x) - \varphi(t_1, x)}{(-\Delta t)} \chi_{(\Delta t, T)}(t_1) dx dt_1 \\ &= - \int_0^T \int_{\Omega} D(t_1, x) \frac{\partial \varphi}{\partial t_1}(t_1, x) dx dt_1. \end{aligned}$$

# STUDENT SCHOLARS DAY

$$\begin{aligned} g + h &= -4 \\ g - h &= 10 \end{aligned}$$

$$\begin{aligned} a + b &= -5 \\ b + c &= 2 \\ a + c &= 1 \end{aligned}$$

$$\begin{aligned} a &= 4 \\ b &= 4 \end{aligned}$$

$$\begin{aligned} e + f &= 8 \\ e - f &= 14 \end{aligned}$$

$$\begin{aligned} j + k &= -8 \\ j - k &= 2 \end{aligned}$$

2014

# TABLE OF CONTENTS

2014 SSD Committee	2
Welcome from Co-Directors	3
Schedule of Events	4
Statement from the Cover Artist	4
Keynote Lecture	5
Henry Hall Map	6
Kirkhof Center Maps	7 & 8
History of SSD	9
History of Undergraduate Research and Scholarship at GVSU	10
McNair Scholars and Student Summer Scholars	11
fishladder	12
Poster Presentations Schedule and Abstracts	13
Oral Presentations Schedule and Abstracts	79
Panel Presentations Schedule and Abstracts	109
Exhibition of Art Schedule and Abstracts	112
Film and Video Schedule and Abstracts	113
Index of Presenters and Mentors	114
Notes	134 & 135

# SSD COMMITTEE

Tara Aday	Undergraduate Research and Scholarship
Feryal Alayont	Mathematics
Alice Chapman	History
Amanda Cuevas	Frederik Meijer Office of Fellowships
Amanda Dillard	Psychology
Christopher Kurby	Psychology
Andrew Lantz	Chemistry
Susan Mendoza	Undergraduate Research and Scholarship (Director)
Melissa Morison	Classics (Chair)
Debbie Morrow	Library
Ross Reynolds	Physics
Michael Scantlebury	Hospitality and Tourism Management
Shelley Sickrey	Undergraduate Research and Scholarship
Richard Vallery	Physics
Patricia Videtich	Geology

# WELCOME TO STUDENT SCHOLARS DAY 2014!

It is with great pleasure that we welcome you to celebrate the diversity and excellence of faculty-student collaboration at GVSU. In its 19th year, Student Scholars Day continues to grow in scope, including six hundred students and mentors in over four hundred presentations. We are excited to support the achievements of these students representing seventy diverse majors across the university. We encourage you to visit presentations of interest in a variety of disciplines and presentation formats, and to engage these students in meaningful discussions of their work. This event is a true celebration of creative thought and practice.

Many have contributed to make this growing event a success. We are especially grateful for the hard work and patience of Shelley Sickrey, Tara Aday, Brianna Stelly, Ruby Dockery, and Dana Eardley who made this process manageable and enjoyable. We thank the members of the 2014 SSD committee, Feryal Alayont, Alice Chapman, Amanda Cuevas, Amanda Dillard, Christopher Kurby, Andrew Lantz, Debbie Morrow, Ross Reynolds, Michael Scantlebury, Richard Vallery, and Patricia Videtich, for their dedication and continuous flow of creative ideas. It takes an entire year to put together a program like this, and we appreciate the hours spent engaging with us in this process. We thank the College of Liberal Arts and Sciences for their support.

Once again our deepest gratitude goes to Dan Slaughter for all of his work in the web registration redesign for SSD. We would also like to thank the Kirkhof Center staff, Fred Mooney, and Kellie Pnacek-Carter for their assistance and patience. We would also like to thank Jeff Woollet for assisting in the preparation of Henry Hall.

Thank you to Jay Park for his artistic contributions to this abstract book. "Breaking Guidelines" was one of several pieces submitted in response to a student competition hosted by the Office of Undergraduate Research and Scholarship. Jay's piece was selected to serve as the cover by the SSD committee.

Thanks to our student, faculty, and staff volunteers for their commitment to the university's mission and values, as evidenced by their involvement in this important activity. We value the time and effort given to this event.

A very special thank you goes to the faculty mentors who work collaboratively with undergraduate and graduate students in their scholarly and creative pursuits. We know it takes a great deal of time and dedication, but these experiences make a formidable impression on the education of GVSU students. We applaud your commitment and passion for teaching and learning.

And finally, a day like this does not happen without outstanding students like this year's SSD presenters. These students have sought ways to connect their classroom experiences with scholarly and creative practice. They have engaged in a process of discovery that is often difficult and demanding. We thank these students for taking full advantage of their liberal education at GVSU. We are proud of their achievements and excited to share their success.

Please enjoy this day of celebration. Attend the many presentations available throughout the day. We extend a special invitation to attend the presentation given by this year's Keynote speakers, Stephen Macknik and Susana Martinez-Conde from the Barrow Neurological Institute in Arizona. Today is sure to be a day of sharing and celebration.

Susan Mendoza  
Director, Office of Undergraduate Research & Scholarship  
Center for Scholarly & Creative Excellence

Melissa Morison  
Assistant Professor, Classics  
College of Liberal Arts & Sciences

# SCHEDULE OF EVENTS

## Poster Presentations

Henry Hall Atrium and Kirkhof Center

9:00 a.m. – 5:00 p.m.

See page 13 for detailed schedule.

## Oral Presentations

Kirkhof Center

9:00 a.m. – 5:30 p.m.

See page 79 for detailed schedule.

## Exhibition of Art

Mary Idema Pew Library Exhibition Space

9:00 a.m. – 5:00 p.m.

See page 112 for detailed schedule.

## Panel Presentations

Mary Idema Pew Library Multi-Purpose Room

9:00 a.m. & 4:30 p.m.

See page 109 for detailed schedule.

## Film/Video

Mary Idema Pew Library Multi-Purpose Room

3:30 p.m.

See page 113 for detailed schedule.

## Keynote Lecture

Kirkhof Center, Room 2250 Grand River Room

6:00 p.m. Doors Open

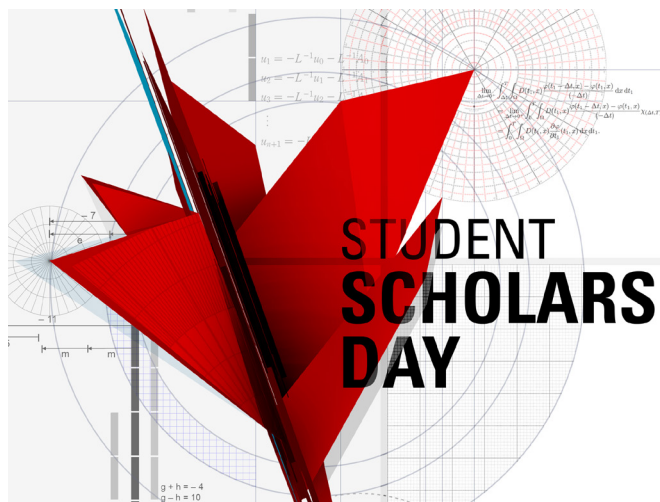
7:00 p.m. Lecture

# STATEMENT FROM THE COVER ARTIST

## Jay (Ju Yong) Park

Breaking Guidelines

In the graphic design world, there are rules and guidelines to follow in creating designs. These guidelines help to achieve balance, harmony, and hierarchy. My design entitled “Breaking Guidelines” represents the development of students with a well-founded base in our school. At Grand Valley, there are students who enroll with no knowledge of the essential information to succeed in their area of study. The professors at our university teach us this information, or the basic guidelines. When we understand the rules and the essentials to solve a problem, we learn how to not only build upon these rules, but also to break them and come up with creative yet unique answers to our problems.



# KEYNOTE LECTURE

Kirkhof Center, Room 2250 Grand River Room  
7:00 p.m.

## SLEIGHTS OF MIND

Have You Ever Wondered How Magic Works?

Illusions are perceptual experiences that do not match the physical reality. Our perception of the outside world is generated indirectly by brain mechanisms, so all sensory perception is illusory to some extent. The study of illusions is critical to understanding the basic brain mechanisms of sensory perception, as well as to cure various neural diseases. The illusion community includes sensory neuroscientists, neurologists, painters, sculptors, mathematicians, musicians, graphic designers, actors, movie directors, and even magicians—each use a variety of methods to unveil the underpinnings of illusory perception. Magic tricks are cognitive illusions that fool us because humans have hardwired processes of attention and awareness that are hackable—a good magician uses your mind’s own intrinsic cognitive properties against you in a form of mental jujitsu. The insights that magicians have gained over centuries of informal experimentation have led to new discoveries in the cognitive sciences, and they also reveal how our brains work in everyday situations. If you’ve ever bought an expensive item you’d sworn you’d never buy, the salesperson was probably a master at creating the “illusion of choice,” a core technique of magic. The implications of “neuromagic” go beyond illuminating our behavior; early research points to new approaches for everything from the diagnosis of autism to marketing techniques and education.

## STEPHEN MACKNIK AND SUSANA MARTINEZ-CONDE

Stephen L . Macknik, Ph.D. , is director of the Laboratory of Behavioral Neurophysiology at the Barrow Neurological Institute in Phoenix, Arizona.

Susana Martinez-Conde, Ph.D., is director of the Laboratory of Visual Neuroscience at BNI.

Drs. Macknik and Martinez-Conde are members of the Academy of Magical Arts (aka the Magic Castle in Hollywood), the Magic Circle (UK), the Society of American Magicians, and the International Brotherhood of Magicians.

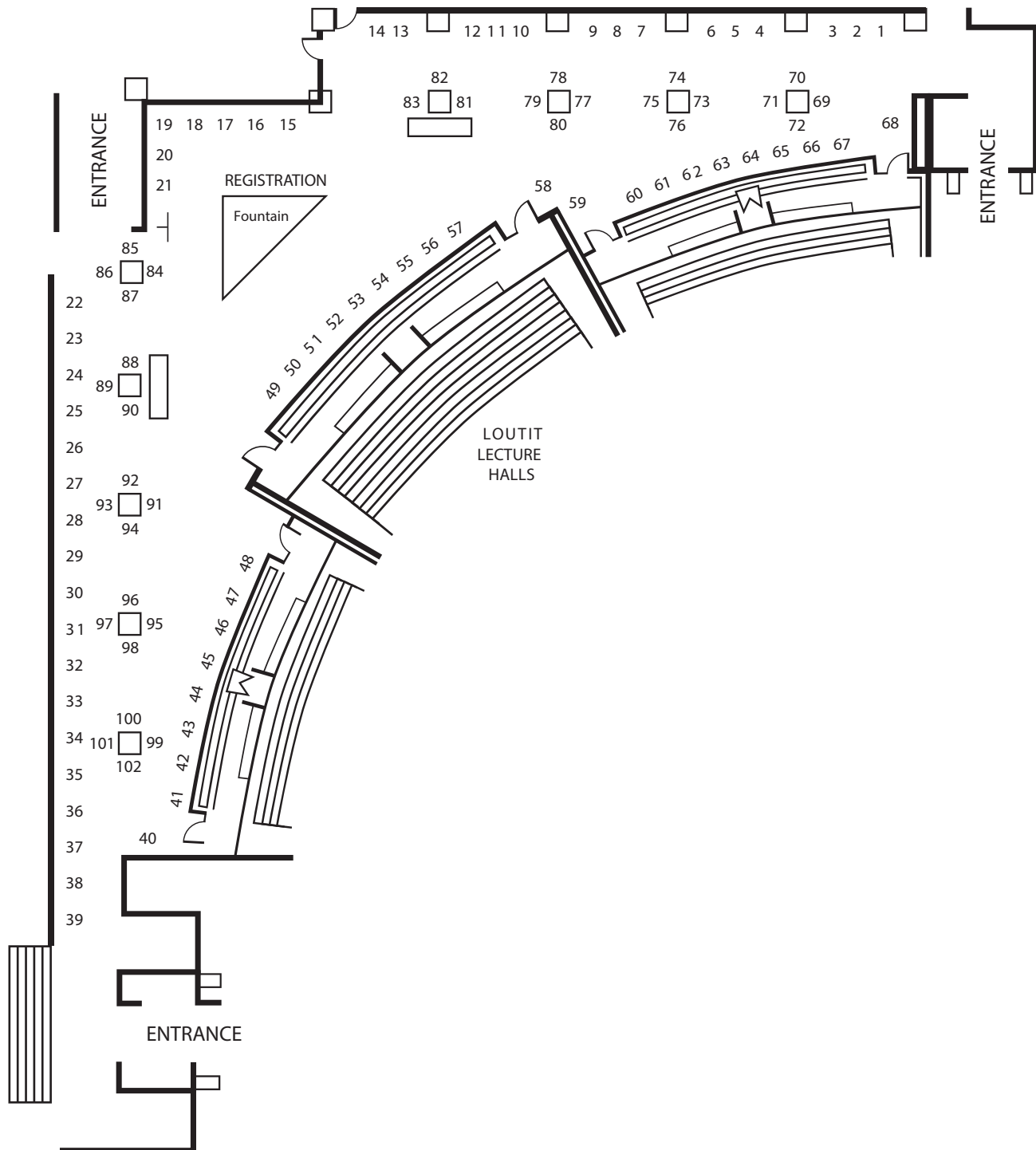
“We trained as magicians for 1.5 years and performed our one-and-only performance in our audition for membership as magicians to the Magic Castle. They graciously accepted us while suggesting that we do not quit our day jobs.”

Lecture co-sponsored by the College of Liberal Arts and Sciences.

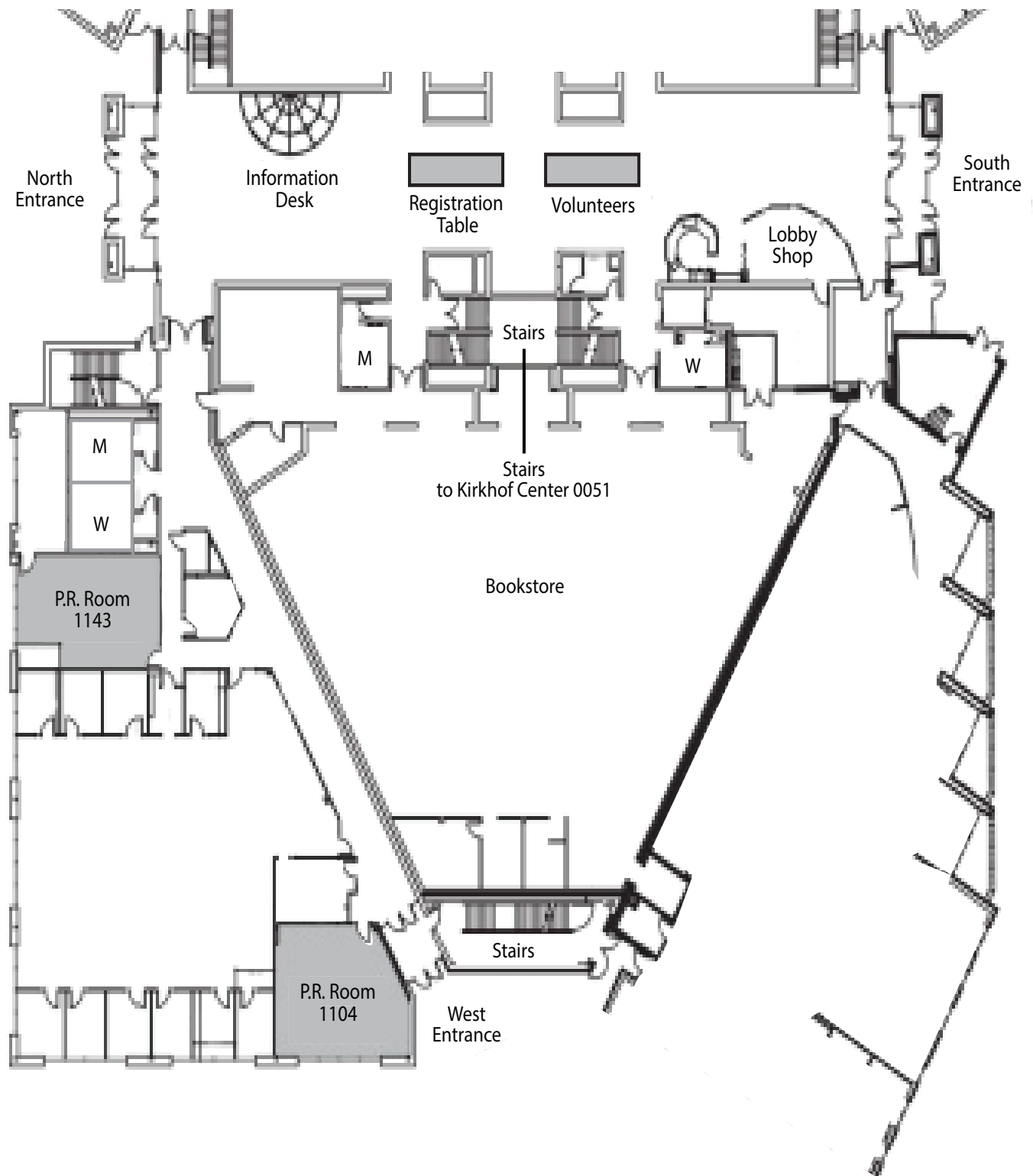




# Henry Hall Map

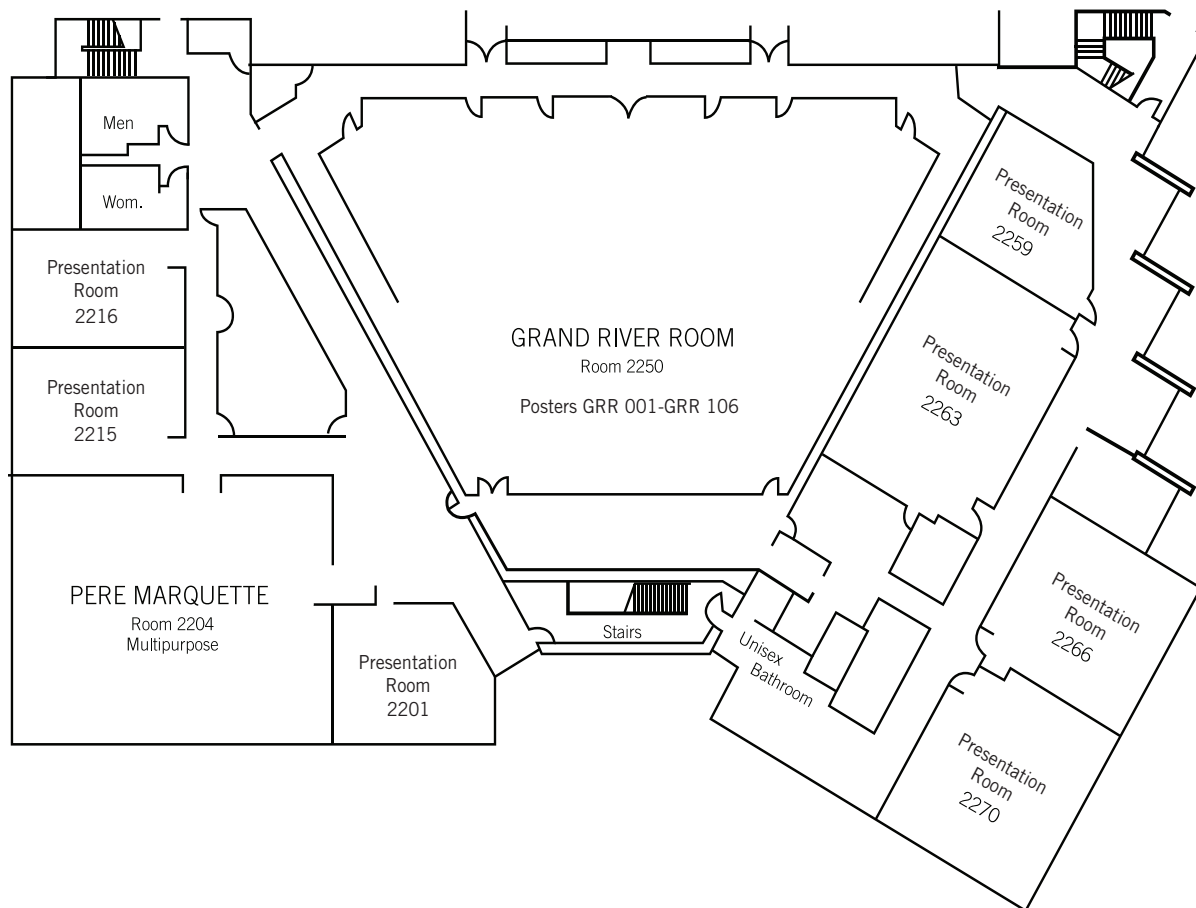


# Kirkhof Center First Floor Map





# Kirkhof Center Second Floor Map



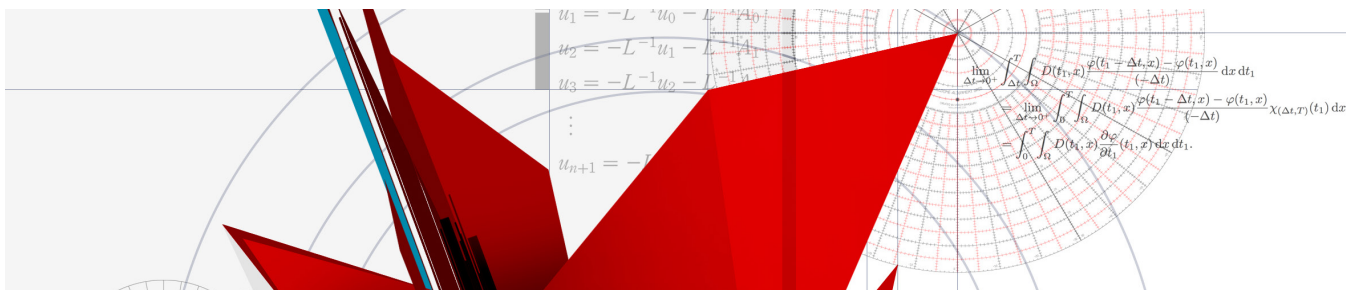
# HISTORY OF STUDENT SCHOLARS DAY

By Neal Rogness and Shelley Sickrey

In the summer of 1995, a small group of faculty members in the Science and Mathematics Division met to explore the feasibility of creating an event where students could present their findings from faculty-mentored research to a university-wide audience. P. Douglas Kindschi, Dean of Science and Mathematics, was enthusiastically supportive, thus Student Research Day (SRD) was born.

It was decided to hold the event on April 12, 1996, in conjunction with the dedication and celebration of the new Seymour and Esther Padnos Hall of Science. The first-time event was expected to draw about thirty student participants. All expectations were exceeded when the registration period ended with over 150 presenters committed to present almost 100 presentations. The first event was a tremendous success; however, it was unknown whether SRD could be a successful “stand alone” event. These fears were quickly allayed when the second annual Student Research Day was held in April of 1997 and proved to be a great success with a similar level of participation. The event became popular enough to get requests from students outside of science and mathematics majors who wanted to present their work. An effort began to make the event truly university-wide, which then Provost Glenn Niemeyer whole-heartedly supported. Students from all majors were encouraged to present and/or exhibit their faculty-mentored scholarly work at the event. To help make the event more inclusive, its name was changed from Student Research Day to Student Scholarship Day. The first university-wide event doubled in size with nearly 300 students giving almost 200 presentations in 1998. The first SSD keynote speaker was Dr. Robert Powell, Professor of Biology at Avila College, who talked about “Student/Faculty Collaboration: Teaching and Scholarship.” Another name change occurred in the Fall of 2009, this time to Student Scholars Day. The name change was instituted to combat occasional confusion over the nature of the event. “It’s still very focused on student work, but the new name takes away any ambiguity about what the purpose of the day is,” said Susan Mendoza, Director of Undergraduate Research and Integrative Learning.

What began as an event primarily composed of science and mathematics majors has grown to include student presentations representing majors from across the university. The GVSU community has truly embraced this annual event as a day in which to take pause and proudly celebrate the scholarly achievements of students from the past year. Student Scholars Day continues to grow, both in size and scope. The event continues to encompass interdisciplinary relationships among the presentations. Individually, the presentation is clear and focused. Taken as a whole, a larger, more inclusive picture of collaboration and learning emerges.



# HISTORY OF UNDERGRADUATE RESEARCH AND SCHOLARSHIP AT GVSU

The pursuit of student research and scholarship at Grand Valley has deep roots in the history of the university. Original student research began in a number of the original Colleges at GVSU, namely Thomas Jefferson College, William James College, and the College of Arts and Science. This tradition continued through decades as the university grew.

Student Scholars Day (SSD) and Student Summer Scholars (S3), originally established in the Division of Math and Science, have served as the anchors for undergraduate research for almost twenty years. These programs have served thousands of students by encouraging original research and scholarship.

SSD and S3 moved to the Brooks College of Interdisciplinary Studies and became part of the Office of Integrative Learning in 2006. During this time both programs were expanded to support student research from all disciplines and majors.

In 2010, the Office of Undergraduate Research and Scholarship (OURS) was established as part of the Center for Scholarly and Creative Excellence. The mission and intent of the office is to establish comprehensive services and programs which support students in their pursuit of inquiry, creativity, scholarship, and research. In addition to Student Scholars Day, the hallmark programs of OURS include:

## STUDENT SUMMER SCHOLARS (S3)

S3 provides a \$6,000 grant for an undergraduate and faculty mentor to devote 12 weeks to a research and/or creative project during the spring/summer semester. Generally, S3 grants provide a student stipend, faculty stipend, and a small budget for supplies. The S3 program offers a unique opportunity for undergraduate students to conduct research and creative practice in their chosen field. The combination of immersion in the discipline, active scholarship, and deep reflection provides students with a meaningful learning experience that helps to prepare them for graduate school and future careers.

## ACADEMIC CONFERENCE FUND (ACF)

This fund is available to all undergraduate students to present, exhibit, or perform at an academic conference. Student presenters are able to apply for travel grants that range up to \$500 for domestic travel and \$750 for international travel. The grants encourage student presentations, performances, and exhibits by helping offset the cost of attendance.

## ACADEMIC AND PROFESSIONAL ENRICHMENT FUND (APEF)

The APEF is a faculty travel grant that provides travel funds to support undergraduate student travel to academic conferences and meetings. Attending a conference with a faculty member can be a valuable experience that can enrich a student's understanding of a discipline. APEF is available to all undergraduate students. Full-time faculty can apply for travel grants that range up to \$400 per student for travel. Grants do not exceed \$1,200.

## OURS UNDERGRADUATE GRANT

The OURS grant program is designed to encourage collaborative scholarly research and creative work between undergraduate students for faculty members. Students may propose a research, scholarly, or creative project to a faculty member, or a faculty member may actively recruit students for collaboration. OURS grants provide students with financial support that ranges up to \$500. Undergraduate students (both part- and full-time) are eligible to apply.

# TRIO RONALD E. MCNAIR SCHOLARS

## Post-Baccalaureate Achievement Program

The McNair Scholars Program is designed to prepare highly talented undergraduates to pursue doctoral degrees and to increase the number of individuals (from target groups) on college and university faculties.

The McNair Scholars are highly talented undergraduate students whose parents have no 4-year college degree and are low-income, or groups underrepresented at the graduate level for doctoral studies. The program accepts students from all disciplines.

The McNair Scholars receive academic counseling, advising, and GRE preparation. In addition, they are matched with a Ph.D. faculty mentor to conduct research and attend a McNair research conference to present their findings. In the first semester of their senior year, the scholars receive assistance with the graduate school application process.

McNair Scholars is a TRiO program funded through the United States Department of Education and Grand Valley State University.

The 2013 McNair Scholars presenting at this year's SSD include:

Alexandra Bouza, Nicolas Fernandez, Nkrumah Grant, Garrett Hisler, Sorscha Jarman, Kelly Le, Nikole LeCompte, Saray Morales, Rhiannon Robke, Alyssa Snyder, Samantha Stamps, Katie Uhl, and Jacqueline Williams.

*More information about the program can be found at [www.gvsu.edu/mcnair](http://www.gvsu.edu/mcnair)*

# STUDENT SUMMER SCHOLARS

The Student Summer Scholars Program (S3) provides funds for a student and faculty mentor to devote twelve weeks to a research and/or creative project during the spring/summer semester. Through these grants and the mentorship of a faculty member, the S3 program offers a unique opportunity for undergraduate students to do hands-on, professional research and creative practice in their chosen field. Combining academics, field work, and a reflection component provides students with a meaningful learning experience that helps to prepare them for graduate school and future careers.

For each S3 participant, the project begins with an innovative and thoroughly researched proposal. With guidance from faculty mentors, students identify a research question or an area of creative practice and shape the structure of their project. The value of mentorship is an important part of S3. Experienced faculty mentors act as support and sounding board for their students.

By building on a foundation of academic and critical thinking skills provided by undergraduate courses, self-motivated students can use S3 to further their knowledge in a specific area while learning to incorporate academics with professional work. S3 provides students with a new lens through which to view their long-term educational, work, and life plans.

The 2013 Student Summer Scholars presenting at this year's SSD include:

Abigail Carlson, Holly Cassell, Christopher Churches, Jozlyn Clasman, Jacob Dec, Alexander Fisch, Vincent Gasparotto, Julia Gjebic, Breanna Gould, Danielle Harris, Rachel Hughart, Lisa Keeney, David Leestma, Kayla Lockmiller, Andrea Morrow, Alice Munday, Jessica Pontow, Aula Ramo, Mitchell Roth, Max Spencer, Aubriana Spenski, Jordan Straight, Hollister Swanson, Marissa Swartz, Adam Terwilliger, Jared Toogood, Josephine Werner, and Noah Zucker.

*More information about the program can be found at [www.gvsu.edu/ours/s3](http://www.gvsu.edu/ours/s3)*

Spring 2014

THE HIGH PULP EDITION

# fishladder

*A Student Journal of Art and Writing*

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<b>Faculty Advisor</b>	Amorak Huey

## Join us!

### ART EXHIBITION:

Lake Ontario Hall,  
Red Wall Art Gallery  
March 24-April 21, 2014

### UNVEILING:

Lake Ontario Hall, room 174  
Friday, April 18 at 6 PM

## CONTRIBUTORS

### Fiction

Aaron Crider  
Amy Hinman  
Nathan Holtrey  
Brian Saladino

### Nonfiction

Rick Lowe

### Poetry

Ariel Mokdad  
Kaitlyn Nix  
AJ Nolte  
Stephanie Oesch  
Jake Reed  
Alexander Sinn  
Mark Zito

### Drama

René Rodriguez

### Art and Photography

Blaire Bancroft  
Linnea Gish  
Megan Gurisko  
Rayne Klar  
Stephanie Mabie  
Katie Pershon  
Michael Rajnicek  
Kirk Rasmussen  
Christopher Smyka  
Ross Tanner  
Kyla Traina  
Daniel VanZandt

# POSTER PRESENTATIONS, ABSTRACTS & SCHEDULE

## HENRY HALL ATRIUM 001

### **Sex Differences in Exclusion, Aggression and Helping on Collegiate Sports Teams**

Participants attending 10:00 AM - 11:00 AM

Presenter: Amanda Barnes

Mentor: Robert Deaner

Previous studies indicate that, on average, men and women differ in several aspects of group related behavior. Nevertheless, little research has addressed whether these differences occur in long-standing, single-sex groups. Based on previous research, we predict that (1) women will be more likely to exclude group members whereas men will be more likely to use direct aggression against them and (2) women will be less likely than men to help lower-status group members but they will be more likely to help those of equal status. We will test these predictions with data from collegiate sports teams. Specifically, we will recruit, by email, several hundred men and women playing varsity collegiate sports and ask them to complete online surveys regarding their social behavior and team dynamics. Our results may have implications for understanding group behavior in a variety of other non-sports contexts, including the labor force, the military, and schools.

## HENRY HALL ATRIUM 002

### **Using the Distal Femoral Epiphyses in Age Estimates of Juvenile Skeletal**

Remains: A Pilot Study

Participants attending 10:00 AM - 11:00 AM

Presenters: Ashleigh Lowis, Teresa Moreno

Mentor: Gwyn Madden

Techniques for aging juvenile long bones focus on the length of the bone itself and the bone plus epiphyses. In comingled contexts it may not be possible to match diaphysis with epiphysis or the diaphysis may be broken. Therefore, as a starting point to increase our knowledge of long bone growth, the goal of this pilot project was to determine if there was a correlation between age and the size of the distal epiphysis of the femur. Two measurements were taken on unfused left distal femoral epiphyses including maximum length anterior/posterior and maximum width medio/lateral. The study sample was made up of 19 juveniles ranging in age from 3-15 years from five cemeteries housed at the Museum of London. Individuals in the five cemeteries had been aged using dental development, which was the basis for age comparisons. A regression equation was developed based on the measurements to create a new method for age estimation of skeletonized juveniles. The resulting model was found to accurately estimate age in 92.3% of individuals with a standard error of 2.279 years.

## HENRY HALL ATRIUM 003

### **Novel Telomerase Inhibitors Synthesized from BIBR 1532 Derivatives**

Participants attending 12:00 PM - 1:00 PM

Presenter: Katie Uhl, McNair Scholar

Mentor: Robert Smart

As of 2011, cancer was the second leading cause of death in America. Normal cell proliferation is limited by the caps on the ends of chromosomes, called telomeres. Cancer cells are immortal in the fact that an enzyme known as telomerase continues to lengthen the chromosomes, and thus they are never degraded to the point of signaling apoptosis. This project aimed to synthesize novel telomerase inhibitors that are derivatives of the compound BIBR 1532, a proven telomerase inhibitor. The compounds were created via the organic synthesis of cinnamic acid and were coupled to 2-amino-4-chlorobenzoic acid. The resulting compounds include the active sites found on BIBR 1532, as well as cinnamic acid's natural anti-cancer properties. These compounds are



currently being tested for telomerase inhibition, and their efficacy will be compared against that of BIBR 1532. A more efficient telomerase inhibitor would be a major step towards safer chemotherapy treatments.

HENRY HALL ATRIUM 004

**Violence and Trauma: Skeletal and Social Analysis of Neolithic/Eneolithic Human**

Remains from Ukraine

Participants attending 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM

Presenter: Jarrod Trombley

Mentor: Gwyn Madden

The people of the ancient Cucuteni-Trypillian culture inhabited lands ranging from Northern Romania to Eastern Ukraine during the Neolithic/Eneolithic transition in Europe. Historically these peoples had been thought to be relatively peaceful due to limited archaeological finds indicating widespread violence, but recent excavations and research have begun to cast doubts on this belief especially in terms of the middle to later periods of occupation. This is supported here through skeletal analysis of two human skulls from the Verteba Cave site in Ukraine with evidence of violent trauma dating to the BII-CII period (4100-2750 B.C.E). Furthermore other evidence is put forward by various authors that agrees with this being the case, such as defense structures and other instances of trauma. Finally an analysis of the dynamic social, technological, and environmental factors of this time are explained that would have allowed for these increased levels of violent conflict that evidently took place.

HENRY HALL ATRIUM 005

**Analysis of Breakfast Consumption, Screen Time, and Sleep Time Observed in Bursley Elementary 4th, 5th, and 6th Graders**

Participants attending 1:00 PM - 2:00 PM

Presenter: Emma Martin

Mentor: Deborah Lown

Sleep deprivation, not eating breakfast, and excessive screen time among children are of concern due to detrimental cognitive and health effects. BMS 404 students will provide lessons to 4th, 5th, and 6th graders at Bursley Elementary on adequate amount of sleep, eating breakfast every morning, and less than two hours of screen time a day. Each student will take a pre-test to measure baseline behaviors. A competition will be held amongst the grades to see which grade is meeting the recommendations for each of the particular categories. The competition is something fun for the kids to do to reinforce behaviors and help them strive to meet all the categories requirements. The Bursley students will then take a post-test to see if they have changed their behaviors. BMS 404 students will also send e-mail blasts to Bursley parents on these topics. The overall goal is the 4th, 5th, and 6th graders at Bursley Elementary are inspired to get enough sleep, eat breakfast every morning, and obtain less than two hours of screen time each day.

HENRY HALL ATRIUM 006

**An Investigation of Neurogenesis in Crayfish: The Effects of Social Enrichment**

Participants attending 1:00 PM - 2:00 PM

Presenter: Abigail Carlson, S3 Scholar

Mentor: Daniel Bergman

Neurogenesis is the formation of new neurons from neural stem cells that occurs throughout adulthood in a variety of animals, including humans. Social experiences enhance cell proliferation in mammals, and have been linked to ameliorating age associated declines in memory. Since the nervous system operates under common rules in both vertebrates and invertebrates, our experiment aimed to observe the effects of social enrichment on the crayfish nervous system using BrdU that labels newly synthesized DNA and indicates cell proliferation.



Crayfish brains were dissected, isolated, preserved in paraffin and sectioned via microtome. Our fundamental focus has been centered on mastering these techniques, and after much practice and troubleshooting, we have viable brain tissue sections and are currently progressing to the testing phase. We hypothesize that crayfish that have social interactions will have more neurogenesis when compared to crayfish that have been socially isolated.

HENRY HALL ATRIUM 007

**Computational Modeling of Solar System Evolution and Formation**

Participants attending 11:00 AM - 12:00 PM

Presenter: Austen Jousma

Mentor: Geoffrey Lenters

Computational modeling of physical systems has become extremely commonplace and imperative for the study of many subfields of physics. Astrophysics is no exception. This project involved the learning of coding in a python environment and comparing different numerical methods to analytical solutions to the basic 2-Body Problem. The methods with the best results, Runge-Kutta and 4th-Order Symplectic, were extended to the more complex systems of 3-Body and N-Body problems that are impossible to solve analytically. Approximating these scenarios through the use of numerical methods is important as these models are useful in understanding the current and future states of solar systems. In order to model formation of solar systems from accretion discs the model involving N-bodies was discarded in order to more accurately simulate the discs through the use of mass-density functions.

HENRY HALL ATRIUM 008

**Coulomb Blockade/Staircase in Inhomogeneous Arrays of Tunnel Junctions**

Participants attending 12:00 PM - 1:00 PM

Presenter: Daniel Pawlak

Mentor: Kingshuk Majumdar

Tunnel junctions are composed of two conducting materials, separated by a thin layer of an insulating material. The electrons have a small probability of tunneling from one conductor, through the insulator, and into the other conductor. Tunnel junctions have many applications, including single electron transistors for use in quantum computers, and modeling scanning tunneling microscopy of thin films. We have examined the step-like nature of the I-V curves, known as the Coulomb staircase, and the suppression of current at low temperatures and voltages, known as the Coulomb blockade, in systems of multiple tunnel junctions in series by creating a computer model.

HENRY HALL ATRIUM 009

**Integration of Community Health Care Services in Grand Rapids, MI**

Participants attending 9:00 AM - 10:00 AM

Presenter: Samantha Utter

Mentor: Evelyn Clingerman

Integration of health care services reduces costs, decreases fragmented care, and improves clinical outcomes, patient satisfaction, and use of evidence-based practice. Anecdotal data from focus groups in the Grand Rapids area suggested that health care leaders could assist in better understanding integration of health care services. The purpose of this qualitative analysis was to identify local health care leaders' perceptions of integration of health care services in Grand Rapids, MI. Twenty local health care leaders responded to semi-structured interview questions regarding integrated health services in the local community. Preliminary findings from the first five participants revealed that leaders perceived health care services are integrated when services share the same philosophy, mission and/or values. Partnerships were defined differently by each participant but did

include similarities: trust, shared vision, the triple aim, and experience within the community.

HENRY HALL ATRIUM 010

**The Spacing Distributions of Eigenvalues of Various Types of Random Matrices**

Participants attending 11:00 AM - 12:00 PM

Presenter: Nathan Gerken

Mentor: Kingshuk Majumdar

In this project, we investigate Random Matrix Theory. Random Matrix Theory was originally developed to numerically investigate the spectral properties of random matrices. The theory allows us to take seemingly infinite matrices, and find eigenvalue distributions. These distributions can then tell us about the energy and other properties of complex systems.

HENRY HALL ATRIUM 011

**The Role of CBL10 in Stamen Development in *Arabidopsis thaliana***

Participants attending 12:00 PM - 1:00 PM

Presenter: Mitchell Roth, S3 Scholar

Mentor: Margaret Dietrich

For self-pollinating plants to produce seeds, the male and female floral organs must grow coordinately. Once the stamens grow tall enough, the anthers release pollen on the stigma to initiate fertilization. When *Arabidopsis thaliana* mutants unable to produce the Calcineurin B-like 10 (CBL10) protein are grown in standard conditions, floral growth and fertilization is relatively normal. However, when grown in the presence of 40mM NaCl, the stamens do not fully develop, preventing pollination, fertilization, and seed production. This sterile phenotype suggests that the CBL10 protein aids in development of the stamen during salt stress, and results indicate a potential role in the jasmonic acid (JA) biosynthesis portion of the stamen development pathway. Gene expression analyses of the JA biosynthesis genes *Allene Oxide Synthase (AOS)* and *Defective in Anther Dehiscence 1 (DAD1)* via RT-qPCR show significant differences between NaCl-treated *cb10* mutant and Wild Type floral tissues. A full understanding of this pathway may help us improve crop yields despite decreasing soil quality, such as high salinity from over irrigation.

HENRY HALL ATRIUM 012

**Grand Valley State University Athletes' Knowledge About and Use of Caffeine in Athletic Performance**

Participants attending 3:00 PM - 4:00 PM

Presenter: Caitlyn Madsen

Mentor: Deborah Lown

Research has shown that caffeine enhances physical performance, but there is little data on the use of caffeine by athletes. The goals of this study are: 1) to determine GVSU athletes' perceptions of how caffeine affects performance; 2) determine if GVSU athletes know about the amount of caffeine in products; and 3) what is their motivation to consume caffeine and what products are used.

The target population for this study is full-time GVSU students between the ages of 18-24 who participate in swim/dive and track/field. Surveys will be distributed to athletes and will be analyzed for caffeine use and knowledge. Chi-square tests will be performed to examine the frequency of perceived effects of caffeine. Mean, standard deviation, ranges and percentages will be performed on demographics, sports, years of competing, goals, perception of effect, caffeine levels, reason for use, and what caffeine is used. Statistical significance is  $P \leq 0.05$ .

The hypothesis for this study is that athletes surveyed will perceive that caffeine can enhance performance and

will be knowledgeable about sources of caffeine but not the quantity of caffeine in those sources.

HENRY HALL ATRIUM 013

**The Administration of the Hajj**

Participants attending 9:00 AM - 10:00 AM

Presenter: David Leestma, S3 Scholar

Mentor: Sebastian Maisel

For those with jurisdiction over the Hijaz, ensuring the safety and security of pilgrims has been a central tenet of governance. Although at times stemming from genuine piety, administering the Hajj has additionally served to legitimate political power in both domestic and international spheres. Technological changes in transportation, and changes in international politics witnessed since the inception of the Saudi state have greatly altered the degree and scope of safety and security issues. By building off the scant literature on the Hajj, utilizing a range of Saudi and international press sources, supplemented by interviews with former Saudi government officials, this study uncovers the uniquely modern challenges to the Saudi government's procurement of safety and security, and the policies employed by the Saudi government to ensure safety and security during the pilgrimage. A historical analysis of domestic and international security challenges reveals that Saudi Arabia has met those challenges by attempting to remove external political expressions from the pilgrimage, the employment of vast technological resources, and engineering innovation.

HENRY HALL ATRIUM 014

**The Effects of Instructor Guidance on Student Self-Diagnosis**

Participants attending 3:00 PM - 4:00 PM

Presenter: Ryan Warner

Mentor: Bradley Ambrose

This study looked at the possible effects that physics instructors have on student self-diagnosis of their work and how this guidance affects student understanding of the physics material being taught. Our study had two experimental groups made up of students from a general algebra based physics class at Grand Valley State University. Collected data included student answers to pretests, self-diagnosis activities, and posttests. During the self-diagnosis activity one group was provided with guidance as they self-diagnosed their work, while another group self-diagnosed their work on their own. A self-diagnosis rubric was designed by the researchers to grade the self-diagnosis of the participants, which gave each student who participated in the study a self-diagnosis score. Using pretest scores, posttest scores, and self-diagnosis scores an analysis of covariance was performed to determine what factors played important roles in the posttest data that was collected.

HENRY HALL ATRIUM 015

**Is it Okay to be Sad?: Preceptions of the Emotions of Individuals with Disabilities**

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenters: Allison Desautels, Jessica Naftaly

Mentor: Amanda Dillard

Researchers have argued that individuals with disabilities may often be perceived as being unhappy and having a low quality of life, but there have been few experimental investigations comparing perceptions of individuals with disabilities to those without disabilities on variables of quality of life including happiness and life satisfaction. In the present study, we examine whether an individual may be perceived differently depending on whether she/he is described to have, or not have, a disability. In addition to this factor, we also vary the emotional expression of the rated individual. College student participants will read about an individual who is described to either have or not have a disability and who is either perceived to be expressing a negative or a positive emotion. Participants will rate the individual on measures of happiness, subjective life satisfaction, and personality. They

will also report their preferences for interacting with the individual. Ultimately, this research will further our knowledge and understanding of how people view individuals with disability including how emotional perception may interact with those views.

HENRY HALL ATRIUM 016

**Emotion as a Modulator of Self-Affirmation in Reducing Defensiveness to Health Messages**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM

Presenters: Michael Mead, Megan Wertheimer

Mentor: Amanda Dillard

Past research has shown that when confronted with information that one's behavior may negatively impact health, individuals can become defensive. However, if individuals self-affirm, or reflect on a value they find important, they may instead be more accepting of this information. In this study, 300 college student participants were presented with a message about the dangerous health effects of alcohol consumption. We tested whether emotion would moderate the effects of self-affirmation in increasing acceptance of this information. The experiment used a 2 by 4 factorial design with the levels of self-affirmation (affirm or control) and emotion (angry, happy, fearful, or neutral).

HENRY HALL ATRIUM 017

**Muscle Activation Using an Instability Training Device**

Participants attending 9:00 AM - 10:00 AM

Presenter: Taylor Blanchette

Mentor: Stephen Glass

Strong core muscles are essential for balance, agility and coordination. A number of methods are used to create unstable exercise environments so that the individual must use core muscles (abdominal and back) in order to maintain posture and complete the movement. Previous studies have only assessed unstable exercise surfaces; none thus far have considered the weight being lifted as the unstable factor of the exercise. The purpose of this study was to examine the muscle activation patterns of the primary and core muscles while using an instability training device. Electromyography (EMG) is utilized to analyze the electrical activity of musculature during an exercise motion. EMG data help to analyze the eccentric and concentric contractions throughout a specific range of motion. The instability was produced by a 25 pound "slosh tube" which allowed water to flow throughout the tube, generating an unstable barbell. Subjects completed 30 seconds of timed repetitions at three levels of instability, stable, 50% water "slosh" and 100% "slosh". EMG activation of the rectus abdominus, paraspinal, anterior deltoid and biceps muscles were analyzed. Raw data were filtered and integrated across contraction. Results of the activation patterns will be discussed.

HENRY HALL ATRIUM 018

**Synthesis of Non- $\beta$ -Lactam Antibiotics for Gram Positive Bacteria**

Participants attending 12:00 PM - 1:00 PM

Presenter: Alexandra Bouza, McNair Scholar

Mentor: Robert Smart

A new class of antibiotics has been discovered in a collaborative project at Grand Valley State University. These compounds do not rely on  $\beta$ -lactam structure, have a mechanism of action different from understood mechanistic pathways for treatment of infections and are readily synthesized. Our compounds demonstrated *significant antimicrobial activity* against a group of Gram-Positive microorganisms. A number of compounds in this structural class had low minimum inhibitory concentrations (2-8  $\mu\text{g/ml}$ ) against *Staphylococcus aureus*, *Bacillus anthracis*, *Clostridium difficile*, & *Streptococcus pneumoniae*. Six compounds were tested *in vitro* toxicity screening in a rat hepatoma cell line. All compounds had minimal toxicity. Further testing revealed significant binding to human serum protein. Our work to overcome this binding affinity in order to increase efficacy of the

drugs is described.

HENRY HALL ATRIUM 019

**Influences on Men and Women's Career Choices in the Medical Field**

Participants attending 3:00 PM - 4:00 PM

Presenter: Danielle Meirow

Mentor: Kathleen Underwood

Since the passage of Title IX in 1972, women's educational and career opportunities have expanded drastically in the United States, however, research has shown that women pursue post-baccalaureate and graduate level education at lower rates than men, and that when they do enter graduate school, they are more likely to drop out of their programs. The metaphor of a leaky pipeline has been used to explain this phenomenon. This study will draw on the leaky pipeline effect to study students in their undergraduate years who hoped to become a physician upon entering college, but have since changed their career aspirations. Additionally, it will investigate the causes of this change. Primary data will be collected through an e-mailed survey, while additional in-depth information will be gained through one on one interviews. It is expected that women will have altered their career goals at greater rates than men and that these changes will be due to social pressures placed upon them by those around them.

HENRY HALL ATRIUM 020

**Exceptional Students, Exceptional Art: Play, Discovery, and Invention**

Participants attending 9:00 AM - 10:00 AM

Presenters: Jessica Brown, Chelsey Sall, Kyle Schroeder

Mentor: Katalin Zaszlavik

Grand Valley State University Art Education students prepared and taught studio art projects to 16 visiting Special Need Students for the duration of two semesters. The visiting group's ages varied from 16-22 years with varying disabilities. The fall of 2013 project was based on the Big Idea of Community that resulted in a collaborative art-making project. The winter of 2014 had a Big Idea of Time. Each teaching practice was visually documented, and a written reflection was collected and shared within the Art Education students. The group applied their research skills through a.) Preparing the project, b.) Problem solving emerging ideas or/and technical challenges, and c.) Inventing new communication strategies. The poster session will share how this non-traditional teaching practice can be applied in a K-8 classroom as well as advocate for the power of art and art making in the development of a special need student.

HENRY HALL ATRIUM 021

**Characterization of Polar Growth in a *Physcomitrella patens* Insertional Mutant**

Participants attending 12:00 PM - 1:00 PM

Presenter: Ronald Kamgang

Mentor: Margaret Dietrich

The characterization of polar growth can improve our understanding of the molecular mechanisms fundamental to root and pollen tube growth in angiosperms. Tip growth is critical as it increases the total root surface area for water and nutrient acquisition, and pollen tube growth is necessary for fertilization. This investigation aimed to determine the effect of a disrupted genomic sequence in *P. patens*, a model organism for the study of polar growth. We first characterized the recovery of tip growth from isolated protoplasts in early development of both the wild type and the mutant, and second, we continued characterizing polar growth in later development. Both the wild type and the mutant are able to recover tip growth. Normally the initial cell in the wild type is initiated on the second subapical caulonema cell while the filament tip cell keeps dividing. However, the initial cell is initiated on the first subapical cell in the mutant. Within ten days of growth, the wild type appeared very invasive



covering a larger area than did the mutant, which also showed undulating filamentous growth. Finally, the wild type is able to develop completely to a young leafy gametophyte within 19 days; on the other hand, the mutant failed to develop leafy gametophytes as it stays in the chloronema-like caulonema stage. Our studies show that while the mutant can establish polar growth from protoplasts and can form initial cells, tip cell differentiation, the direction of tip cell growth, and the site of new polar growth initiations are all affected.

HENRY HALL ATRIUM 022

**Techniques for Quantifying Muscle Activation Using Electromyography**

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM

Presenters: Kristena Bevier, Grace Couture, Mitchell Fisher, Lauren Karwan, Spencer Pearson, Sarah Tillotson

Mentor: Stephen Glass

Electromyography (EMG) is the process of recording electrical activity of muscles. EMG can be used to examine the amount of muscle activation during physical activity, such as determining the difference between certain types of exercises and comparing effectiveness of rehabilitation techniques. The EMG signal contains the muscle signal itself (20-200hz) along with low frequency movement artifact and electrical interference from lights. To clear the unwanted signals, digital filters must be applied to isolate the EMG. Mathematical permutations (rectification and integration) are used to quantify the amount of activation from the muscle fibers. This presentation will detail the steps involved in effectively processing the EMG signal for examining muscle activation.

HENRY HALL ATRIUM 023

**Effects of Information Processing Style and Health Message Format on Skin Cancer Risk Perceptions and Behavioral Intentions**

Participants attending 2:00 PM - 3:00 PM

Presenters: Chelsea Herzhaft, Garrett Hisler

Mentor: Amanda Dillard

In this experiment, we examined how message format would interact with information processing style to influence risk perceptions and behavioral intentions related to skin cancer. Our sample included 147 female college women who reported regular use of tanning beds. Participants were randomly assigned to process a narrative or a factual message about the risks of tanning beds and skin cancer in either an experiential style which focuses on using past experiences and emotions or a rational style which focuses on using logic and reason. Afterwards, risk perceptions of skin cancer, worry about cancer, and behavioral intentions were assessed. Results revealed significant interactions between processing style and message format for three types of risk perceptions and worry. In each case, a pattern emerged showing that risk perceptions and worry were highest when participants read the narrative message with the experiential processing style.

HENRY HALL ATRIUM 024

**American Marten Kit Independence and Dispersal in Manistee National Forest**

Participants attending 9:00 AM - 10:00 AM

Presenter: Aubriana Spenski, MS3 Scholar

Mentors: Joseph Jacquot, Paul Keenlance

We documented kit independence and dispersal of American martens in the Manistee National Forest of Michigan from July through August 2013. We had six adult females with radio transmitters, four of which produced kits based on evidence from motion-triggered cameras placed at den sites the females were tracked to. The fourth female lost her single kit soon after birth; only three females were tracked from April through July.

The three remaining female marten had three, two, and one kit for a total of six kits for the field season. Daily kit activity was monitored remotely through cameras placed at each den site. Of the six kits, only three were caught, and only one was large enough for a radio transmitter. This kit was tracked from the beginning of July until August. At each site the kit was found, rest site data was collected, including but not limited to, tree species and dbh, canopy density, and basal area. The mother of the kit was also tracked during the July through August time period to better distinguish kit dispersal from the den. Preliminary results indicated that kit independence was gradual; the kit spent time both away from its mother, and with its mother at the den site. Each time the kit traveled away from a den, the distance from the den increased.

HENRY HALL ATRIUM 025

**Variation in Fast Food Habits Between Males and Females at Grand Valley State University**

Participants attending 4:00 PM - 5:00 PM

Presenter: Brittany Ballew

Mentor: Deborah Lown

The main goal of this study is to develop an understanding of the most influential motivations for consuming fast food and to uncover how overall fast food habits differ between the male and female population of GVSU students. The population of interest is full-time, traditional college students between the ages of 18-24. A survey will be the primary means of investigation. Descriptive statistics including gender, class, amount and types of fast food purchased, factors influencing consumption including reasons why, influence of nutritional information, and perceptions of their own choices will be analyzed using means of continuous variables. Chi square tests will be used to assess the differences in the gender among each descriptive statistic. The hypothesis of this study is that among students surveyed, there will be a difference between genders in the amount of fast food consumed as well as the justifications for frequenting fast food restaurants.

HENRY HALL ATRIUM 026

**Identification of Potential Cytoskeletal Proteins as Binding Partners of Mid1 in *Schizosaccharomyces pombe***

Participants attending 2:00 PM - 3:00 PM

Presenter: Sarah VanOeveren

Mentor: Dawn Hart

The anillin-like protein, Mid1 in *Schizosaccharomyces pombe* is responsible for recruiting the necessary cytoskeleton proteins to the medial plane of the cell to assemble the actin-myosin contractile ring during cytokinesis. This final step in cell division is a highly dynamic process that results in ultimate division of the cell into daughter cells. Orientating the contractile ring to the proper site of cell cleavage is vital to the equal distribution of genetic material. Mid1 contains several protein binding domains important for proper contractile ring formation, yet a complete understanding of Mid1 interactions has not been attained. Cpc2, a RACK homolog, has been identified as a potential binding partner of Mid1. Here, we hypothesize that Cpc2 transiently interacts with Mid1 for both the formation and stability of the contractile ring. The mechanism of this interaction is the focus of this investigation. Research supported by a National Science Foundation RUI Award #1157997.

HENRY HALL ATRIUM 027

**The Effects of a Novel Object on Tree Swallow Parental Care**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM

Presenters: Delaney Cargo, Taylor Gebben, Amber Olson, Jessica Pontow, Elaine Sheikh, Kari Thomas

Mentor: Michael Lombardo

Personality may affect the quality of parental care and reproductive success. We examined the effects that a novel object at a nest had on parental care in Tree Swallows to detect differences in personality (bold or shy). We observed parental behavior in the absence or presence of a rubber ducky at 27 nests during the nestling



period in 2013. We recorded latency to return to the area and enter the nest and the number of feeding visits. Individuals varied in their responses to the presence of the novel object. There were no differences between the sexes in latencies to return to the area or enter the nest. Males and females fed their young more often when the rubber ducky was absent indicating that its presence inhibited feeding behavior. Female feeding was less affected than male feeding by the presence of the rubber ducky. These results suggest that individual differences in personality may have little effect on reproductive success in this species.

HENRY HALL ATRIUM 028

**Collisional Effects in Molecules Measured with a Laser-Based Spectrometer**

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenters: Jakob Nowicki, Catlin Schalk

Mentors: George McBane, Stephanie Schaertel

The goal of this experiment is to use a homebuilt infrared (IR) spectrometer to determine the pressure-broadening coefficient (PBC) of carbon monoxide (CO) as it interacts with neon (Ne). The PBC gives insight into how energy is transferred when molecules collide with each other. These collisional effects are useful to theoretical chemists who develop potential energy surfaces for chemical reactions. The PBC is also helpful in measuring gas concentrations in earth, planetary and stellar atmospheres from IR absorbance spectra. An IR absorbance spectrum is a plot of light intensity transmitted through the sample as a function of excitation wavelengths; a peak will appear in the spectrum where the sample absorbs light. The width of the peak as a function of gas pressure is determined by the PBC. We will show progress in the development of our homebuilt IR spectrometer for making PBC measurements.

HENRY HALL ATRIUM 029

**Translational Meta-Analysis Tool for Temporal Gene Expression Profiles**

Participants attending 9:00 AM - 10:00 AM

Presenters: Santhosh Dharmapuri, Mary Hoinski, Olvi Tole

Mentor: Guenter Tusch

Widespread use of microarray technology leading to highly complex datasets often addresses similar or related biological questions. In translational medicine research is often based on measurements that have been obtained at different points in time. However, the researcher looks at them as a progression over time. If a biological stimulus shows an effect on a particular gene that is reversed over time, this would show, for instance, as a peak in the gene's temporal expression profile. Our program SPOT helps researchers find these patterns in large sets of microarray data. We created the software tool using open-source platforms and the Semantic Web tool Protégé-OWL.

HENRY HALL ATRIUM 030

**The Effects of Embryonic Lead Exposure on Avoidance Learning in Female Zebrafish**

Participants attending 11:00 AM - 12:00 PM

Presenters: Rebekah Burge, Natosha Mercado-Idziak, Kelsey Vanamberg

Mentor: Xiaojuan Xu

Lead (Pb) is known as an environmental toxin that has detrimental effects on humans. In fact, a relationship between early Pb exposure and neurobehavioral deficits, including slower reaction times and hyperactivity, has been demonstrated by past research. The zebrafish has become a model for studying the effects of environmental toxins because of the ease with which zebrafish can be bred and taken care of. Our previous study demonstrated that embryonic Pb exposure may impair learning in male zebrafish. The current study used an active avoidance conditioning paradigm to explore the effects of Pb exposure on 12-month-old female zebrafish that were exposed to Pb as embryos. Adult zebrafish were placed in a shuttle-box separated into

two compartments by a manually raised divider. On Experimental Day 1, they were trained to associate a light with an electrical shock and to avoid the shock by swimming under the divider. Testing for avoidance learning occurred on Experimental Day 3.

HENRY HALL ATRIUM 031

**Neurotransmission within the Crayfish**

Participants attending 10:00 AM - 11:00 AM

Presenter: Rhiannon Robke, McNair Scholar

Mentor: Eric Ramsson

Fast-scan cyclic voltammetry was utilized to measure neurotransmitters in real time that were present near the pericardial cavity in freely moving *Procambarus clarkii* crayfish. Within the crayfish open circulatory system, neurotransmitters are released into their hemolymph and brought to the heart for circulation. During various behaviors, such as crawling and the meral spread, histamine (HA) was able to be recorded consistently using a histamine-sensitive waveform. Due to the placement of the recording electrode above the heart, the results show a slight delay in the recording of HA after a behavior, indicating a possible release of HA further away from the heart. The release of HA was also found to be dependent on previous aggressiveness and movements; displaying more forceful behaviors correlate with higher amounts of histamine. The purpose of this study is to better understand the crayfish general physiology and to assess the role histamine plays in regulating their behavior.

HENRY HALL ATRIUM 032

**Synthesis of a Sila-allyl Anion**

Participants attending 9:00 AM - 10:00 AM

Presenter: Michael Maddalena

Mentor: Randy Winchester

The sila-allyl anion is an allyl anion in which one of the carbon atoms is replaced with a silicon atom. The synthesis of a sterically hindered derivative will enable us to investigate the resonance stabilization of the sila-allyl system. One method for obtaining this information will be analysis of the variable temperature NMR spectrum of the system to obtain rotational barriers. Our progress on the synthesis of a sila-allyl anion will be presented as well as our efforts to improve the synthesis of the tris(trimethylsilyl)vinylsilane and the reactions of it to form the anion.

HENRY HALL ATRIUM 033

**A Periodized Training Routine for Olympic Women's Artistic Gymnastics**

Participants attending 1:00 PM - 2:00 PM

Presenters: Ercilia Lopes, Connor McGee

Mentor: Amy Crawley

Flying through the air twisting and flipping as one goes is the basis of women's artistic gymnastics, a competition focusing on balance, grace, technique, and power. The purpose of this presentation was to provide a year-long training program for a female athlete preparing for her Olympic debut. Training for an Olympic competition is a four-year process where every single aspect of training must be addressed in order to peak right at competition time. The researchers examined previous literature to create a periodized training routine specifically designed to include balance, flexibility, and sport specific exercises. Limitations include not being able to conduct original research on the topic or the opportunity to test effectiveness of this program. The beneficiaries of this program could include female gymnasts and coaches wishing to train for the Olympic level.

HENRY HALL ATRIUM 034

**Investigation of Lanthanide and Actinide Metals with a Multidentate Carbamoylmethyl Phosphine Oxide Compound**

Participants attending 9:00 AM - 10:00 AM

Presenter: Katherine Coburn

Mentor: Shannon Biros

Lanthanide and actinide metals from spent nuclear fuel (SNF) are dissolved in nitric acid and deposited in environmental repositories as part of nuclear waste remediation. Separation of these metals would decrease the metals' half life and allow for them to be repurposed. Using carbamoylmethyl phosphine oxide compounds (CMPOs), lanthanide and actinide metals can be selectively chelated and removed from solution. To enhance selectivity for actinide metals, our group coupled three CMPOs with a cap molecule, which intensified the chelate affect. Various R-groups and caps were investigated for their influence on the selectivity and extraction efficiency of both metal series in nitric acid solutions.

HENRY HALL ATRIUM 035

**Motility of Lake Huron Cyanobacterial Mats**

Participants attending 10:00 AM - 11:00 AM

Presenter: Adam McMillan

Mentor: Bopaiah Biddanda

Cynobacteria residing in Lake Huron sinkholes form a unique mat community that relies upon communication and motility of individual filaments for survival in an environment characterized by low-light and oxygen and high-sulfur. These cyanobacteria must use motility to optimize light intake, manage resources, and sustain a thriving symbiotic community. The problem of characterizing motility in regards to light availability and inter-filament communication, among other stimuli, can be investigated through the use of microscopy utilizing image analysis software and using a Diving PAM Underwater Fluorometer. By experimenting with simple petri dish analog communities in the lab, stimuli-dependent motile response behaviors were analyzed by measuring movement speed and distance traveled along with effective photochemical quantum yield. Findings showed precision of movement in response to light and mat building behavior dependent upon inter-filament communication. The behavior described has profound implications for this extremophile population, including exact coordination of communication to ensure community organization and survival.

HENRY HALL ATRIUM 036

**Can Drugs for Alzheimer's Disease Be of Benefit in Glaucoma?**

Participants attending 1:00 PM - 2:00 PM

Presenter: Aula Ramo, S3 Scholar

Mentor: David Linn

Glaucoma, a neurodegenerative disease, is a leading cause of blindness. It is associated with increased intraocular pressure that may lead to death of retinal ganglion cells. Activation of acetylcholine (ACh) receptors has been shown to have neuroprotective effects against this neurodegeneration. This study examines whether a potential Alzheimer's drug (DMP 543) can increase ACh release in the retina, as in the brain, to activate these protective receptors. Retinal ACh was labeled with tritium and release measured with a liquid scintillation counter. Potassium served as a positive chemical control (via direct depolarization), flashing light as a physiological control & tropisetron (a selective ACh compound) as a pharmacological control. Preliminary results show a dose-dependent increase in ACh release with DMP 543. Future experiments will try to determine the full dose-response characteristics, site of action in retinal circuitry, and possible effects on physiological responses.

HENRY HALL ATRIUM 037

**Interfacing an I<sup>2</sup>C Luminosity Sensor with a Raspberry Pi**

Participants attending 11:00 AM - 12:00 PM

Presenter: John Garbini

Mentor: Ross Reynolds

We developed hardware and software to allow a micro-computer, called a Raspberry Pi, to control a series of General Purpose Input/ Output (GPIO) pins that in turn would be able to talk to a luminosity sensor via a widely used commercial bus, the I<sup>2</sup>C. Programed using Python, in a Linux environment, we created the software interface between the Raspberry Pi and the GPIO pins and then finally to the I<sup>2</sup>C chip. Our Python program collected and converted the 22-bit binary data stream sent from the sensor into a decimal data sheet for evaluation. To connect our (2x2x1)mm I<sup>2</sup>C to the GPIO we designed and produced a very small circuit board using Eagle, a circuit-board design system. The program and hardware system were then tested by preforming small scale experiments using different angles of exposure and media thickness to experimentally determine intensity, and we related these measurements to predictions based on the coefficients of reflection and transmission.

HENRY HALL ATRIUM 038

**Prevention of Trail Degradation by Off Highway Vehicles in the Manistee**

National Forest, Michigan

Participants attending 4:00 PM - 5:00 PM

Presenter: Steven Sawyer

Mentor: Todd Aschenbach

This study focuses on the prevention of trail degradation by illegal Off Highway Vehicle (OHV) use within the Manistee National Forest, Michigan. Currently, riders using the Cedar Creek Motorsports Trail have been traveling off the trail to areas that are illegal for motorized use. This issue leads to severe erosion which affects water quality and destruction of vegetation which negatively impacts wildlife habitat. Here we identify areas currently impacted by illegal OHV use and areas that are vulnerable to future degradation. We also provide recommendations to prevent further degradation and restore areas that have been previously impacted. Results of this study can be used to prevent trail degradation in other areas designated for OHV use.

HENRY HALL ATRIUM 039

**The Selective Control of Aromatic Placement on CMPO Ligands for the Fluorescence of Lanthanide Metals**

Participants attending 11:00 AM - 12:00 PM

Presenters: Alyssa Kulesza, Erin Leach

Mentor: Shannon Biros

Our research is focused on the area of increasing the sensitivity of lanthanide luminescence. This has been achieved with the synthesis of several new carbamoylmethylphosphine oxide (CMPO) ligands. These ligands have different numbers of aromatic groups, which we believe act as antennas in these systems. Through substituting the aromatic rings with different functional groups, the overall CMPO-metal complex shows different levels of fluorescence for selected lanthanide metals. Detailed fluorescence data has been taken of the complexes and will be presented.

HENRY HALL ATRIUM 040

**A Comparative Analysis of the Tibia of *Paralouatta varonai*, an Extinct Cuban Primate**

Participants attending 9:00 AM - 10:00 AM

Presenter: Andrea Morrow

Mentor: Melissa Tallman, S3 Scholar

Primates inhabited the Caribbean islands for millions of years, from at least the Miocene up until several thousand years ago. One genus, *Paralouatta*, was endemic to the island of Cuba. The fossils of *Paralouatta varonai*, one of the two known species of that genus, have been well described, including evidence for possible semiterrestriality in the skeletal remains. Currently, all known New World monkeys are arboreal, spending almost all of their time in trees. This work offers additional comparative analyses of the fossilized tibia of *Paralouatta varonai*, specifically looking at the distal articular surfaces to determine the locomotion of the extinct platyrrhine along with the relation of *Paralouatta* to the extant platyrrhine families. We used geometric morphometrics in order to collect three-dimensional shape data to carry out statistical analyses. Principal component analyses were carried out on all individuals as well as on all extant taxa means and individual fossils. Our sample consisted of 160 individuals, 154 of which were extant taxa from 14 primate families. The remaining 6 were platyrrhine fossils. The PCAs performed in this study lend support to earlier assertions that *Paralouatta* is most closely related to the atelids, the family of New World monkeys that includes the howler, spider, and woolly monkeys. While primary locomotor mode is still unclear, the distal tibia of *Paralouatta* exhibits a mix of morphological characteristics that are typically associated with terrestrial and suspensory primates.

HENRY HALL ATRIUM 041

**Effects of Antibiotics and Antifungals on Isolated Porcine Vasculature**

Participants attending 1:00 PM - 2:00 PM

Presenter: Kathryn Young

Mentor: Francis Sylvester

Although cardiovascular studies commonly use low-dose antibiotics in buffer solutions, I have found no data that compiles evidence as to the affects that such microbial compounds may have on isolated organ or vessel specimens. I am looking to assess the effects of antibiotic and antifungal treatment in isolated organs in the context of improved or impaired function. After isolating and identifying microflora that are relevant to the subject of my research, porcine kidneys, I will conduct paired functional studies between specimens treated with an appropriate antibiotic/antifungal compound and those without. First, I will observe increased or decreased vascular constriction and relaxation within renal arteries. If a positive effect from antimicrobials is noted at a vascular level, I will continue paired functional studies in isolated porcine kidneys, measuring functionality as the amount of urine output from the organs.

HENRY HALL ATRIUM 042

**Distribution of Four Michigan Trout Species from 1951-2002**

Participants attending 3:00 PM - 4:00 PM

Presenter: Philip Reed

Mentor: Kin Ma

The purpose of this research was to map the changing geography of four native trout species, rainbow, brown, brook, and lake trout, in Michigan from 1951 to 2002. Michigan trout represent an important resource for game, trade, and tourism. Data were gathered from the Michigan Fish Atlas and mapped using ArcGIS. The highest density of sightings for rainbow and brook trout was in Alger County (13%), Mackinac County for brown trout (9%), and Berrien County for lake trout (29%).

HENRY HALL ATRIUM 043

**Operant Conditioning Of Crayfish Via LED Cue Coupling With Food**

Participants attending 9:00 AM - 10:00 AM

Presenters: Rebecca Cronin, Holly Malinoski

Mentor: Daniel Bergman

Animals commonly experience combinations of stimuli. When multiple stimuli are detected simultaneously,

there is an opportunity for an association to develop between those stimuli. The animal may eventually show a response originally associated with one stimulus when it now detects the second stimulus. Based on prior work, it is apparent that crayfish can learn to associate odors with naïve stimuli. However, the association between novel visual cues and naïve stimuli is not as well tested in crayfish. Crayfish were conditioned for three days by pairing an LED with food. On the fourth day, crayfish were allowed to move freely in a tank with an LED at one end to examine if they expressed a bias toward the LED. We documented the length of time the crayfish spent near the LED. It was found that the experimental crayfish spent more time in the presence of the LED, demonstrating that crayfish are capable of learning novel visual stimuli.

HENRY HALL ATRIUM 044

**Crystal Structures of a Clinically-Derived Class D -lactamase Variant with Cefotaxime, Ceftazidime, and Aztreonam Bound**

Participants attending 9:00 AM - 10:00 AM

Presenter: Jozlyn Clasman

Mentor: David Leonard

OXA-24 is a carbapenem-hydrolyzing class D -lactamase that poses a medical threat by destroying carbapenem class antibiotics. OXA-160 is a clinically-derived OXA-24 variant with a ProSer substitution. Previously, it was shown that OXA-160 has higher catalytic activity against third-generation cephalosporins compared to OXA-24 and is able to maintain normal activity against penicillins and carbapenems. To slow deacylation, we introduced a second mutation (V130D) to allow us to capture a drug-complex structure. We examined OXA-160/V130D in complex with the substrates cefotaxime, ceftazidime, and aztreonam using X-ray crystallography. Our analysis shows that bulky substrates require 5-6 and/or omega loop deviations, and we propose that these conformational changes are made possible by replacing the restricted proline with the more flexible serine. These crystallographic structures reveal that a P227S mutation enlarges the active site, better accommodating advanced cephalosporin drugs.

HENRY HALL ATRIUM 045

***Nato3* induces the expression of key DA neuron markers in a regionally and temporally specific manner within the developing CNS**

Participants attending 10:00 AM - 11:00 AM

Presenter: Jordan Straight, S3 Scholar

Mentor: Merritt Taylor

The floor plate (FP) of the developing midbrain gives rise to dopaminergic (DA) neurons, an important class of neurons involved in Parkinson's disease. *Nato3*, a basic helix-loop-helix transcription factor, is expressed along the ventral FP of the developing neural tube. In vitro studies suggest that *Nato3* overexpression (OE) is sufficient to promote FP and DA neuron marker expression, whereas in vivo studies suggest that *Nato3* is not. Here, we show that *Nato3* OE in the developing chick produces a regionally and temporally specific increase in DA neuron markers within the ventral midbrain. In ovo electroporation was used for transfection, and *Nato3* OE was monitored using a bicistronic EGFP reporter vector. The observed effects were characterized by Q-PCR and immunohistochemistry. Our results suggest that *Nato3* action is regulated by an unknown mechanism that functions in the developing ventral midbrain, and provide new insight into the role that *Nato3* plays in DA neurogenesis.

HENRY HALL ATRIUM 046

**Public Exposure of Female Breasts: The Topless Mystique**

Participants attending 9:00 AM - 10:00 AM, 12:00 PM - 1:00 PM

Presenter: Silvia Biella

Mentor: Kathleen Underwood



This study examines attitudes towards female topless behavior in the context of a beach setting. I plan to explore women's limited agency that results from the disparity that exists with regard to the laws and standards surrounding topless behavior for men and women. I am interested in examining how society's control of women's bodies, through the perpetuation of outdated and stereotypic ideas, affects topless sunbathing. More specifically, I want to determine what factors influence attitudes toward public exposure of women's breasts among the GVSU female student population. Data collected will be analyzed for the purpose of determining whether those findings encourage or discourage the legalization of female topless behavior on Michigan's beaches. I anticipate that the results will reveal that cultural context, along with level of self-esteem, religiosity and sexual attitudes will be the most important variables in predicting GVSU students' attitudes towards female topless beach behavior.

HENRY HALL ATRIUM 047

**Non-Catalytic Conversion of Cellulosic Material**

Participants attending 11:00 AM - 12:00 PM

Presenters: Aaron Marshall, Angela Michael, Gerrit Rauch

Mentor: Dalila Kovacs

Cellulose, the most abundant polycarbohydrate found in plant material, presents a high potential to be converted, under suitable conditions, either into fuel or into various platform-molecules. Difficulties in plant cellulose conversion rise from its robust structure, and the 'packaging' of natural cellulose fibers in lignin, which give support to plant cell wall. In addition to microbial pathways, literature abounds with heterogeneous catalytic systems that allow cellulose hydrolysis/hydrogenolysis. This study aims to identify lower energy requirements to convert cellulose into hydrogenated polyols, without using metal catalyst, such as ruthenium, palladium or nickel, used previously and proved efficient. In order to investigate the possibility to hydrogenolyze cellulose in water without transition metal catalysts, initially Cellobiose, a two-glucose unit dimer, was used as an ideal simplified model for cellulose. We found that cellobiose, can be converted to sugar alcohols at 550 psi of hydrogen gas and 200 °C. To further our understanding of the mode of transformation of the process, additional reactions were preformed using glucose, sorbitol, and xylitol as the starting materials.

HENRY HALL ATRIUM 048

**The Role of Post-Translational Modification of Rfg1 in the Regulation of *Candida albicans* Filamentation**

Participants attending 3:00 PM - 4:00 PM

Presenter: Nicolas Fernandez, McNair Scholar

Mentor: Derek Thomas

*Candida albicans* is a fungal organism that resides in the mucosa of humans and is the fourth most frequent nosocomial infection in the US. Integral to the pathogenic potential of *Candida albicans* is the ability to reversibly switch its morphology between yeast cells, pseudohyphae and true hyphae. This research focuses on Rfg1, a negative regulator of filamentation. Rfg1 is believed to function in conjunction with Tup1 to repress genes associated with filamentation; however, the exact mechanism of interaction between the two proteins is unknown. Recent data from our lab has implicated post-translational modification in regulation of the interactions between Tup1 and its co-repressors. *In silico* analysis has shown multiple amino acid residues in Rfg1 have the potential to be phosphorylated. Future research will look to determine the extent of post-translational modification and the results should further our understanding of the global repression in the regulation of filamentation.

HENRY HALL ATRIUM 049

**Characterization of a New CMPO Ligand for the Sensitization of Lanthanide Metal Luminescence**

Participants attending 10:00 AM - 11:00 AM

Presenter: Justin Shady

Mentor: Shannon Biros



Our research is focused on the area of increasing the sensitivity of lanthanide luminescence. This has been achieved with the synthesis of several new carbamoylmethylphosphine oxide (CMPO) ligands. In particular the diphenylCMPOphenyl works best at increasing the luminescence of terbium but also works with other lanthanide metals such as samarium, dysprosium and europium. Characterization including the optimal excitation, optimal concentration, dissociation concentrations, luminescence lifetime, crystal structure as well as equivalence in solid and dissolved states were determined for this particular ligand.

HENRY HALL ATRIUM 050

**Head and Neck Anatomy of *Papio hamadryas anubis***

Participants attending 10:00 AM - 11:00 AM

Presenter: Nathan Kalinowski

Mentor: Melissa Tallman

Primates are often used as medical models for humans in pharmaceutical and biomedical research. Currently, all published information on the anatomy of head and neck musculature of primates is outdated and lacks actual images of a specimen. My project focused on filling this void by creating an anatomy atlas of primates using *Papio hamadryas anubis* as a model. This atlas includes labeled photos of all superficial and deep muscles, three-dimensional images of the skull and mandible, with the origins and insertions superimposed onto them, in addition to a list of every muscles' origin and insertion.

HENRY HALL ATRIUM 051

**The Dutch Boy Conquers Old Man Gloom: The lead industry's rally against public health.**

Participants attending 1:00 PM - 2:00 PM

Presenter: Sian Mehl

Mentor: Rachel Campbell

The toxic properties of lead have been known for centuries. Countless studies show that when consumed, irreversible damages are done to a child's nervous system and intellectual development. Despite this knowledge, only in the past few decades have formal regulations been put into place to reduce accidental exposure of children and adults to lead. Further, millions of home across the country built before 1978 when lead-based paint was banned in interior spaces still pose hazards to the inhabitants. By discussing the history of policies to regulate the use of lead and the lead industry's role in disseminating misinformation about the quality of its products, this paper seeks to understand why lead paint is still an issue today and the extent of its potential impact in the Grand Rapids area. Finally, this paper ends with an overview of action that is currently being taken to eliminate the presence of lead-based paint in home interiors.

HENRY HALL ATRIUM 052

**First-Principle Calculations of Elastic Properties of Crystalline Solids**

Participants attending 3:00 PM - 4:00 PM

Presenter: Amy Mohr

Mentor: Maja Krcmar

First-principle calculations based on density-functional theory will be used to study elastic response of selected cubic crystalline solids to deformation. First-principle calculations are a quantum mechanical method used to find the ground state energy of a physical system by approximating the Hamiltonian of interacting many-body electron systems in an external potential due to ionic background by the Hamiltonian of non-interacting electrons in an effective potential. The desired elastic deformation of the solid is described in terms of a deformation tensor which yields a new structure upon deformation. In the elastic regime deformation energy density can be expanded in power series of the applied strains. Fitting the energy density vs. strain curves allows calculating bulk modulus, sheer modulus, and second order elastic constants for the system. We will focus on elastic

properties of cubic crystals (iron, aluminum) and compare our calculated results with available experimental data.

HENRY HALL ATRIUM 053

**Den Site Characteristics and Kit Survival of American Marten in Manistee National Forest Michigan**

Participants attending 1:00 PM - 2:00 PM

Presenter: Rachel Hughart, S3 Scholar

Mentors: Joseph Jacquot, Paul Keenlance

We tracked and documented the den sites and number of kits for three female American marten within Manistee National Forest from April through August 2013. Kits were monitored using remote, motion-triggered trail cameras, and kit activity times were documented. The mothers were located two to three times per week using radio telemetry. A total of 7 kits were documented with only 6 surviving into the rigorous tracking season and only 4 known survivors into mid-July. Nineteen unique den sites were documented in three different areas of marten use (Olga Lake, Pine River and Caberfae), and 12 of those had cavities at ground level. All of the den structures were in live trees (84.2%), snags (10.5%) and fallen logs (5.3%). The average DBH of den trees in each area were: Olga Lake-61.95cm, Pine River- 38.88cm and Caberfae-47.58cm. When each was compared to a randomly chosen tree within a random plot in the same area a significant difference was found for all three areas indicating selection for trees with a larger diameter. Basal area was not found to be significantly different and neither was the comparison of the DBH of trees surrounding the den tree in comparison to the random plot. (Caberfae is the exception to the latter, a significant difference was found.) Kit survival may be limiting the population but denning sites are not; however, management for mature hardwoods and pine stands is recommended.

HENRY HALL ATRIUM 054

**Mechanism of Telomerase Inhibition by Novel Non-nucleosidic Drug Candidates: Application of a Genetic Algorithm to Improve the Accuracy of Ligand Docking Simulations.**

Participants attending 12:00 PM - 1:00 PM

Presenter: Katie Chernoby

Mentors: Bill Schroeder, Robert Smart, Suganthi Sridhar, Agnieszka Szarecka

Telomerase is an enzyme that adds telomeric repeats at the ends of linear chromosomes. Normal somatic cells show low telomerase activity. In contrast, majority of cancer types can express telomerase, enabling the cancer cells to divide uncontrollably. Thus an effective telomerase inhibitor would potentially aid cancer therapy in all telomerase-expressing tumors. In our previous study, we simulated binding of several potential inhibitors to telomerase TERT domain using the method implemented in SwissDock server. In this project, we seek to improve the accuracy of our predictions by employing a genetic algorithm and multiple parallel docking runs, each focusing on a different structural subdomain of TERT. This approach allows us to reexamine the binding pockets in two crucial regions of TERT: the *Fingers* and the interface between the *Thumb* and the RNA-binding domain. This protocol will also be applicable to accurate screening of binding affinities of current and future drug candidates.

HENRY HALL ATRIUM 055

**Relationships Between Maternal-Mind-Mindedness, Gender-Stereotypes, and Mother-Child Emotion Talk About Jealousy**

Participants attending 9:00 AM - 10:00 AM

Presenter: Challie Frostick

Mentor: Naomi Aldrich

Research suggests that maternal-guided reminiscing about emotional events and maternal-mind-mindedness

(MMM, degree of maternal attention to a child's mental capacities) are beneficial to preschoolers' social cognition. However, few studies have examined maternal-guided reminiscing with older children about complex emotions with no investigation of the effects of MMM. The current study examined influences of MMM and gender-stereotypes on 5- to 11-year-olds' (40 girls, 40 boys) emotion talk with their mothers about jealousy (a ubiquitous complex emotion concerning interpersonal rivalry). Our results suggest that while MMM may play less of a role in school-age children's social cognition, maternal stereotyped-beliefs and maternal-guided reminiscing may continue to influence children's developing abilities beyond preschool. These findings have important implications for understanding socialization practices behind children's emotional discourse about childhood rivalry and aggression.

HENRY HALL ATRIUM 056

**Correlations Between Locomotor Repertoire and Upper Limb Muscular Characteristics in Four Species of Primates**

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenter: Moriah Muscaro

Mentor: Melissa Tallman

Primates that use their upper limbs in specific ways related to their daily locomotor repertoires should have differences in muscular features that correlate to differences in use. Taking data obtained through dissection of upper limbs of four species of primates, we examined muscle lengths, muscle weights, and fiber lengths as they correlate to locomotor data for each species. By standardizing data to eliminate the imbalance of side dominance, we are able to compare the following muscle groups across species: pronators, supinators, biceps, triceps, as well as ratios of triceps to biceps and forearm extensors to flexors. Then, utilizing data from primate behavioral studies, we are able to make a regression model to determine which aspects of muscular dimensions best correlate with frequency of specific types of movements. This enables us to visualize correlations that exist between the structure and function of major muscle groups in primate upper limbs.

HENRY HALL ATRIUM 057

**The Application of Prescribed Fire and Herbicide to Reduce *Carex pensylvanica* Cover at the Newaygo Prairies Research Natural Area, Manistee National Forest, Michigan**

Participants attending 3:00 PM - 4:00 PM

Presenters: Samantha Brodley, Connor Wojtowicz

Mentor: Todd Aschenbach

Sand prairies, once an integral part of Michigan's oak-pine barrens ecosystem, have been degraded mainly due to fire suppression and agriculture. Restoring sand prairies could increase biodiversity and improve ecosystem function, but *Carex pensylvanica* (*C. pens.*), a native invasive sedge, threatens the success of restoration efforts. This study examines the impact of five site-preparation treatments on *C. pens* in the Manistee National Forest (MNF), MI: fire, herbicide, fire-herbicide, herbicide-fire, and no treatment (control). Species richness, cover, and biomass samples were evaluated in 2013 following each treatment. Results show the control exhibited the highest *C. pens.* cover, which was significantly greater than the fire-herbicide and herbicide treatments. *C. pens.* increased in control and fire plots over the growing season, but decreased in fire-herbicide and herbicide plots. These results will help determine future site-preparation methods for prairie restoration in the MNF.

HENRY HALL ATRIUM 058

**The Effect of Alkylphenol on Heart Function**

Participants attending 2:00 PM - 3:00 PM

Presenters: Conor Driscoll, Victoria Johnson, Michaela Kastura, Austin Meadows, Leah Starks

Mentor: Francis Sylvester

Alkylphenols are used in the application of agricultural chemicals since alkylphenols possess excellent adhesive properties. Alkylphenols have potentially toxic properties that may be contaminating the Grand Rapids water basin. Crayfish inhabit these waters and could be affected by alkylphenols. This research is focused on studying whether there is a link between alkylphenol contamination and crayfish heart function. By taking a myogram of the heart while the crayfish is exposed to this chemical, the rate and strength of the heart can be determined and analyzed. Similar studies will be performed using a pig heart model.

HENRY HALL ATRIUM 059

**The Mass Production of Desires: A Close Examination of *Cosmopolitan* Magazine**

Participants attending 1:00 PM - 2:00 PM

Presenter: Tiffany Gibbs

Mentor: Kathleen Underwood

This research examines how desires are first created and then marketed as a means to encourage the continuation of a consumer based culture. This research draws upon theories that argue that marketers create limited possibilities, which in turn limit desires. I argue that magazines targeting women show a limited focus on beauty at the same time creating the illusion of limitless products. Using a content analysis, I focus on a specific section of *Cosmopolitan* Magazine entitled "What We're Into This Month," and then compare how often the products mentioned in that section appear elsewhere in that magazine. I also examine the types of products to see if competing products are advertised in higher numbers.

HENRY HALL ATRIUM 060

**An Eye-Tracking Study of Expert and Novice Chemistry Problem Solving**

Participants attending 1:00 PM - 2:00 PM

Presenter: Jessica Vogl

Mentors: Thomas Pentecost, Jessica VandenPlas

Professors always write in the directions to read the question and all of the answers before moving on. But how many people actually read through everything before moving on? Do they just read through a question once? The current study has looked at the difference between how experts (professors) and novices (students) read and answer general chemistry questions. An eyetracker was used to record where individuals looked and for how long. Although both groups spend about the same amount of time on each of the questions, they do not read through them the same way. These differences will be discussed in terms of memory capacity and prior knowledge of the experts and novices.

HENRY HALL ATRIUM 061

**A Periodized Olympic Lifting Plan for Collegiate 200m and 400m Dash Athletes**

Participants attending 1:00 PM - 2:00 PM

Presenters: Nicholas Marcinkowski, Mohamed Mohamed

Mentor: Amy Crawley

Sprinting is a key foundational element in most sports and is most often associated with track and field. A sprinter's performance is mainly determined by the force and the speed with which their muscles contract and relax while the rate at which they can contract/relax determines their overall explosiveness and power. The theory of combining a resistance-training program along with sprinting has been present for several decades. The purpose of this research was to combine an Olympic lifting program with sprint training to improve performance in a 200m and 400m dash over a 12 month period. A review of previous literature was completed to develop a proper strength and conditioning program that would increase overall speed and explosiveness in a collegiate sprinter. A limitation of this research is the lack of original data and testing of the purposed program. Coaches and entire sprint programs could gain from proper inclusion of Olympic lifting into their training program.

HENRY HALL ATRIUM 062

**Assessment of Cyclicity in the Upper Ordovician Kope Formation of Northern Kentucky**

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenters: Zachary Foulks, Karen Musser, Christopher Vanderlip, Rachel VanderVere

Mentor: Peter Riemersma

The Upper Ordovician Kope Formation is a unit of approximately 75 meters of shale-dominated strata with cyclically interbedded limestones in between two surrounding limestone-dominated units. The cycles of limestone and shale have been variously interpreted by previous workers as being caused by intermittent clusters of powerful storms, varying sources of sediment, and cycles of alternating local and distant storm effects interacting with sea level change. Using stratigraphic columns from the literature and petrographic analysis of rock type, grain size, bed thickness and sedimentary structures from field samples, we aim to characterize the limestone beds to differentiate proximal and distal storm facies and, in doing so, infer an environment of deposition.

HENRY HALL ATRIUM 063

**Geomorphic History of the Grand River and Grand River Valley: Natural and Anthropomorphic Hydraulic Controls**

Participants attending 9:00 AM - 10:00 AM

Presenter: Christopher Churches, S3 Scholar

Mentor: Peter Wampler

Five low head dams located on the Grand River in Grand Rapids, Michigan, are under consideration for removal. These dams were constructed at the location of the only known natural hydraulic controls in the Lower Grand Basin. This study investigates previously unmapped natural hydraulic controls upstream of the dams. Six potential natural hydraulic controls were investigated through bathymetric mapping of a ~13 km reach upstream of Grand Rapids. An exposure of boulder-rich fluvial sediment was identified 5 km upstream of Ada, MI. This exposure provides unique substrate and habitat uncommon in the Grand River, which is a sand and silt dominated river. Mapping of approximately 40,000 water wells adjacent to the Grand River Valley revealed: 1) a bedrock channel, presumably occupied by an ancestral Grand River; 2) evidence for a Grand River outlet north of the modern location; and 3) a N-S trending area of thick alluvium which may represent valley fill of the pre-LGM bedrock valley.

HENRY HALL ATRIUM 064

**Functional Movement Screening Score by Somatotype**

Participants attending 12:00 PM - 1:00 PM

Presenters: Brady Cone, Amanda Robertson, Megan Thompson

Mentor: Heather Gulgin

The purpose of this research study is to establish normative reference values for functional movement screening score based on body type category. By establishing reference norms for movement abilities by body type we will be able to know more about the relationship between the way we move and body composition. Additionally this study will lay the groundwork for being able to compare functional movement screening scores between body type groups. This will provide a better understanding of how an individual's body type affects the ability to move, which may be useful in decreasing risk of injury due to dysfunctional movement patterns.

HENRY HALL ATRIUM 065

**Development of an Efficient Seebeck Measurement Method for Broad Temperature Ranges**

Participants attending 11:00 AM - 12:00 PM

Presenter: Dustin Kirkendall

Mentor: Harold Schnyders

The Seebeck effect is a phenomenon by which a potential difference is produced across a material due to a temperature gradient within that material. This effect is quantified in the Seebeck coefficient. The Seebeck coefficient can be determined by measuring the potential difference across the material as a function of the temperature difference between the voltage leads, but an accurate measurement is based on small temperature intervals. We can uniformly and continuously increase the average temperature of the material while periodically establishing small temperature gradients to take many measurements of the coefficient. This method allows for much more efficient collection of data for large temperature ranges since thermal equilibrium is not required for the measurement at each temperature. This method is tested and calibrated using a standard Seebeck material.

HENRY HALL ATRIUM 066

**Developing a Further Understanding of Heavy Metal Chelation for the Improvement of Radioactive Waste Remediation and Magnetic Resonance Imaging**

Participants attending 10:00 AM - 11:00 AM

Presenter: Julie Stoscup

Mentor: Shannon Biros

Our lab is focused on the development of tripodal carbamoylmethylphosphine oxide (CMPO) ligands to complex with *f*-elements. Our strategy aims to take advantage of the chelate effect, via CMPO ligand preorganization, to increase the selectivity for heavy metals. Applications of this research include, but are not limited to: the extraction of hazardous heavy metals to improve the remediation of nuclear waste, the enhancement of magnetic resonance imaging (MRI) abilities, the production of light-emitting diodes (LED) with increased lifetimes, and the exploration of heavy metal polymers.

HENRY HALL ATRIUM 067

**Impact of Ligand Binding on the Dynamics of  $\beta$ -lactam Sensor Domain**

Participants attending 12:00 PM - 1:00 PM

Presenter: Paul Francoeur

Mentor: Agnieszka Szarecka

$\beta$ -lactamases mediate antibiotic resistance and can quickly evolve function toward new antibiotics. Novel strategies are needed to either inhibit  $\beta$ -lactamases or their expression. The BlaR sensor domain is involved in a signaling process that regulates expression of  $\beta$ -lactamases. If antibiotic binds, the sensor domain undergoes a conformational change that transmits the expression signal. Thus ligand-induced conformational change in BlaR is essential and its disruption can potentially make BlaR-expressing bacteria more susceptible to  $\beta$ -lactams. In this study we examined the conformational mobility of the BlaR domain and identified specific motions that contribute to the signal. We use the Elastic Network Model to classify the seven slowest collective modes of two apo and three ligand-bound BlaRs and to determine if the motions are affected by the ligand binding. We found that all modes are hinge-motion and we identified hinge residues. The motions are indeed affected by the ligand.

HENRY HALL ATRIUM 068

**Pistil Composition and Flower Morphology in *Arabidopsis thaliana***

Participants attending 3:00 PM - 4:00 PM

Presenter: Kara Myers

Mentor: Margaret Dietrich

Understanding how plants respond to environmental stresses, such as high-salt soil conditions, has important applications in agricultural systems. The Calcineurin-B-like (CBL10) protein functions by binding calcium ions



and is involved in the salt overly sensitive (SOS) signaling pathway during vegetative growth. Interestingly, *cb110* mutant plants grown in saline soil conditions produce stamens that are too short to self-fertilize and pollen tubes that do not properly elongate down the pistil for fertilization. Histological staining studies have been pursued on hand-sectioned pistils to assess the polysaccharide makeup of the pistil; we have detected no differences between wild-type and *cb110* mutant pistils to date. In addition, we will examine flower morphology through development using microtome-sectioned material. Determining the role of CBL10 in flower development may help us better understand how plants cope with the stress of saline soil conditions.

HENRY HALL ATRIUM 069

**Technique for the Acquisition of Electromyographic Signals to Measure Muscle Activation**

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM, 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM

Presenters: Robert Albert, Anna Bennison, Kassandra Bevier, Dustin Karlik, Theresa Swastek

Mentor: Stephen Glass

Understanding electromyography (EMG) is important for exercise and rehabilitation. EMG records the electrical activity of muscles during rest and contraction in order to understand which muscles are activated during movement. The purpose of this presentation is to demonstrate the technique for the acquisition of EMG data. We will discuss skin preparation and impedance, EMG electrode application, and acquisition equipment. Data collection begins with shaving, abrading, and cleaning the skin, to ensure the lowest skin impedance. Bipolar electrodes are then placed over the belly of the muscle to record electrical activity and on a bone for grounding. Finally, the wiring of the acquisition equipment is attached to the electrodes in order to receive the electrical signals from the muscle activation. This presentation will detail each step in the process of acquisition.

HENRY HALL ATRIUM 070

**A Strength and Injury Prevention Periodized Program for Horse Jockeys**

Participants attending 9:00 AM - 10:00 AM

Presenters: Elizabeth Dowd, Sarah Opdycke

Mentor: Amy Crawley

At the annual Kentucky Derby many put great emphasis on the uniqueness of the hats wore by spectators; but certainly equal emphasis should be placed on the helmet worn by the jockeys to help prevent head injuries. The purpose of this study was to provide a periodized training and injury prevention regime for the competitive horse jockey. This presentation explored research related to injury prevention techniques, as well as strength and stabilizing exercises that a horse jockey would use in a year long macrocycle training program. The basis of this plan was developed through the analysis of past studies that have been completed in the field of jockeying. Due to a strictly theoretical approach to our research, the limitations in this presentation include a lack of experimental data as well as the nutritional aspect of meeting weight requirements in the sport. The benefits of this investigation are a well-researched exercise training plan that should not only help prevent injuries to jockeys but enhance overall racing performance.

HENRY HALL ATRIUM 071

**I Am Top Shelf: The Effect of Image Oriented Advertising and Extrinsic Contingency Focus on Attitudes Toward High and Low Status Consumer Products.**

Participants attending 10:00 AM - 11:00 AM

Presenters: John Hessler, Isaac Simon

Mentor: Todd Williams

Extrinsic contingency focus (ECF) reflects people's tendency to derive self-esteem by meeting socially vs. personally defined standards. Previous research shows that high levels of ECF are associated with a concern



with meeting salient social ideals. It has been found that exposure to social ideals in advertising media and public service announcements affects eating, shopping and health related behaviors (Arndt et al., 2009; Williams, 2009). Although the relationship between ECF and responses to advertising has been investigated, the relationship between ECF and product preferences has not been examined. Two studies explore the possibility that ECF is related to people's preferences for consumer products. Study 1 shows that ECF predicts preference for the image-oriented qualities of consumer products. Study 2 extends these results by demonstrating that ECF relates to an increased preference for high (vs. low) status consumer products.

HENRY HALL ATRIUM 072

**Effects of a Positive Energy Balance on Endothelial Cells**

Participants attending 11:00 AM - 12:00 PM

Presenter: Noah Zucker, S3 Scholar

Mentor: David Kurjiaka

The positive energy balance of obesity increases circulating blood glucose and fatty acids, which compromises vessel function and increases atherosclerotic vessel damage. These damaged endothelial cells should grow faster and express more Cx43 protein than a healthy endothelium. Thus, we assessed the influence of glucose (high [25 mM] vs low [5.6 mM]) on endothelial cell growth and fatty acids (18 carbons with and without double bonds) on Cx43 expression. The rate of endothelial cell growth (bEnd.3 cells) was greater in high than low glucose media (9 days) independent of the presence of serum. Endothelial cells responded to 30  $\mu$ M linoleic (omega-6) and oleic (cis) acid with an early (~3 hrs) increase and a later (~12 hrs) decrease in Cx43 expression over control. However, at 24 hours at 0.3 to 300  $\mu$ M, there was little difference in Cx43 expression following treatment with saturated (stearic) or 3 unsaturated [oleic, linoleic, and eladonic acid (trans)] fatty acids. These data argue that endothelial cell health is negatively impacted by elevated glucose while more work needs to be done with fatty acids to determine whether there are any negative effects.

HENRY HALL ATRIUM 073

**How to Become a Millionaire: An Application of Modular Arithmetic and Systems of Equations**

Participants attending 10:00 AM - 11:00 AM, 4:00 PM - 5:00 PM

Presenter: Nicholas Karavas

Mentor: Shelly Smith

Imagine that you are chosen to be a contestant on a game show for a chance to win one million dollars. All you have to do is turn the knobs of four dials so that they read the number 0 on every individual dial. The catch is that when you turn one dial, it turns surrounding dials simultaneously. Will you be able to win the prize? Through the use of modular arithmetic and systems of equations we show this task to be easier than one may fathom. Matrices, determinants, and inverses are beneficial when attempting this task. We show that the number of dials, numbers upon the dials, and the effect of turning each dial can be changed depending on the specific problem. Come and learn more so if you ever have the chance to win a million dollars, you'll be knowledgeable and ready!

HENRY HALL ATRIUM 074

**MoKai's Ninja Star**

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenter: Kyle Zimmer

Mentor: Oliver Golden

This fractal can be looked at as a variation of a Sierpinski Triangle, and also resembles a fractal known as Koch's Snowflake. Unlike Sierpinski's triangle which grows inwards, or Koch's Snowflake which grows outwards however, it grows inwards and outwards simultaneously as the recursive function that generates it iterates. The

realization that led to it being truly interesting is that the outward growth is bounded and can be inscribed within an equilateral triangle. Since the fractal generates "shaded" and "non-shaded" equilateral triangles, it became apparent that a copy of the entire design can be inscribed into each of its own infinite number of "non-shaded" equilateral triangles. Thus a finite ratio of shaded to non-shaded area can be calculated as the function that generates the fractal iterates on towards infinity.

HENRY HALL ATRIUM 075

**Periodization and Injury Prevention for Female High School Soccer Players**

Participants attending 1:00 PM - 2:00 PM

Presenters: Kristen Cargo, Jordan Hart

Mentor: Amy Crawley

As a result of being one of the most popular team sports in the world, soccer is played by a wide range of individuals from elementary school kids to elite professionals. At every level of training, the technical demands of the sport force the body to be put through rapid changes in speed and direction while requiring various sport specific skills such as passing, shooting, dribbling, and explosive power. In this project, a proposed strength and conditioning periodization program for female high school soccer players was generated from the compilation of various research studies regarding soccer training methods. This program includes conditioning guidelines throughout the multiple stages of a high school female soccer season regarding resistance training, aerobic activity, sport specific exercises, and flexibility geared towards injury prevention. Limiting factors for this research include the lack of actual data generated directly from an original study; however, the project does provide techniques and practices that are based on actual peer-reviewed research. The goal is to help female soccer players improve their performance and athleticism by providing the proper training techniques and exercises, while simultaneously reducing their chances of injury.

HENRY HALL ATRIUM 076

**Faith on the Move: Spatial Analysis of Christian Movement from 1960-2010**

Participants attending 11:00 AM - 12:00 PM

Presenter: Melissa Salich

Mentor: Kin Ma

The purpose of this study was to analyze the worldwide movement of Christians into and out of the United States. Data were obtained from the Pew Forum and were analyzed and mapped in ArcGIS. Comparison of immigration and emigration was accomplished cartographically and explained with ancillary data. Results suggest that significantly more Christians immigrate to the United than leave it. The greatest numbers of Christian immigrants come from Mexico followed by India and China. The vast majority of Christian emigrants moved to adjacent countries with predominantly Christian populations.

HENRY HALL ATRIUM 077

**Fragment-Based Discovery of Novel Inhibitors for the Class D  $\beta$ -Lactamase OXA-24**

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM

Presenter: Ryan Hoogmoed

Mentor: Rachel Powers

Since the discovery of the penicillin,  $\beta$ -lactam antibiotics have become the preferred and most widely used antimicrobial agents. Bacteria, however, have developed resistant mechanism to these therapeutic, particularly through the expression of  $\beta$ -lactamase enzymes, which hydrolyze the  $\beta$ -lactam bond and render the antibiotics useless. Currently all clinically available inhibitors of  $\beta$ -lactamases contain the same recognizable  $\beta$ -lactam ring scaffold found in  $\beta$ -lactam antibiotics. In addition, these available inhibitors fail to effectively inhibit the class D  $\beta$ -lactamases, which are one the four known classes of  $\beta$ -lactamases. In order to address these serious

problems, molecular docking was used to search for novel inhibitors of the class D enzyme, OXA-24. Five commercially-available fragments were ordered and found to have  $K_i$  values of less than 5 mM. The structures of OXA-24 in complexes with two of the higher affinity inhibitors were determined to 1.67 Å and 1.78 Å resolution.

#### HENRY HALL ATRIUM 078

##### **The Formation of Chert Nodules in the Silurian Brassfield Formation in Northern Kentucky**

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenters: Devinne Fackelman, Kaylin Price, Racquel Renkema

Mentor: Peter Riemersma

The Silurian Brassfield Formation is composed of orange buff weathering dolomitized limestone with local concentrations of light grey chert nodules. There is evidence of gutter casts and traces of fossilized brachiopods, bryozoans, crinoid columnals, as well as solitary and colonial corals within the formation, indicating that this was once a shallow marine environment. Dolomitization occurred later, when the limestone ( $\text{CaCO}_3$ ), came into contact with magnesium-rich water, creating dolomite ( $\text{CaMg}(\text{CO}_3)_2$ ). However, the origin of the chert nodules is not exactly clear. We will try to determine whether the chert was deposited early, following deposition of sediment or as a secondary replacement by superfluous silicon dioxide within the dolostone from ground water. We will be looking for evidence of fossils within the chert nodules, as well as evidence of dolomite within the chert, with the hopes of determining the relative order in which the dolomitization and chert nodules occurred.

#### HENRY HALL ATRIUM 079

##### **Book Swap**

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM

Presenter: Caleb Gomer

Mentor: Roger Ferguson

Book Swap is a cross-platform application (Android, iOS, and Web) that helps organize and facilitate the purchase and sale of used textbooks among college students. The initial application focuses on GVSU students but will expand to other universities if possible. Book Swap provides a great place for students looking for affordable, used textbooks by swapping books with other students. To accomplish this, the application matches selling and buying students from the same university so they can meet on-campus and sell or exchange their books.

#### HENRY HALL ATRIUM 080

##### **Interpreting the Alternating Lithologies and Depositional Environments in the Upper Ordovician Fairview Formation, Northern Kentucky**

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM

Presenters: Ashley Brady, Joshua Ehlich, Steven Ossim, Shelby Van Zalen

Mentor: Peter Riemersma

Conflicting theories concerning the cyclical nature of the Fairview Formation have been debated by geoscientists. The Fairview Formation overlies the Kope Formation in northern Kentucky and consists of cyclical beds of limestone and shale, perhaps recording changes in sea level or storm events. Researchers suggest three competing depositional mechanisms: (1) rare, large storm events; (2) small storms events associated with regression; and (3) sea level changes irrespective of storm events. We aim to understand the origin of these cyclical patterns and interpret their requisite depositional environments. In doing so, we will examine hand samples, thin sections, stratigraphic columns, and conduct point counts for evidence of depositional environment. Faunal variability will be instrumental in determining the precise role of sea level changes. Stratigraphic columns display the frequency and thickness of limestone beds helping to distinguish the occurrence and magnitude of storm events.

## HENRY HALL ATRIUM 081

**Causes of Dolomite Formation in the Silurian Bisher Formation**

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM

Presenters: Andrew Barrette, Zachary Ostrom, Zackery Remtema, Anthony Vickers

Mentor: Peter Riemersma

In an ancient world that was once dominated by intricate corals and other fossil features in a vast ancient sea, dolomite has swept over and replaced the once prominent oceanic seascape. The Bisher Formation in Northern Kentucky show signs of a marine environment once present, and furthermore, the sparse fossil remnants (conodonts, crinoids, and tabular corals) would suggest a low energy fore reef environment. However, these remnants have since become dolomitized. Thin sections from the formation contain a large number of dolomite rhombs that are incomplete and very fine grained in size, and show evidence of dolomite replacing calcareous cement. Our ultimate goal is to interpret, with the use of thin sections, hand samples, and sedimentary petrography, the conditions that caused the dolomitization in our samples and to construct a feasible scenario as to how different processes lead to this end product at hand.

## HENRY HALL ATRIUM 082

**Drosophila Genomics: Hypothesis-Driven Genome Annotation in the Classroom**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 3:00 PM - 4:00 PM

Presenters: Stephanie Banta, Brittany Callegari, Daniel Doyle, Andrew Messina, Jordan Miller, Caitlin Polakowski, Timothy Rescigno, Robin Wolschendorf

Mentor: Martin Burg

The Genomics Education Partnership (GEP) allows undergraduates at participating institutions to experience the process of transforming raw genomic sequence data into a high quality annotated genome. Students are assisting in the finishing (improvement) of the genome sequence and annotation of specific regions of the "dot" chromosome from *D. biarmipes*, using *D. melanogaster* as a reference species. Students first locate a *D. melanogaster* gene that is orthologous to a gene in the assigned *D. biarmipes* genome. Using a variety of online tools (BLAST, Gene Model Checker), gene models are developed and tested to create a gene model for *D. biarmipes*. Sequence finishing is also being performed, in which the reported genome sequence of a particular region is examined for errors, and corrected if errors are found. Completed student projects are submitted to a genome database at the GEP to be used to further understand the evolutionary changes that can occur between different *Drosophila* species.

## HENRY HALL ATRIUM 083

**Does Childhood Behavior Predict Collegiate Athletes' Sports Interest?**

Participants attending 11:00 AM - 12:00 PM

Presenter: Nikole LeCompte, McNair Scholar

Mentor: Robert Deaner

A biological perspective suggests that sex differences in sports interest may be partly due to sex differences in prenatal hormones. This hypothesis predicts that the gender-typicality of childhood behavior will predict adult sports interest. We tested this by recruiting varsity intercollegiate athletes (cheerleading, gymnastics, swimming, tennis, soccer and football) to complete online surveys. We used an established self-recall questionnaire to determine the femininity or masculinity of childhood behavior. Overall, participants (307 total, 200 women) reporting more masculine childhood behavior were significantly more likely to report interest in masculine sports. Among women, the masculinity of childhood behavior significantly predicted the masculinity of the athlete's sport. These results support the hypothesis that prenatal hormones contribute to sex differences in adult sports interest, although they are also consistent with explanations emphasizing socialization.

HENRY HALL ATRIUM 084

**Social Exclusion and Its Impact on Feelings of Physical Vulnerability**

Participants attending 2:00 PM - 3:00 PM

Presenter: Nikole LeCompte

Mentor: Kristy Dean

This study examines the relationship between feelings of social exclusion and physical vulnerability. Currently, most social exclusion research focuses on the emotional consequences of social exclusion; whether social exclusion has implications for one's physical experience is a novel question. If we can show that social exclusion prompts physical vulnerability, it would lay the groundwork for examining if the phenomenon works in the reverse, as well as whether the factors that aid in coping with social exclusion also help people cope with feelings of physical vulnerability. Participants were recruited from GVSU's subject pool of PSY 101 students. The first task in the test materials was the experimental manipulation, in which participants wrote about a time when they felt very accepted in some way, excluded in some way, or about a socially neutral event. Participants then answered questions regarding their thoughts on how susceptible they might be to some kind of threat.

HENRY HALL ATRIUM 085

**Correlations Between Verbs, Body Parts and Conceptual Meanings in Maternal and Child Speech**

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM

Presenters: Trista Witherspoon, Kristin Woods

Mentor: Josita Maouene-Cavin

A major question in language acquisition is how infants learn meaning and use the verbs they know with one object, two objects, no object or with a locative. A former study found a significant connection between the three body regions of HEAD, ARM and LEG of 89 verbs and six basic types of sentences. The corpora analyzed had 3,321 sentences drawn from the speech of 20 month olds (n=67), 28 month olds (n=27) and their mothers (n=54) (CHILDES: MacWhinney, 2000). In the present study, we correlated these former results with another aspect: the abstract meaning of verbs as defined by Levine (1993). Our question is whether certain abstract meanings are linked to the three body regions through the particular verb frames. A chi-square test of independence yielded a non-random relationship between body regions and different abstract meanings expressed through the verb frames. The results are discussed in terms of embodiment and their value to verb meaning acquisition in younger children.

HENRY HALL ATRIUM 086

**Examining Associations between Nintendo Wii Fit Plus and the Balance Error Scoring System (BESS)**

Participants attending 9:00 AM - 10:00 AM

Presenters: Eunice Ahn, Emily Bougher

Mentor: Christina Beaudoin

Impaired balance increases the risk of falls and diminishes functional ability. An important component in assessing an individual's balance is to quantify center of pressure, which can be measured by a force plate. The Wii Balance Board can be used to measure balance. The full extent of this system's reliability and validity is unknown. The Balance Error Scoring System (BESS) measures static balance that reveals balance deficits when large deficits exist. By using the BESS test, we hope to see a strong correlation between the force plate readings and results from the Wii Balance Board. Scores will be obtained from various Wii Fit Plus balance exercises to compare to the force plate and BESS data. Forty-five students aged 18-25 were asked to complete a BESS test on the force plate and Wii Fit Balance activities. Results from these findings will reveal associations between the three balance tests as well as determine the intra- and intersession reliability of the Wii Balance Board.



HENRY HALL ATRIUM 087

**Experiences of Interpersonal Interactions Between Incoming Honors College Freshman and College Faculty**

Participants attending 9:00 AM - 10:00 AM

Presenter: Jakob Slep

Mentor: Amanda Propst Cuevas

This qualitative study aimed to understand the interactions that college students had with college faculty during The Scholars' Institute. The Scholars' Institute was a week-long academic boot camp offered to entering Honors College students, in which 35-40 participants engaged with faculty to meet learning objectives. Understanding the perceptions of interpersonal interactions between Honors students and college faculty provides insight into how faculty interactions influence student success. Insight into this relational phenomenon provides a basis of argument for the importance of The Scholars' Institute above only an academic endeavor. College faculty may use the results of this study to connect better with students both inside and outside of the classroom, and students may use the results of this study to better understand the challenges of college and the influence faculty members can have.

HENRY HALL ATRIUM 088

**Methodological Reflections on Two Pilot Studies: The Case of Verbs and Gender**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenters: Thomas Herin, Erin Knochenhauer

Mentor: Josita Maouene-Cavin

This exercise specifically questions the utility of doing multiple pilot studies before running the full-fledged study. The question was explored using pilot data from four research method classes learning to write a scientific paper in PSY 300. The topic was that of verbs and gender. The participants, GVSU undergraduate students from Fall (N=44) and Winter (N=35) semesters were asked to attribute a gender to a list of 102 verbs orally presented. The dependent measure was male, female, both, or non-applicable. Following the limitations of the first study, four modifications were introduced to the second pilot study: 1) Different instructions. 2) The verbs were read by both a male and a female experimenter. 3) The N/A option appeared first. 4) The participants were asked to circle their response instead of writing them. The goal in using two pilot studies was to control for the effect of acquiescence on verb attribution to specific verb categories.

HENRY HALL ATRIUM 089

**CD82 Regulation of Prostate Cancer Metastasis: Its Interaction with CD151 and c-Met and Its Role in Cytoskeletal Rearrangements**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM

Presenters: Veena Janardan, Shambhavi Singh, Heather Zolen

Mentor: Suganthi Sridhar

CD82 (KAI), a metastasis tumor suppressor protein, is under-expressed in prostate as well as several other types of metastatic cancers. It inhibits cancer metastasis, but the mechanism through which regulation happens remains unclear. Various pathways are being explored in this lab, including regulation of C-MET, a growth factor receptor observed from our previous studies. CD82 and c-Met do not co-localize and recent literature indicates an association between C-Met and another tetraspanin CD151. We are currently exploring the link between CD151, CD82 and C-Met. Since CD82 has been shown to decrease migration and invasion, another pathway being explored is the difference in cytoskeletal rearrangements between cells that express CD82 (+) and that does not express CD82 (-). Both hypotheses are currently being tested in our lab to see if any difference exists in the function and arrangement of the proteins above in prostate cancer cells with and without (+/-) CD82. Once the pathway regulated by CD82, and how CD82 suppresses metastasis, are discovered, the findings would help us identify proteins that could serve as biomarkers and or help develop drugs that can target these molecules.



HENRY HALL ATRIUM 090

**Adapting a Meta-Analysis Methodology at the Undergraduate Level**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM

Presenter: Kelsey Canada

Mentor: Josita Maouene-Cavin

A meta-analysis is a research procedure used to examine similar quantitative studies within an area of interest and synthesize the findings. The purpose of this poster is to examine and outline the steps needed to conduct a meta-analysis. There is limited focus on this topic within the current undergraduate curriculum. This poster offers insight on both the procedure and value of the methodology. The process described for the presented methodology is a variation of the 12-step model given by Erford et al., 2010. Due to the time limitations placed on students when conducting a meta-analysis at the undergraduate level, I condensed the steps to better fit the level of detail required and the resources available at Grand Valley State University. The steps within the modified meta-analysis methodology are charted and focus on multiple studies from the last ten years exploring the impact of maternal and paternal post-partum depression on language development in infancy.

HENRY HALL ATRIUM 091

**Effect of Telomerase Inhibitors on Malignant Breast Cancer Cells**

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM

Presenter: Alexander Fisch, S3 Scholar

Mentor: Osman Patel

Current therapies have nominal effect on the most intrusive-type of breast cancers (triple-negative) that have a higher tendency to metastasize or recur. Recent studies reveal an enzyme, telomerase, as key for unlimited cell growth (immortality) and replication. Therefore, our objectives were to assess (i) short- and (ii) long-term effects of a novel anti-telomerase agent (GV6) developed at our institute and compare it to a known analogue, BIBR1532 on MDA-MB 231 breast cancer cells. Cell viability was measured on days 5, 9, 14, 18 and 27 after treatment with GV6 (n=4), BIBR1532 (n=4) or solvent alone (Control, n=3). The number of viable cells in GV6 and BIBR1532 treated flasks (T75) fell about 35% ( $p < .05$ ) and 40% ( $p < .05$ ) relative to Control by day 14, respectively. Further drops of roughly 35% ( $p < .05$ ) were observed for both on day 27. Our results indicate the anti-telomerase effects of GV6 parallel that of BIBR1532 and should be investigated further.

HENRY HALL ATRIUM 092

**Deformation of Lamina in the Upper Ordovician Point Pleasant Formation**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM

Presenters: Zachary Curry, John DeYoung, Mitchell Slachter

Mentor: Peter Riemersma

The Point Pleasant Formation in northern Kentucky reveals ancient limestone and shale beds. These beds, through some unknown sequence of events, have become heavily deformed. The tilting of the lamina, likely caused by seismic activity, is the most obvious evidence of deformation, but ball and pillow structures, along with chaotic shale beds are among other types of deformation observed in the Point Pleasant Formation. The localized chaotic beds and ball and pillow structures point to other, smaller scale, types of deformation that occurred in this area millions of years ago. Through hand sample and thin section analysis from samples from this specific outcrop, our goal for this project is to accurately determine a sequence of events that could have produced the deformation in this outcrop as we see it today.

HENRY HALL ATRIUM 093

**Designing Inquiry-Based Organic Chemistry Laboratory Procedures to Promote Critical Thinking**

Participants attending 11:00 AM - 12:00 PM

Presenter: Kathleen Venhuizen  
Mentor: Felix Ngassa

Several current second-year organic chemistry laboratory procedures were recreated in the lab in order to design from them procedures that were more inquiry-based. Four aldol reactions were tested with one being successful and two microwave-based reactions were tested with one yielding a complete product, the other not. The next step will be taking the successful procedures and applying them to an inquiry-based format to use in the organic chemistry teaching laboratory in the near future.

HENRY HALL ATRIUM 094

**"GV-2 - A Novel Anthranilic Acid Derived Therapeutic to treat MRSA and other Antibiotic Resistant Microorganisms and its Inhibitory Interaction with Human Serum Albumin"**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM

Presenter: Nkrumah Grant, McNair Scholar

Mentor: Roderick Morgan

Implementation of antibiotics to treat bacterial infections began during World War II. Since then, a number of antibiotic resistance microorganisms have emerged, one of these being Methicillin Resistant *Staphylococcus aureus* (MRSA). This resistance can be accredited to multiple factors, but the greatest contributor is the similarity in the chemical composition of the commonly prescribed antibiotics used to treat MRSA. MRSA is the most frequent health acquired infection in the United States and to combat this growing problem, we have developed a novel class of antibiotics derived from anthranilic acids that show antibacterial activity against MRSA. Our derivatives record a minimum inhibitory concentration (MIC) of 2-32  $\mu\text{g/ml}$ , however when in the presence of human serum protein (HSP) this value increases, decreasing their effectiveness. We have identified a component of HSP, albumin, that causes the increase in MIC, and have characterized the intermolecular interactions allowing this to occur. Using this information we are currently synthesizing new derivatives with a low binding affinity for albumin, or when bound does not lose antibacterial activity.

HENRY HALL ATRIUM 095

**Direct Cu-free Sonogashira Cross-coupling Reaction of Aryl Sulfonates with Terminal Alkynes**

Participants attending 9:00 AM - 10:00 AM, 11:00 AM - 12:00 PM

Presenter: Tyler Cooley

Mentor: Felix Ngassa

Using conventional and microwave-assisted copper-free Sonogashira-type synthesis, we have developed cross-coupling of aryl sulfonates with terminal alkynes. The steric and electronic effects of the substituents in the aryl sulfonates and terminal alkynes have been investigated. The corresponding alkyne and enyne products are produced in fair to good yields. A broad spectrum of arylsulfonates, vinyl sulfonates and terminal alkynes was used. Preliminary results of the synthesis will be presented.

HENRY HALL ATRIUM 096

**How to Train, not Over-Train, in MMA**

Participants attending 11:00 AM - 12:00 PM

Presenters: Alexander Lutz, Alexander Yoas

Mentor: Amy Crawley

Striking, takedowns, and grappling are three key components in professional mixed martial arts (MMA) that are executed using speed, agility, and power, all balanced into one dangerous package. How is this level of performance reached without overtraining? The purpose of this study was first to explore the literature

on professional MMA training and overtraining to determine what limits exist, and second the effects that overtraining can have on the MMA athlete. Due to the increasing popularity of MMA more people are entering the octagon every day. It is because of this popularity that this research is important to teach proper periodization as well as the risks involved when training methods are left unchecked. A limitation to this research was that all information was developed from current literature and no testing was performed. This research should benefit trainers and athletes involved with MMA, by providing a researched periodization method of training focused on avoiding overtraining.

HENRY HALL ATRIUM 097

**Zine Fests: Self-Publication and Empowerment**

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenter: Sara Chittenden

Mentor: Kathleen Underwood

Zine fests, gatherings of those who makes zines (self-published magazines) and those who enjoy them, are an increasing phenomenon. To investigate this, I will be handing out questionnaires at the Chicago Zine Fest on March 8<sup>th</sup>, 2014 to attendees to explore why they are drawn to such events. Using an intersectional feminist perspective and drawing on past research on the impact of zine culture, I will analyze their answers for any possible patterns. I propose that zine fests offer a diverse physical safer space for marginalized groups to empower themselves and find camaraderie. I anticipate that participants will cite items such as safer spaces, policies, and gender neutral bathrooms as part of the draw of zine fests. Although the location of the zine fest and the number of people who choose to participate may limit my research, I am confident that I will gather enough data to draw conclusions.

HENRY HALL ATRIUM 098

**Rugby Periodized Strength and Conditioning Program**

Participants attending 9:00 AM - 10:00 AM

Presenters: Daniel Moss, Sam Nowlan

Mentor: Amy Crawley

Rugby players require many attributes to be successful; among them are speed, agility and power. The purpose of this presentation was to provide a training regime for professional level rugby players, allowing them to maximize these three attributes. These abilities are significant because they directly relate to the skills required to be successful in rugby. This presentation took advantage of existing research by reviewing and condensing the data available into an applicable, easy to implement, year round program. The key limitation inherent in this approach is the use of secondary data. The key benefit of this presentation is to better inform or reinforce existing training regimes designed to help rugby players increase speed, agility and power.

HENRY HALL ATRIUM 099

**Optimization for Recording Porcine Gut Motility for Subsequent Study of the Effects of Hyperbaric Oxygen Therapy on the Intestines**

Participants attending 12:00 PM - 1:00 PM

Presenters: Devan Dykstra, Tyler Gardner, Benjamin Kahler

Mentor: Francis Sylvester

Hyperbaric oxygen therapy has been used to treat ischemia of the intestines. The mechanism of action of hyperbaric oxygen therapy in this application requires further investigation. First, a protocol for testing contractile strength of the intestinal smooth muscle was optimized using force transducers and a data acquisition system. Particular attention was paid to the orientation of the intestinal smooth muscle when mounted in organ baths and the amount of passive tension applied to the intestinal smooth muscle prior to stimulation. Using the optimal

experimental conditions as determined in this study, future experiments will evaluate the effect of hyperbaric oxygen therapy on intestinal motility.

HENRY HALL ATRIUM 100

**Is Ignorance Bliss? Knowing Why Expressive Writing Works May Reduce Its Effectiveness**

Participants attending 3:00 PM - 4:00 PM

Presenters: Derek Loutzenhiser, Derek Manke

Mentor: Benjamin Swets

Research has shown that by simply writing about their feelings towards a test, or writing expressively, those with high test anxiety can improve their scores (Ramirez & Beilock, 2011). Expressive writing has been studied for its ability to improve test scores, but none of the participants in this previous research knew why they were expressively writing. Will knowing why expressive writing is utilized change its effects? In the current study participants will solve modular arithmetic problems in a high-pressure environment. Some participants will be told why expressive writing will improve their test scores, others will not. Participants then complete a post-test. If being informed of the purpose of expressive writing causes high-anxiety individuals to focus even more on their performance, expressive writing might cause a "choking" effect. The results of this experiment can be very useful to educators and students in utilizing expressive writing effectively.

HENRY HALL ATRIUM 101

**Are Little Brown Bats Ingesting the Liver Toxin Microcystin Through *Hexagenia* Mayflies?**

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenters: Jennifer Grousd, Devin Jones, April Kaneshiro

Mentors: Amy Russell, M Woller-Skar

The liver toxin microcystin (MC) can cause complications such as skin irritations, vomiting, liver cancer, and death in humans, livestock, pets, and aquatic organisms. This toxin is produced by a blue-green algae *Microcystis aeruginosa* that has been increasingly prevalent in the Great Lakes Basin. *Microcystis* is a possible food source for aquatic species such as *Hexagenia* spp., a burrowing mayfly. *Hexagenia* spend part of their lifecycle as aquatic nymphs, which have the potential to acquire the MC toxin from ingesting *M. aeruginosa*. During mayfly emergence, *Hexagenia* may serve as a food source for bats and possibly spread MC into the terrestrial ecosystem. To determine if the MC toxin is being transferred to bats through *Hexagenia*, bats and bat fecal samples were collected near Little Traverse Lake in Michigan before and after the *M. aeruginosa* bloom. Our results will show whether little brown bats (*Myotis lucifugus*) are eating *Hexagenia* spp. and whether they are acquiring the MC toxin.

HENRY HALL ATRIUM 102

**A Feminist Reading of 'Enaguas y Pantalones' by Angel Rubio**

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM

Presenter: Jessica Wehby

Mentor: Kathleen Underwood

By examining the social, political, and literary movements of the 19th century, the focus of this project is to read the 1864 play 'Enaguas y Pantalones' by Angel Rubio with a feminist lens. Themes examined will include if the roles of the principal man and woman in the play are stereotypical of the time period or radical and to what extent sexuality is discussed. The aim of this project is not to label Rubio as a feminist but rather to determine if the play can, in fact, be read with a feminist interpretation. Once the reading is completed, I will determine if 'Enaguas y Pantalones' has a place in Spanish feminist literature. If, once the readings are complete, I am unable to determine that 'Enaguas y Pantalones' can be seen as feminist, I will discuss the aspects that hinder its ability to be seen as feminist and offer suggestions for more appropriate feminist pieces from the time period.

KIRKHOF CENTER GRR 001

**Biomass Estimation in Osaka, Japan**

Participants attending 4:00 PM - 5:00 PM

Presenter: Geoffrey Kenney

Mentor: Wanxiao Sun

The city of Osaka is considered to be the Japan's second largest city, which was once the commercial, financial, and industrial center of Japan. However, this region has been experiencing deteriorating effects for the past 100 years. Through the use of remote sensing and geographic information systems (GIS) techniques the natural vegetation biomass changes will be measured and compared between two different time periods using the following procedure. First, land use/land cover (LULC) maps would be generated from Landsat imagery of May 2004 and May 2013, using supervised classification. Second, a land change model would be used to detect changes in the natural vegetation. The big question to answer is how much change in biomass has occurred in Osaka, Japan in a nine year time interval?

KIRKHOF CENTER GRR 002

**Investigating the Cellular Interaction of Mid1 and Protein Phosphatase Dis2 in *Schizosaccharomyces pombe* Cell Division**

Participants attending 10:00 AM - 11:00 AM

Presenter: Eric Moore

Mentor: Dawn Hart

Cell size and shape are principle factors contributing to the point at which a cell enters mitosis, and ultimately, divides into two equivalent daughters. In fission yeast, Pom1 kinase concentration gradients regulate mitotic commitment. Pom1 is present in high concentrations at the cell tips. Here it is dephosphorylated by Dis2 phosphatase, allowing for association with the cell cortex while preventing the cytokinetic scaffold protein Mid1 from moving to the cell tips. Mid1 serves as the scaffold that recruits proteins associated with the contractile ring. To characterize novel Mid1-protein interactions, we developed *dis2* mutant yeast strains and analyzed Mid1 localization in the absence of Dis2. Mid1-GFP localization exhibits broad cytoplasmic distribution in *dis2* cells when visualized *in vivo*. We also conducted Dis2 phosphatase assays on Mid1 to observe phosphorylation status. Our results affirm that Dis2 dephosphorylates Mid1 *in vitro*. Research supported by NSF RUI Award #1157997.

KIRKHOF CENTER GRR 003

**The Impact of Cooking Classes on Stress Levels and Dietary Intake of Alzheimer s/Dementia Caregivers**

Participants attending 1:00 PM - 2:00 PM

Presenter: Alexandra O'Brien

Mentor: Deborah Lown

Caregivers of loved ones with dementia and/or Alzheimer's disease (AD) are subjected to high levels of stress and depression. The objective of this study is to describe the quality of dietary intake in male caregivers of AD/dementia patients and determine if an educational nutrition cooking class will positively impact their group dietary intake and reduce their group stress levels. Male caregivers participating in the Conquering the Kitchen educational nutrition program, will be asked to complete a demographic information survey along with a Caregiver Burden Inventory (CBI) and partake in three 24-hour diet recalls, each measured pre and post class to test for group change. We hypothesize that caregivers will have an increase in fruits/vegetables, and decrease in fat and sodium intake post class. Additionally, we propose that stress levels of caregivers will be reduced post class and will vary dependent on stage of patients Alzheimer's disease.



KIRKHOF CENTER GRR 004

**Developmental Differences in Decision Making**

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenter: Angele Yazbec

Mentor: Mario Fific

This study compares decision making strategies among children and adults via a computerized, deferred decision making task. The objective was to make a decision to buy or not to buy a product based on the recommendations consulted. The first goal is to investigate how source reliability affects the number of recommendations consulted and the accuracy of the decision. The second goal is to observe how the dynamics of stopping rule selection changes across age groups. The third goal is to see whether or not participants operate as optimal decision makers. Results showed the striking differences in a number of reviews consulted and accuracy as result of both reliability of the source and subject age.

KIRKHOF CENTER GRR 005

**The Cost of Walking Again: A Look at a New Care Model for Below Knee Amputees**

Participants attending 4:00 PM - 5:00 PM

Presenter: Cameron Wilson

Mentor: Mathew Edick

As American society increasingly struggles to carry the economic burden of health care, pressure is placed on medical providers to deliver evidence-based healthcare on a strict budget. A newly proposed integrated care model for patients undergoing below knee amputation aims to accomplish this. This study investigates whether integration of rehabilitation and prosthetic care into a surgeon's practice will lower the economic burden following below knee amputation. A retrospective chart review from January 2009-December 2012 will compare two separate practices using the integrated care model against one clinic using a more traditional non-integrated care model. Our hypothesis is that patients treated by the integrated care model will have lower cost of care and better rates of survival than patients treated with non-integrated care. This study will provide important insights into how to best deliver care to patients undergoing below knee amputation.

KIRKHOF CENTER GRR 006

**Antibiotic Resistance Enzyme OXA-24  $\beta$ -Lactamase: Expression, Purification, and Optimization of Crystallization Conditions**

Participants attending 3:00 PM - 4:00 PM

Presenter: Josephine Werner, MS3 Scholar

Mentor: Rachel Powers

Beta-lactam antibiotics (i.e. penicillin) are crucial to the field of medicine. Yet due to the reliance and over-prescription of these antibiotics, bacteria become resistant to many drugs that were once extremely efficient. Many resistant bacteria express an enzyme, known as a  $\beta$ -lactamase, which hydrolyzes the amide bond of the defining four membered  $\beta$ -lactam ring, rendering the drug inactive. The carbapenem-hydrolyzing class D  $\beta$ -lactamases (CHDLs) are a particularly worrisome subtype of the class D enzymes. OXA-24 is a clinically relevant member of the CHDLs and, therefore, is a key target to inhibit. Atomic structures of OXA-24 in complexes with  $\beta$ -lactam ligands would inform inhibitor design efforts. Currently, OXA-24 is crystallized using high concentrations of ammonium sulfate (2.0 M), resulting in the presence of a sulfate ion in the active site of the enzyme, preventing certain ligands from binding. In order to discover an inhibitor for OXA-24, a complex without the ammonium sulfate in the active site must be found. In this experiment, we show that the lowest concentration that still allows for crystallization of OXA-24 is 1.4 M ammonium sulfate. We also discovered a novel crystallization condition for OXA-24 with a significantly lower concentration of sulfate (0.2 M lithium sulfate). Optimizing this new condition may aid in future crystallization efforts and eventual inhibitor discovery.



KIRKHOF CENTER GRR 007

**Codifying the Proteins Involved in the Nuclear Localization of the Mid1 Protein in Fission Yeast Cell Division**

Participants attending 12:00 PM - 1:00 PM

Presenter: Patrick Schneider

Mentor: Dawn Hart

The ability for *Schizosaccharomyces pombe* to undergo a successful round of cell division is contingent upon the regulation of protein rich punctate structures embedded within the yeast's cytoplasmic membrane. Mid1 is a nodal protein that acts as a recruitment tool necessary to correctly assemble the contractile ring late in mitosis. Mid1 localization alters during the cell cycle and little is known about the proteins involved in its movement into the nucleus during interphase. Fission yeast contain two importin- genes, *imp1* and *cut15*, which aid in nuclear transport. Knockout strains of the importin- genes were crossed with a Mid1-GFP strain to observe aberrations in Mid1 localization in comparison to wild type. The *imp1* strain did not allow Mid1 to migrate into the nucleus, while the *cut15-85* strain mimicked wild type. Over expression of the two genes did not significantly alter Mid1 localization, suggesting regulatory events are required for Mid1's interaction with the importins.

KIRKHOF CENTER GRR 008

**TOC, C/N,  $^{13}\text{C}$ , and  $^{15}\text{N}$  of Shales from the Mississippian Michigan Formation, Western Michigan**

Participants attending 11:00 AM - 12:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM

Presenter: Kayla Lockmiller, MS3 Scholar

Mentor: Patricia Videtich

Samples of shale from three beds exposed in a gypsum mine were collected, and proxies (TOC, C/N, organic  $^{13}\text{C}$ , and total  $^{15}\text{N}$ ) were used to help determine the depositional environment of the shales. Low percentages of TOC (0.20 - 0.51%) indicate low productivity of organic matter. C/N (3.98 – 8.50) and  $^{13}\text{C}$  (-22.77 to -25.39‰ PDB) imply carbon input from mixed marine-derived water and freshwater sources. On C/N versus  $^{13}\text{C}$  plots, the data for the three shales fall in three different fields. One is most nearly characteristic of a freshwater source, and one is most typical of a marine source.  $^{15}\text{N}$  (1.78 – 3.77‰) remains enigmatic; however, it may also indicate a mix of sources. The lack of terrestrial plant indicators suggests an arid environment with little vegetation. An arid environment would promote the evaporation of seawater, producing gypsum, the most common rock type in the mine. Freshwater influx into the brine would halt gypsum precipitation and allow clays to be deposited.

KIRKHOF CENTER GRR 009

**Fat Transformation: The Negotiation of Fat Tropes Through Counter-Abjection in My Mad Fat Diary**

Participants attending 9:00 AM - 10:00 AM, 12:00 PM - 1:00 PM

Presenter: Madeline Boyd

Mentor: Kathleen Underwood

This study examines representations of fat women on television by analyzing the character of Rae Earl on the UK television show *My Mad Fat Diary*. It is my argument that fat tropes are used to humanize Rae, a fat counter-abject character, rather than to objectify her. The depiction of Rae (a young fat woman) was analyzed using feminist media analysis for the presence of several fat stigmatizing tropes including: 1. Fat as a lack of self-control, 2. Fat as a lack of self-discipline, 3. Fat as unattractive, 4. Fat as asexual, and 5. Fat as diseased. *My Mad Fat Diary* provides an important opportunity for analysis because of its negotiation of fat tropes inherent in many representations of fat women. In many ways this program can be viewed as fat counter-abjection with its open discussion of sexuality in relation to a fat character, while it still reifies other fat tropes.

KIRKHOF CENTER GRR 010

**Facile Conversion of Aryl Trimethylsilyls to Aryl Trifluoroborates Using Boron Tribromide**

Participants attending 10:00 AM - 11:00 AM

Presenter: Zachary Hamersma  
Mentor: Andrew Korich

Boronic acids have been used as effective substrates for palladium catalyzed cross-coupling reactions. Specifically, boronic acids undergo Suzuki-Miyaura cross-coupling. However, they are inherently difficult to purify and in some cases can lack conversion proficiency, and functional group compatibility. Boronic acids also readily dehydrate to form boroxine rings, which complicates their utility in drug syntheses and biological studies. As an alternative boron substrate, trifluoroborates are bench stable and easy to handle compounds that effectively undergo the Suzuki-Miyaura reaction. In an effort to extend the latitude of aryl trifluoroborate chemistry we have developed an efficient and facile method for converting aryl trimethylsilanes to aryl trifluoroborates. This methodology circumvents the current high cost production of trifluoroborate compounds while preserving the ability to selectively add the trifluoroborate functional group.

KIRKHOF CENTER GRR 011

**Benchmarking a Computational Protocol for Redox-Induced Electron Transfer**

Participants attending 9:00 AM - 10:00 AM

Presenter: Samantha Bidwell

Mentor: Richard Lord

Redox-induced electron transfer (RIET) is an unusual electron transfer mechanism whereby a metal complex with two (or more) redox-active ligands is oxidized (reduced), yet the metal center is reduced (oxidized) concurrent with oxidation (reduction) of both ligands. We explore how the choice of density functional, basis set, and solvation model influences how well computational chemistry is able to reproduce known experimental results in RIET systems.

KIRKHOF CENTER GRR 012

**Do We Need to Analyze Spectra by Hand?**

Participants attending 10:00 AM - 11:00 AM

Presenter: Adam Terwilliger, MS3 Scholar

Mentor: Richard Lord

Computational chemistry uses computer science to explore structures and energies of chemical species. A typical computational chemistry output file contains tens or hundreds of thousands of text lines. Automation makes the analysis of these large data sets increasingly more efficient. In turn, we constructed computer programs using Python that allow us to focus our time upon the chemical interpretation of these results. We used these efficient analyses to study a vanadium-oxo species synthesized by our collaborators. Our calculations answer many questions about the redox states in these compounds though they predict that the experimental crystal structure may not reveal all species present. Subsequently, in an effort to distinguish which species are present, we simulated the absorption spectra of the lowest energy structures. These spectra motivated a spectral analysis program written in Mathematica, with which we gain greater insight into why these compounds absorb light differently.

KIRKHOF CENTER GRR 013

**An Eye Tracking Analysis to Identify Wayfinding Strategies of Older Adults in a Virtual Environment**

Participants attending 10:00 AM - 11:00 AM

Presenter: Brandy Alexander

Mentor: Rebecca Davis

The ability to navigate to a specific destination, termed wayfinding, has been shown to decline in persons with Alzheimer's disease (AD). In this study, it is proposed that salient and familiar cues placed in the environment

may improve wayfinding. This intervention may help persons with AD remain independent, have better environmental safety, and have a higher quality of life. The purpose of this study is to identify if persons with early-stage AD, compared to a normal older adult control group, use cues in a virtual environment and if cues improve wayfinding. Each subject underwent five trials without cues and five trials with cues while wearing eye tracking glasses that record visual gaze. This is an initial evaluation of eye tracking data of one test subject and one control subject to develop the analysis process of the larger study. The results of this study will improve our understanding of wayfinding, which can lead to interventions to improve the environments of older adults.

#### KIRKHOF CENTER GRR 014

##### **Identification of a Potent Inhibitor for the Extended-Spectrum Class C Beta-lactamase, ADC-7**

Participants attending 10:00 AM - 11:00 AM

Presenter: Hollister Swanson, S3 Scholar

Mentors: Rachel Powers, Bradley Wallar

Resistance to  $\beta$ -lactam antibiotics in the pathogenic bacteria, *Acinetobacter baumannii*, presents one of the greatest challenges to current antimicrobial chemotherapy. Majority of resistance is due to expression of class C  $\beta$ -lactamase enzymes, known as *Acinetobacter*-Derived Cephalosporinases (ADCs). The enzyme ADC-7 is a broad-spectrum class C  $\beta$ -lactamase, capable of deactivating multiple types of antibiotics. Boronic acid transition state inhibitors (BATSI) are compounds able to inhibit by reversibly binding to class C  $\beta$ -lactamases. Enzyme kinetic studies of one BATSI, designated S02030, demonstrated a greater affinity for binding than a common cephalosporin substrate. After expression and purification of ADC-7, the first known X-ray crystal structure of ADC-7 with inhibitor complex was solved at 2.03 Å resolution. The ADC-7/S02030 complex provides insight into ADC enzymes structure and offers a novel starting point for the structure-based optimization of  $\beta$ -lactamase inhibitors.

#### KIRKHOF CENTER GRR 015

##### **Computational Study into Controlling Azide Reduction vs. Dinitrogen Expulsion Through Metal and Ligand Choice**

Participants attending 1:00 PM - 2:00 PM

Presenter: Talon Kosak

Mentor: Richard Lord

We demonstrated recently that  $\text{Fe}^{\text{II}}$  supported by bulky alkoxide ligands is capable of reductively coupling adamantyl azide to form a diiron hexazene complex (*Inorg. Chem.* 2013, ASAP). The same metal complex was unable to reductively couple trimethylsilyl azide. Inspired by this experimental finding, we seek to understand how the metal, ligand, and azide substituent influence the reaction thermodynamics of azide reduction vs. dinitrogen expulsion using density functional theory.

#### KIRKHOF CENTER GRR 016

##### **Economic Context and Civic Engagement: the Effects of Localism in Four Michigan Cities**

Participants attending 4:00 PM - 5:00 PM

Presenter: Marissa Swartz, S3 Scholar

Mentor: Whitt Kilburn

The economic structure of a city affects the civic well-being of its residents. The degree of localism in an economy affects the area's social capital, contributing to the development of its civic institutions. I examine the relationship between localism and social capital in case studies of four Michigan cities: Flint, Grand Rapids, Kalamazoo, and Pontiac. A more local, or independent economic structure, is resilient to harmful effects of globalization. Local business leaders support civic institutions. Bridging social capital flourishes, creating a civically engaged population. Big-business dominated economic structures, on the other hand, foster an unstable environment

and are relatively more susceptible to the effect of global economic forces. The heart of a locality's economic structure thus provides insight into the development of a city's civic institutions.

#### KIRKHOF CENTER GRR 017

##### **Synthesis of Vinyl-Substituted Chiral Silanes**

Participants attending 10:00 AM - 11:00 AM

Presenters: Kelly Le, Christa Purdy

Mentor: Randy Winchester

We are interested in finding a method that provides high yields of chiral, non-racemic, silicon compounds that can be used in organic synthesis. Recently, we have been investigating the reactions of nucleophiles with prochiral at silicon dimethoxy-substituted silanes. We will present our results for the reactions of nucleophiles with dimethoxyphenylvinylsilane and dimethoxymethylvinylsilane. The starting materials, phenylvinylchlorosilane and methylvinylchlorosilane were reacted with lithium menthoxide and the dimethoxy compounds purified. These chiral precursors were used for the reactions with several different organolithiums. The product chiral silanes were purified by column chromatography and kugel rohr distillation, then they were analyzed with the use of NMR, GC-MS, and HPLC. The selectivities for the chiral silanes will be discussed in terms of the steric effects in the starting dimethoxydialkylsilanes.

#### KIRKHOF CENTER GRR 018

##### **GPS-derived Preliminary Vertical Tectonic Motions and Causes, Puerto Rico and Trinidad**

Participants attending 9:00 AM - 10:00 AM

Presenter: Saray Morales, McNair Scholar

Mentor: John Weber

We are studying vertical tectonic motions in the Caribbean islands of Puerto Rico and Trinidad using data from continuously operating GPS stations (cGPS). Our preliminary results from seven cGPS sites in Puerto Rico show that the northernmost sites with long time series (2008-2013) may be sinking at rates (2-sigma uncertainties) as follows: MOPR (-1.33mm/yr  $\pm$  2.76), MAYZ (-1.47mm/yr  $\pm$  2.77), AOPR (-5.33mm/yr  $\pm$  2.42), BYSP (-1.26mm/yr  $\pm$  1.73) and CUPR (-2.52mm/yr  $\pm$  1.76). This contrasts with our suite of southern cGPS sites, which appear to be more vertically static: P780 (-0.5mm/yr  $\pm$  1.94) and MIPR (-0.6mm/yr  $\pm$  1.70mm). Trinidad, which is clearly tilting to the west into the Gulf of Paria pull-apart basin based on geomorphology, sits in a mirror image plate tectonic setting to Puerto Rico. We analyzed data from five Trinidadian cGPS sites (ALBI, CALD, FORT, GALE, GRAN), and an episodic GPS site (POST) located on the sinking west coast. Our preliminary vertical GPS rates (2-sigma uncertainties) are as follows: ALBI (-2.20mm/yr  $\pm$  1.52), CALD (-0.97mm/yr  $\pm$  1.36), FORT (0.49mm/yr  $\pm$  1.67), GALE (-0.90mm/yr  $\pm$  1.78), GRAN (-1.36mm/yr  $\pm$  1.62), and POST (-4.21mm/yr  $\pm$  1.96). Results from sites ALBI and POST are consistent with sinking. FORT on the southwestern coast moved down and then up. The other central and eastern sites (CALD, GALE, GRAN) appear to be more vertically static.

#### KIRKHOF CENTER GRR 019

##### **New Aging Technique for Juvenile Skeletal Remains Using the Superior Articular Facets of the C1 Vertebra**

Participants attending 9:00 AM - 10:00 AM

Presenter: Sarah Corrello

Mentor: Gwyn Madden

Madden and Karsten (2013) developed a new technique for aging juvenile individuals based on measurements of the occipital condyles with an age estimate accuracy of 71.3%. As the superior articular facets of the first cervical (C1) vertebra articulate with the occipital condyles, a similar level of accuracy in age estimation should be possible for C1. Therefore, the goal of this research project was to determine if there was a correlation between age and the size of the superior articular facets of C1. Two measurements were taken on the left

superior articular facets including maximum length at midline and maximum width parallel to length. The study sample was made up of 113 juveniles ranging in age from prenatal to 17 years from five cemeteries housed at the Museum of London. Individuals in the five cemeteries had been aged using dental development, which was the basis for age comparisons. A regression equation was developed based on the measurements to create a new method for age estimation of skeletonized juveniles. The resulting model was found to accurately estimate age in 74.7% of individuals with a standard error of 2.83 years. The model was slightly more accurate than that found by Madden and Karsten (2013) for the occipital condyles.

KIRKHOF CENTER GRR 020

**An Attribute Analysis of the Ceramics from 2012 Fieldwork at Connor Bayou (200T353)**

Participants attending 9:00 AM - 10:00 AM, 10:00 AM - 11:00 AM

Presenter: Sarah Corrello

Mentor: Janet Brashler

This ceramic analysis is a descriptive piece of research which addresses the occupation of Connor Bayou (200T353), an archaeological site excavated during Grand Valley State University's 2012 field school season. In addition, this analysis may provide evidence of the possible relationships between the Grand River Valley and other populations located in the Illinois River Valley, the Kankakee River Valley, and the Saint Joseph River Valley. Attribute analysis of ceramic styles and technologies can shed light on the various Woodland period (ca. 800 BC – AD 1600) people throughout the region and how they fit into the larger pre-Columbian contact chronology for groups who occupied the Grand River Valley. Using both plain body ceramic sherds and more diagnostic rim and decorated pieces, a picture has emerged of the people who occupied Connor Bayou based on patterning of the stylistic attributes of their pottery.

KIRKHOF CENTER GRR 021

**New Modulators of the Trace Amine Associated Receptor: Meta Linked Ureas**

Participants attending 9:00 AM - 10:00 AM

Presenter: Jacqueline Williams, McNair Scholar

Mentor: Matthew Hart

A naturally occurring thyroid hormone metabolite, 3-Iodothyronamine ( $T_1AM$ ), is a fast acting derivative which activates the Trace Amine Associated Receptor (TAAR1). In mice,  $T_1AM$  exhibits effects opposite of those induced by the thyroid hormones. This presents a novel regulatory mechanism of thyroid hormone action. Studying this regulatory mechanism expands on the understandings of thyroid hormone biology and may contain medicinal value. The project described herein examines  $T_1AM$  analogs that contain a urea linker between the aryl groups. The structure activity relationship of these analogs is further explored by examining many functional groups and meta connections around the phenethyl amine group. These analogs will be used in a cell-based assay to examine TAAR1 regulation.

KIRKHOF CENTER GRR 022

**Advancements in the Treatment of Alzheimer's Disease**

Participants attending 9:00 AM - 10:00 AM

Presenter: Clinton Levi

Mentor: John Capodilupo

During the Fall semester of 2013 I completed a 25 page paper concerning Alzheimer's disease (AD). This paper familiarized the reader with the common characteristics of Alzheimer's disease and how it is currently being treated. I am using the Winter 2014 semester to develop a second portion of the paper, which is primarily focused on future treatments of Alzheimer's disease. Though my paper will cover many different techniques, I will likely choose one technique to display at Student Scholars Day. I will most likely portray the effects of amyloid-derived



diffusible ligands (ADDL) on the human brain, and ADDL's hypothesized mechanism of pathology on the human brain. With the aging of the "baby boomers," AD is becoming increasingly prevalent worldwide. As of yet, there is no cure. My goal is to familiarize my audience with what is new and fascinating in the world of AD treatment, in hopes of evoking interest in the field, and promoting advancement for future generations.

KIRKHOF CENTER GRR 023

### **Graph Theoretic Models of Interdependent Preferences in Referendum Elections**

Participants attending 9:00 AM - 10:00 AM

Presenter: Beth Bjorkman

Mentor: Jonathan Hodge

In referendum elections, voters are frequently required to cast votes simultaneously on multiple questions or proposals. The separability problem occurs when a voter's preferences on the outcome of one or more proposals depend on the predicted outcomes of other proposals. These kinds of interdependencies cannot be fully expressed in a simultaneous election. When voters are forced to separate issues that may be linked in their minds, the resulting election outcomes can be unsatisfactory or even paradoxical. In this work, we will use graph theoretic models to characterize, construct, and better understand interdependent voter preferences in referendum elections. We will also explore connections between these models and prior research on the structure of interdependent multidimensional preferences. This work was completed as part of the Grand Valley State University Summer Mathematics REU.

KIRKHOF CENTER GRR 024

### **Influences of Discrete, Incidental Emotions on Risk Perceptions of Cancer**

Participants attending 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM

Presenters: Shane O'Donohue, Saulo Ortiz

Mentor: Amanda Dillard

Research indicates that emotions are essential for judgment and decision-making, including risk perception. In the health domain, research has rarely focused on discrete negative or positive emotions. The focus has been on integral emotions relating specifically to the decision rather than incidental emotions that are contextually unrelated. This study examined whether discrete, incidental emotions of fear, anger, happiness, and surprise influenced health-related risk perceptions of cancer. After an emotion-inducing task, college students completed a set of risk perception measures for either testicular or skin cancer for respective males and females. Along with traditional risk perception measures, we included another measure that has been hypothesized to be more affective in nature than traditional measures. As well as examining the effects of the various emotions on risk perceptions, we examined whether the magnitude of the effects differed depending on the type of risk perception.

KIRKHOF CENTER GRR 025

### **Political Orientation and Attitudes Regarding the Role of Government vs. Private Charities**

Participants attending 12:00 PM - 1:00 PM

Presenter: Peter Norkus

Mentor: Luke Galen

To determine whether political orientation (conservatism vs. liberalism) is associated with generalized versus particularistic charitable giving, we surveyed participants about their attitudes regarding the role of government taxation and private charitable giving. Political conservatism is correlated with a preference for lower taxation and lower social services, as well as the belief that the poor are undeserving of assistance. The relationship between political conservatism and a preference for private charities versus governmental spending as well as a preference for lower taxation and spending is partially mediated by the belief that the poor are undeserving



of assistance.

#### KIRKHOF CENTER GRR 026

##### **Principles or Resources: The Justice of Foundation Allowances in Michigan**

Participants attending 9:00 AM - 10:00 AM

Presenter: Marc Plooster

Mentor: Darren Walhof

In 1994, Proposition A changed the way Public K-12 education is funded in Michigan. Beginning in 1994-1995, a system of foundational grants was established to shift the burden from local fund generation to State shared funding. The debate since 1994 has revolved around the ability of the foundation allowance system to meet the dynamic needs of school districts. Using foundation allowance totals and the Value-Added Matrix, I argue Proposition A violates John Rawls' principles of justice. Rawls' first principle states everyone (every school district) has a right to the greatest possible liberties so long as they do not violate others' liberties. In his second principle, Rawls writes the greatest benefit goes to the least advantaged. Michigan's hold harmless school districts are one example of the incompatibility. Using Ronald Dworkin's equality of welfare and equality of resources, I propose a revised education funding system acceptable under Rawls' principles of justice.

#### KIRKHOF CENTER GRR 027

##### **A Specific Periodization Protocol for Stock Car Drivers**

Participants attending 12:00 PM - 1:00 PM

Presenters: Adam Hutton, Eric Seaver

Mentor: Amy Crawley

NASCAR drivers exert physical performances similar to long distance runners. This reality of the sport lends validation towards incorporating pre-planned physical training for these unique athletes. This review of literature has been presented to address the myth that "stock car racing is not a sport," and to educate health related professionals in an attempt to further the quality of physical training being applied in the realm of stock car racing. While no data was originally collected, the information gathered has been compiled through the review of scientific articles published in peer-reviewed literature. Providing a specialized periodization program will address physical training to increase performance, and also emphasize proactive measures to prevent injuries. There is anticipation that this periodization protocol will encourage exercise science professionals to expand their field of study to athletes that are not as commonly addressed by traditional training programs.

#### KIRKHOF CENTER GRR 028

##### **The Power Wheelchair Trainer**

Participants attending 12:00 PM - 1:00 PM

Presenter: John Gravelyn, MS3 Scholar

Mentor: John Farris

Mobility is something most of us take for granted everyday, but some people have no choice or ability to move. The power wheelchairs that make mobility possible for this population are extremely expensive and must be customized to each person. The PWCT solves this problem by converting the person's existing manual push wheelchair into an extremely safe power mobility device. The device has been built before multiple times but each iteration had a lot of room for improvement and this newest version will be the one that is reproduced with some slight modifications. The research is focused on designing and building the sixth version of the power wheel chair trainer (PWCT). This version is designed to be reproduced at a high rate, is much less expensive, and is also designed to be safe enough to be approved by the FDA and the IRB. The design relies on mechanical principles and requires fewer motors and which are expensive and less safe.

KIRKHOF CENTER GRR 029

**What is an Optimal Periodization Program for High School Cross-Country Runners?**

Participants attending 2:00 PM - 3:00 PM

Presenters: Brent Hull, Benjamin Pawson

Mentor: Amy Crawley

Success in long distance running races, such as cross-country, is highly dependent on maximal oxygen consumption ( $VO_{2max}$ ), lactate threshold (LT), and running economy. Analyses of the major metabolic and muscular systems and the proper biomechanics used in these events were needed to tailor a training program for the high school cross-country runner. The purpose of this research project was to determine what types of training should be implemented at each part of the season for peak performance. With this knowledge, cross-country coaches should be able to implement the proper training sessions at the right time so that their runners win at the end of the season. A review of the literature on training to improve  $VO_{2max}$ , LT, and running economy was completed. A limitation of this research is the lack of an original randomized controlled trial. This presentation should provide insight to high school cross-country coaches on how to develop a periodization program for their athletes.

KIRKHOF CENTER GRR 030

**Organic Flow Cell Batteries: A Green Means of Mass Energy Storage**

Participants attending 1:00 PM - 2:00 PM

Presenter: Joel Medina

Mentor: Andrew Lantz

Redox flow cell batteries are a possible option in future, large scale energy storage systems. Because of the variable output of alternative energy sources (e.g., wind, solar) a means of mass energy storage is necessary for the power grid. A redox flow cell battery employing benzoquinone derivatives is proposed and investigated. Quinone compounds are of particular interest because they are naturally occurring redox agents and can be used in more environmentally friendly conditions than traditional electrolytes. Using cyclic voltammetry, various benzoquinone derivatives are analyzed to determine their reduction potentials and electrochemical characteristics. Pairs of compounds that display large differences in reduction potential and show rapid electron transfer are then chosen as potential electrolytes for flow cell testing. These pairs are tested over multiple charge and discharge cycles to assess their energy storage efficiency and voltage discharge profiles.

KIRKHOF CENTER GRR 031

**Tuskegee Syphilis Experiment**

Participants attending 12:00 PM - 1:00 PM

Presenter: Diana Rutaremar

Mentor: Sheldon Kopperl

“Bad Blood” written by James H. Jones explores the truths behind the Tuskegee Syphilis Experiment conducted by the Public Health Service beginning in the 1930’s. This study presents many obvious moral as well as social issues. The reason these issues are so clear is because the study was performed on African American men of lower class who had the sexually transmitted disease but were not informed nor treated, but would the views held today be any different if these men were targeted into a study that helped find a cure for syphilis? The world of research in medicine has come a very long way in regards to the treatment of people and their rights; for instance, what is considered unjust today could have very easily been viewed as necessary in the early 1900’s. It is easy to pass judgment on the gruesome experiments that should never have taken place. However, in the case of the Tuskegee experiment, where the experimental question was a good one, can anyone of good conscience justify the methods and population selected for the study?

KIRKHOF CENTER GRR 032

**Belief Change and Memory for Previous Beliefs After Comprehension of Contentious Scientific Information**

Participants attending 12:00 PM - 1:00 PM

Presenters: Carli Geers, John Hessler, Isaac Simon

Mentors: Todd Williams, Michael Wolfe

We explore the relationship between belief change and recollection of previous beliefs. Subjects reported beliefs about TV violence. Later, subjects read a one-sided, belief inconsistent text. We manipulated whether subjects reported beliefs after reading first, or recollected previous beliefs first. A third group were told their previous beliefs before reporting current beliefs. Recollections were not improved when subjects recollected beliefs first. When told previous beliefs, belief change was reduced, suggesting a desire to appear consistent.

KIRKHOF CENTER GRR 033

**Stereoselective Generation of Silicon Stereocenters Utilizing Organolithium Reagents**

Participants attending 1:00 PM - 2:00 PM

Presenter: Matthew Bailey

Mentor: Randy Winchester

Asymmetric nucleophilic substitution of menthoxy groups at prochiral silicon was investigated. Di-(-)-menthoxysilanes were prepared by reaction of corresponding dichloro silanes with lithium menthoxide. Di-(-)-menthoxysilanes were then reacted with organolithium compounds with variable alkyl or aryl substituents, yielding silicon-stereogenic silanes. The most selective reaction investigated so far was between Di-(-)-menthoxysilane having a methyl and phenyl substituent and a tert-butyllithium nucleophile. This reaction gave 84.6% yield and 70% diastereomeric excess when calculated by integration of Si-Me peaks in  $^{13}\text{C}$  NMR.

KIRKHOF CENTER GRR 034

**Culture, Identity, and Modernity in Contemporary Iranian Photography**

Participants attending 1:00 PM - 2:00 PM

Presenter: Samantha Stamps

Mentor: Sigrid Danielson

The cultures of the Middle East have often been misrepresented in ways that intrigue American and European societies. Television dramas and news programs can propagate characterizations of the exotic within these cultures. Contemporary artists from the Middle East often challenge these stereotypes in their work while also critiquing aspects of their own local societies. This essay explores works by Iranian photographers Bahman Jalali, Shadi Ghadirian, and Shirin Aliabadi. Employing aspects of postcolonial theory, such as hybridity, reveals that the images invite questioning of identity in contemporary societies. The photographs highlight how assumptions about modernity are problematic. The viewer has to question his or her own biases as well as their society's belief systems. Ultimately, the photographers' work reveals the limitations of using cultural assumptions to characterize identity.

KIRKHOF CENTER GRR 035

**Use of Capillary Electrophoresis for the Separation of Chiral Silanes**

Participants attending 2:00 PM - 3:00 PM

Presenter: Emily Peters

Mentor: Andrew Lantz

Chiral silanes have gained significant attention recently in pharmaceutical research in order to increase the potential of drug synthesis and as chiral derivatizing agents. If used in pharmaceuticals, the enantiomers of these compounds must be analyzed to determine how they interact with chiral environments (e.g. human body).

However, for many of these compounds enantiomers are difficult to separate by traditional liquid chromatography methods. Capillary electrophoresis is an attractive alternative as it is fast, has flexible methodology, and low sample/solvent consumption. Here, a method of cyclodextrin modified micellar capillary electrophoresis was used to achieve enantioseparation of chiral silanes. Various  $\beta$ -cyclodextrin derivatives were tested for their enantioselectivity, and the effects of altering the concentrations of surfactant micelles and cyclodextrin on the enantioseparation were also explored.

KIRKHOF CENTER GRR 036

**The Strength & Conditioning Program of An Olympic Snowboarder**

Participants attending 2:00 PM - 3:00 PM

Presenters: Trever Braun, Tyler Ray

Mentor: Amy Crawley

Ever think a Snowboarder isn't a true athlete? Think again. Snowboarders' athletic skills can go far beyond what most regular athletes are required to do. Snowboarding athletes need to train agility, balance, plyometrics, flexibility and core strength. The purpose of this presentation was to provide a comprehensive year-round periodized training regimen for this unique population. There are limitations with the generalizability of the training program as certain individuals based on age and skill level may need greater variation than the current training regimen. This research was completed by reviewing the current literature and was limited by the lack of an original experiment. However, this effort is beneficial for coaches and athletes by providing solid research-based principles and practices of training for a year-round seasonal sport. Any athlete competing as a Snowboarder could benefit from this well-developed training program.

KIRKHOF CENTER GRR 037

**Effects of the Affordable Care Act on the General Public and Healthcare Professionals**

Participants attending 3:00 PM - 4:00 PM

Presenters: Korinne Culley, Shane O'Donohue

Mentors: Jeffrey Chamberlain, Steven Hecht

Despite being a government-instituted overhaul of the U.S. healthcare system, the Patient Protection and Affordable Care Act—commonly known as “Obamacare” or the Affordable Care Act—is not well understood by the public or even those employed in the health field. It has been poorly presented to everyone concerned, and the politics and media involved have further influenced its portrayal. For such a monumental act, there is an alarming lack of knowledge and misinterpretation concerning its policies, including from members in a health care profession. We have attempted to streamline and present the act's effects for both the general public and healthcare professionals in an unbiased, informative manner.

KIRKHOF CENTER GRR 038

**Establishing the Genes Essential for Biofilm Formation Under Anaerobic conditions in *Escherichia coli***

Participants attending 10:00 AM - 11:00 AM

Presenters: Clementina Asamoah, Patrick Schneider, Jordan Zhou

Mentor: Michael Baxter

Biofilm formation in bacteria confers an evolutionarily advantageous mechanism that allows for strong adherence to surfaces. Upon proper environmental stimuli, bacteria undergo a prominent shift in their protein expression profile that results in the secretion of polysaccharides, proteins, and lipids. This extracellular matrix strengthens the persistence of colonization, which implicates biofilms in an array of bacterial infections. *E. coli* are part of the human microbiome and are ubiquitous within the intestinal tract. During colonization, both commensal and virulent strains contain genes and regulatory pathways that allow for robust biofilm formation. Our interest is in elucidating genetic factors that are involved in biofilm formation under the anaerobic conditions native to the

gut. By utilizing transposon mutagenesis in conjunction with a quantifiable biofilm assay, mutants that display variations in biofilm expression between aerobic and anaerobic settings can be characterized.

KIRKHOF CENTER GRR 039

**Life Cycle Analysis of Marcellus Shale Gas Well: A Review**

Participants attending 12:00 PM - 1:00 PM, 4:00 PM - 5:00 PM

Presenters: Ashley Brady, Jacob Dillon, Terry Felty

Mentor: Dalila Kovacs

Hydraulic fracturing is currently a topic of debate due to its negative connotations presented to the public concerning environmental impacts. Water usage and contamination associated with hydraulic fracturing is of concern due to the large volumes of water needed for this process and the environmental repercussions of releasing harmful substances into surface water. Not only is it vital to consider the water source for this process and wastewater developed during well production, but the consideration of greenhouse gas emissions and the economic cost must also factor into the overall life cycle analysis. The goal of this study is to analyze and understand the environmental impacts utilizing life cycle analysis models provided in the literature. Life cycle analysis is a technique used to evaluate the repercussions associated with a process from beginning to end. A review of prior studies will be conducted to consider various aspects of the life cycle of the hydraulic fracturing process.

KIRKHOF CENTER GRR 040

**Xenotransplantation: Ethical Organ Replacement?**

Participants attending 9:00 AM - 10:00 AM

Presenters: Sara Ashlock, Alexis Colligan, Kevin Forster, Duncan White

Mentor: Osman Patel

Xenotransplantation, the transplantation of animal organs into humans for medical purposes, is very controversial. One hundred students at Grand Valley State University partook in an anonymous, voluntary survey in which they expressed their knowledge of xenotransplantation and their opinions on various questions regarding its utilization and implementation. The survey included opinion-based questions about the ethics of xenotransplantation, how the process should be carried out, and the concerns the participant had regarding possibly receiving organs from animals. Students were also questioned about the source of their knowledge on xenotransplantation, though the majority had never heard the term. Our results indicated that while few students had adequate knowledge on the subject, once informed, they were split on the ethical usage of the procedure.

KIRKHOF CENTER GRR 041

**Stem Cells: Public Knowledge and Ethics**

Participants attending 12:00 PM - 1:00 PM

Presenters: Sabrina Elzinga, Jennifer Grousd, Benjamin Hollett, Hollister Swanson

Mentor: Osman Patel

Through the last few decades, stem cell research and discovery have exponentially increased. Although stem cells have demonstrated multiple prospective therapeutic methods for healthcare, numerous ethical issues remain with the source they are derived from, as well as their specific applications. With the dramatically increasing amount of information we acquire and the dynamic policies concerning research methods, a major gap in knowledge arises between researchers and the public. A study was conducted in order to determine the knowledge and ethical beliefs concerning stem cells within the Grand Valley State University student body. The results from this study revealed that students with science majors and students with longer education experience were noticeably more knowledgeable on the topic of stem cells than nonscience majors and students with less education experience. However, beliefs on ethics of stem cells varied little between the categories of

majors and academic experience.

KIRKHOF CENTER GRR 042

**12 Month Long Periodization Training for Collegiate Women Volleyball Players**

Participants attending 12:00 PM - 1:00 PM

Presenters: Eric Campbell, Tyler Soja

Mentor: Amy Crawley

Collegiate volleyball is an intense sport that involves dynamic movements and quick spurts of endurance in order to be successful. The purpose of this study was to develop a periodization schedule for collegiate women volleyball players focused on vertical jump height, agility, and power. This area of study is significant because it can help develop training ideas and a year-long program to help train collegiate volleyball players. In order to conduct this research, previously published journal articles were reviewed to develop a periodization schedule for these athletes. A limitation of this study was the lack of an original experiment and the inability to implement the periodization training schedule to measure improvements in vertical jump, agility, and power. The benefit of this research is that coaches, players, or trainers can maximize vertical jump, agility, and power by tailoring practices towards activities and exercises that will lead to improvements in overall performance.

KIRKHOF CENTER GRR 043

**A Survey of Undergraduate Students' Understanding of Antibiotic Resistance**

Participants attending 9:00 AM - 10:00 AM

Presenters: Ursula Robinson, Craig Russo, Alison Saunders, Daniel Stockard

Mentor: Osman Patel

Antibiotic resistance, a form of drug resistance, occurs when strains of microorganisms develop a tolerance to antimicrobial drugs, commonly through horizontal gene transfer or activation of intrinsic factors. Generations of improper use of antibiotics has resulted in an impending crisis where pathogenic bacterial populations are allowed to expand uninhibited due to severe reductions in the efficacy of our current antibiotics. Here, we surveyed undergraduate students to gauge their knowledge of antibiotics and drug resistance. Students were fairly knowledgeable about when to stop taking medications, how they work, and on whom medications are used. A majority, however, either reported self-medicating at some point in time or not being sure if they had, and 59.4% of respondents reported that they were not worried or were apathetic towards antibiotics not working in the future. Through this study, we further exemplify the need for wide-spread education on proper use of antibiotic drugs.

KIRKHOF CENTER GRR 044

**ART and OMA (Other Misunderstood Acronyms)**

Participants attending 2:00 PM - 3:00 PM

Presenters: Kacie Breen, Jamie Murawski, Garrett Murphy, Amanda Sackett

Mentor: Osman Patel

There is a haze of misinformation and misunderstanding that surrounds in vitro fertilization and other forms of assistive reproductive technology (ART). Many people are strongly opinionated about the topic, though they may not fully comprehend it. This survey of Grand Valley State University students assessed their knowledge and understanding of ART, as well as their opinions about several ethical and moral issues that arise from the process. A total of one hundred students participated in the voluntary, anonymous survey, providing their opinions and general knowledge of the subject. The overall consensus demonstrates that a majority of Grand Valley's student body has limited knowledge of ART. They favor the idea of choosing certain traits in their children, especially intelligence and attractiveness, but are unsure of how they would proceed in the ethical dilemmas proposed.



KIRKHOF CENTER GRR 045

**Screening the Effects of Candidate Self-Renewal Regulatory Genes in the Developing Chick Embryo**

Participants attending 1:00 PM - 2:00 PM

Presenter: Craig Russo

Mentor: Merritt Taylor

Neural stem cells divide to produce daughter cells with the same developmental potential as their mother cell through the process of self-renewal. Many cell-intrinsic factors work to mediate this process. Here, we selected genes highly enriched in the neural stem cell pool of the developing nervous system. Among these candidate genes is the homeobox transcription factor Barx2, previously shown to regulate chondrogenic differentiation. Utilizing in ovo electroporation, we overexpressed Barx2 in the developing chick neural tube to determine if it is sufficient for promoting proliferation and/or controlling differentiation of stem cells. Preliminary results suggest that overexpression of Barx2 enlarges the size of the ventricular zone of the developing spinal cord, indicating it may drive cell proliferation. This study may further reveal the mechanisms that drive neural stem cell self-renewal, a process misregulated in the formation of central nervous system tumors.

KIRKHOF CENTER GRR 046

**DDS/DGEBA Epoxy Used as a Model for Studying Polymer Confinement in Polymer Nanocomposites**

Participants attending 10:00 AM - 11:00 AM

Presenter: Danielle Harris, S3 Scholar

Mentor: Richard Vallery

An interesting class of materials is polymer nanocomposites (PNC). Essentially, PNC's are polymer matrices with nanoparticles dispersed within it. These nanoparticles provide a surface for attachment within the polymer, potentially resulting in alterations of macroscopic properties, such as conductivity, hardness, and flame-retardance. This change in attachment can also alter microscopic properties, such as voids in the polymer. Since it has been well studied, an ideal model system for studying polymer attachment to silica nanoparticles (15-20 nm in diameter for this study) is diglycidyl ether bisphenol A (DGEBA) with 4,4'-diaminodiphenyl sulfone (DDS) hardener. Using Positronium Annihilation Lifetime Spectroscopy (PALS), we can study these voids by analyzing the lifetime of positronium (the bound state of an electron and its antiparticle, a positron) which tends to localize in the voids of the polymer matrix. Preliminary results will be discussed, as will the PNC fabrication process.

KIRKHOF CENTER GRR 047

**Characterization of *f*-Element Bidentate Phosphoryl Complexes**

Participants attending 10:00 AM - 11:00 AM

Presenter: Paul Morse

Mentor: Shannon Biros

The chelation of lanthanides and actinides is of great importance due to the wide variety of applications such as nuclear waste remediation and fluorescence. Phosphoryl groups have been shown to have powerful chelation applications for extraction of *f*-element metal cations. Current industry standards employ monodentate or mixed carbonyl phosphoryl (CMPO) ligands. However X-ray crystallography has indicated that phosphoryl groups tend to contribute more to complexation than carbonyl groups. Our current research lies in exploring the potential chelation of bidentate phosphoryl ligands, and modifying the length of the carbon bridge between phosphoryl groups. We are also exploring the fluorescent properties of these *f*-element complexes.

KIRKHOF CENTER GRR 048

**Ethnography in the GVSU Classroom**

Participants attending 12:00 PM - 1:00 PM

Presenters: Jacquelyn Heuer, David Leins, Alison Wilcoxson  
Mentors: Elizabeth Arnold, Tara Hefferan, Deana Weibel-Swanson

For the purpose of this research, three student interns were selected from the Anthropology Department to work on a pilot internship program in conjunction with the Faculty Facilities Planning Advisory Committee at Grand Valley State University. Data were collected over a period of seven weeks through ethnographic observation in three types of classrooms common on the Allendale campus: a stadium-style lecture hall, a discussion-based classroom, and a "hybrid" classroom. In addition to observations, interviews were conducted with the faculty teaching in the observed classes. Data analysis was performed using HyperResearch and SPSS and findings were presented to the FFPAC and the Anthropology Department faculty. The aims of this study are two-fold: to inform the entire campus community on common facilities-related issues associated with each of the learning environments and to provide students with experience in applying anthropology to research fields outside of academia.

KIRKHOF CENTER GRR 049

**Expression and Purification of the GDP-6-Deoxytalose Biosynthesis Enzymes**

Participants attending 4:00 PM - 5:00 PM

Presenter: Benjamin Nicholson

Mentor: Paul Cook

GDP-6-deoxytalose is an unusual sugar produced by the bacterium *Aggregatibacter actinomycetomcomitans* (Aa) on its cell surface in a sugar-containing structure called the lipopolysaccharide (LPS). This sugar is produced from GDP-mannose through the enzymatic pathway containing the two enzymes GMD and GTS. The production of the product through the use of GTS has been lightly studied, but a full structural analysis must be done in order to fully understand the function and mechanism of this enzyme. Characterization of this enzyme will allow insight to critical features of how the LPS is assembled, and may give insight to pathogenicity of Aa. An understanding of the production of unusual sugars may also allow for glycodiversification of existing antibiotics for reduction of bacterial resistance. We report progress toward the expression, purification, and characterization of the GTS enzyme with the ultimate goal of an X-ray crystallographic and steady-state enzyme kinetic study.

KIRKHOF CENTER GRR 050

**The Effectiveness of *Therapy and Fun***

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM, 4:00 PM - 5:00 PM

Presenter: Christa Formberg

Mentor: Jean Silbar

For 30 years, *Therapy and Fun* has cared for more than 725 children who have special needs. The community-based clinic also offers service learning to teen volunteers and gives families education and respite. Based on verbal accounts from employees and parents, *Therapy and Fun* "works." The participants improve through speech-language pathology and occupational therapy. Up until this project, there have yet to be quantifiable data to track the effectiveness of *Therapy and Fun*. This study aims to examine the outcomes data to determine if *Therapy and Fun* "works" for the benefit of the participants. This honors senior project is an analysis of how the children's therapy objectives, ages, genders, diagnoses, and ethnicities affect therapy success. The mentorship model between volunteers and professionals is also discussed in the body of the presentation. Based on the statistical findings from GVSU's Statistical Consulting Center, *Therapy and Fun* is approximately 80% effective.

KIRKHOF CENTER GRR 051

**Detecting Deletions in the *Hdc* Gene Generated by *Minos* Transposon Excision in *Drosophila melanogaster***

Participants attending 11:00 AM - 12:00 PM, 1:00 PM - 2:00 PM, 3:00 PM - 4:00 PM

Presenters: Vincent Gasparotto, S3 Scholar, Joshua Lorenz  
Mentor: Martin Burg

The enzyme histidine decarboxylase (HDC), encoded by the *Hdc* gene, synthesizes the neurotransmitter histamine. While mutations in the *Hdc* gene have been identified, no mutation totally eliminates expression of the *Hdc* gene. With the use of a *Minos* transposable element (Mi{ET1}) located within the *Hdc* gene, an excision of the Mi{ET1} element and surrounding DNA could occur when the Mi{ET1} element is mobilized, disrupting the *Hdc* gene completely. Thus far, Minos mobilization experiments have yielded an excision rate of about 12.1%. Of the excision-bearing flies identified, over 85 breeding lines have been established and are being examined for the lack of histamine, using histamine immunofluorescent detection. Further analysis of the molecular defect in those lines having no detectable histamine should indicate the extent of the *Hdc* deletion created. By deleting the *Hdc* gene, the resulting mutation will result in elimination of HDC activity, resulting in a strong mutant phenotype.

KIRKHOF CENTER GRR 052

**Fuel Both Your Body and Your Car with Coffee Grounds**

Participants attending 11:00 AM - 12:00 PM

Presenters: Nicholas Mortimer, Cameron Piszczek

Mentors: Dalila Kovacs, James Krikke, Min Qi

The production of biofuel from spent coffee grounds was examined in this research. As a growing need for sustainable, environmentally friendly fuel sources increases, the research into this area continues. Oils were extracted from used coffee grounds via soxhlet extraction, collected oils were then transesterified into biofuel for analysis on a GC-MS. Biofuel was successfully created in varying amounts from spent espresso, regular, blonde, and pike roast variety coffee grounds.

KIRKHOF CENTER GRR 053

**A Simple and Efficient Method for the Sulfonylation of Phenol Derivatives**

Participants attending 2:00 PM - 3:00 PM

Presenters: Lina Atanasova, Sean Riley

Mentor: Felix Ngassa

Several phenol derivatives were smoothly sulfonylated by reacting with aryl and alkyl sulfonyl chloride derivatives in the presence of pyridine. Optimization studies were carried out to ascertain the best ratio of phenol to sulfonyl chloride derivatives. The steric and electronic influences of different substituents on the aryl sulfonyl chlorides were investigated. Each product was purified by recrystallization. Compared to the traditional method of synthesizing sulfonates that employs silica-gel column chromatography for purification, our method is novel in that it does not require silica-gel column chromatography, it has a much higher reaction rate, it is operationally simple, and the undesirable side reaction from the sulfonates to R-Cl is circumvented.

KIRKHOF CENTER GRR 054

**Modeling the Presence of Invasive Species Found in West Michigan Based on Overstory Canopy Cover and other Exotic Species**

Participants attending 10:00 AM - 11:00 AM

Presenters: Sophie Bennett, Heather Taylor

Mentor: Alexandra Locher

Invasive species are known to be a destructive force in many areas, causing a loss in biodiversity and economic value of some natural resources. The first step in treating this problem is to understand where invasives are likely to occur. This study intends to create a model using geographic information systems (GIS) and statistical analysis to predict the likelihood of autumn olive, honeysuckle, and multiflora rose growing in west Michigan

forests, based on canopy cover and the presence of other invasive species. This model will be used to produce maps depicting areas which are high priorities for control. Such results could prove invaluable to land stewards. Models generated from this study may be used as prototypes for identifying risk areas for invasive species in other areas.

KIRKHOF CENTER GRR 055

**Unionids: Their Current Status, Association with Macroinvertebrates and Population Dynamics at Cedar Creek**

Participants attending 3:00 PM - 4:00 PM

Presenter: Kristy Phillips, McNair Scholar

Mentor: Eric Snyder

The decline in mussel populations in North America has been attributed to land-use modifications and unionids are endangered and likely to become extirpated. Our project investigated the status of the unionid community in a 3<sup>rd</sup> order stream and examined their relationship with aquatic macroinvertebrates. Multiple variables were compared to mussel patches. We sampled 18 randomly chosen sites within 2 separate 100-meter reaches at Cedar Creek and compared unionid and macroinvertebrate diversity, density, and richness. Variables measured included transport OM, chemistry, substrate; and biological samples included benthic macroinvertebrates (0.25m<sup>2</sup>) and unionids (n=144). Mussel density was positively correlated with macroinvertebrate density ( $p=0.003$ ,  $R=0.783$ ) and substrate composition correlated with the higher mussel density and consisted of a mixture of gravel, cobble, sand, and *Vallisneria*. Sample sites that had little/no mussels present had one or two dominate types of substrate.

KIRKHOF CENTER GRR 056

**My Sister's Keeper: An Exploration of Ethical Issues**

Participants attending 9:00 AM - 10:00 AM

Presenters: Sarah Bianchi, Kelsey Schroskey

Mentor: Sheldon Kopperl

Medical advancements in technology and knowledge are allowing healthcare personnel to provide better care to patients and improve their overall quality of care. However, these advancements are often used before the long-term implications can be assessed. While Jodi Piccoult's fictitious novel, *My Sister's Keeper*, is not exceptional literature, it brings awareness to modern-day issues resulting from these medical advances. It is important for society to understand the implications that violating informed consent and creating a conflict of interest can have on the lives of patients, which often go unnoticed. Future ethical implications should be considered when introducing a new technology or procedure into the field of medicine. While medicine has come a long way, the ethical treatment of individuals has been ignored and has struggled to keep up with the options that patients face.

KIRKHOF CENTER GRR 057

**Novel Biphenyl Ureas as Regulators of the Trace Amine Associated Receptor**

Participants attending 10:00 AM - 11:00 AM

Presenter: Alyssa Snyder, McNair Scholar

Mentor: Matthew Hart

The thyroid hormone (TH) regulates many physiological functions in vertebrates including the cardiovascular system, metabolism, brain development, and growth. A person suffering from a thyroid disorder can experience symptoms in these areas, and if left untreated, only get worse. Unfortunately, there are limited treatment options because thyroid hormone biology is not completely understood. Recent research has shown that T<sub>1</sub>AM, a compound found in various tissues throughout the body, may play a role in thyroid hormone regulation. T<sub>1</sub>AM acts on the Trace Amine Associated Receptor (TAAR). TAAR activation leads to physiological effects in opposition

to those induced by TH. The goal of this project is to develop novel T<sub>1</sub>AM derivatives to better understand the role of TAAR and T<sub>1</sub>AM in TH biology. Specifically, these compounds will incorporate an extra phenyl ring and, based on previous work, may be antagonists for TAAR. Selective regulators for TAAR will be valuable biological tools.

KIRKHOF CENTER GRR 058

**Dynamics of H1N1 Influenza A Virus Infection**

Participants attending 1:00 PM - 2:00 PM

Presenter: Katie Kruk

Mentor: Benjamin Holder

The dynamics of an H1N1 influenza A virus infection in an individual is fairly complex, but simple mathematical models have been developed to help understand the infection. We utilize differential equations to simulate the population dynamics of uninfected target cells and infected cells (producing and not yet producing virus), along with the concentration of viral particles within a host, and compare that to experimental (nasal wash) data from individuals infected with the H1N1 influenza A virus. In an extension of prior models, we also consider the dynamics of interferon --- a cytokine molecule produced by infected cells, with antiviral effects --- and its effect on the viral infection.

KIRKHOF CENTER GRR 059

**Atypical Apical Growth, Timing and Hormone Response in a *Physcomitrella patens* Developmental Mutant**

Participants attending 9:00 AM - 10:00 AM

Presenter: Ellie Morrison

Mentor: Margaret Dietrich

The protonema of *P. patens* is a filamentous network of chloronema and caulonema cells, which develop via apical growth. Here we analyze the development of a mutant on different media following mechanical fragmentation. When compared to the wild type, the mutant was found to exhibit: 1) an increased number of new polar growth initiations on chloronema cells, 2) delayed transition from chloronema to caulonema, which is especially evident in media containing auxin, 3) atypical timing of new polar growth initiations, in that it occurs on the first subapical cell rather than the second as in the wild type, 4) curling and/or undulating growth under nutrient-deficient conditions, and 5) differences in filament dimensions, with the biggest filaments produced under nutrient rich conditions plus or minus auxin. The basis for all of these observations lies with a defect in the mechanics of apical growth. Future genetic analysis will reveal the molecular underpinnings of this mutant.

KIRKHOF CENTER GRR 060

**Kappa Opioid Regulation of Reward Seeking During Acute and Protracted Withdrawal from Ethanol**

Participants attending 4:00 PM - 5:00 PM

Presenters: Justin Blucher, Andrew Caminata, Elise Devitt, Sorscha Jarman, Hannah Tropiano

Mentor: Glenn Valdez

Withdrawal from alcohol is often characterized by changes in reward seeking. Recent evidence suggests increased activity of the kappa opioid receptor (KOR) system leads to an increase in reward seeking following withdrawal from alcohol. The objective of the present experiments was to determine the role of the KOR system in the regulation of saccharin and alcohol self-administration following chronic exposure to alcohol. In the saccharin self-administration test, alcohol dependent rats showed a decrease in responding for saccharin during acute withdrawal, which was not reversed by nor-BNI. During protracted withdrawal, however, dependent rats showed increased lever pressing for saccharin, which was attenuated by administration of nor-BNI. Experiments examining the effects of nor-BNI on alcohol self-administration are currently in progress. These results suggest that KOR blockade reverses general reward seeking associated with withdrawal following protracted periods



of abstinence.

KIRKHOF CENTER GRR 062

**Benzimidazole-Boron Complex: A New Intracellular Imaging Agent**

Participants attending 2:00 PM - 3:00 PM

Presenter: Lindsey Flaquer

Mentor: Andrew Korich

Fluorescent stains are used to visualize cell regions and work by binding to various cell substructures. Fluorescent stains re-emit light upon light excitation and therefore highlight the specific region by "glowing." In the lab our team has been able to successfully synthesize and test several novel benzimidazole-boron derivative fluorescent stains. This project is contributing to the growing field of biological markers and stains.

KIRKHOF CENTER GRR 063

**Full Immersion into Pediatric Expressive and Receptive Communication Disorders**

Participants attending 10:00 AM - 11:00 AM

Presenter: Anna Sinagoga

Mentor: Gordon Alderink

Reception and expression are factors essential for how human beings interact. How are these factors defined? Reception is how language is interpreted. Expression is how one attempts to communicate. This project studied the differences seen in children with receptive and expressive speech disorders. Research for this project was primary and secondary-source research paired with observations made during an internship. The internship involved working in the Beaumont SLP Department for the extent of the summer in two separate preschool programs for children in need of speech therapy. Responsibilities included identifying and correcting speech and social interaction errors. This project allowed for real world experience to meet textbook explanations. Though expressive and receptive speech disorders are not uncommon, they are not as commonly understood as disorders such as dyslexia or ADD. I believe that this project will expand public knowledge of receptive and expressive speech disorders.

KIRKHOF CENTER GRR 064

**Novel Inhibitor Design Against the Antibiotic Resistance Target, AmpC  $\beta$ -lactamase**

Participants attending 9:00 AM - 10:00 AM

Presenter: Andrew Hood

Mentor: Rachel Powers

$\beta$ -lactam antibiotics are ubiquitous in modern medicine. These drugs contain a four-membered  $\beta$ -lactam ring, which permanently inhibits transpeptidase enzymes in many bacteria. Extensive use has given rise to antibiotic resistance; many bacteria are now able to hydrolyze the  $\beta$ -lactam ring with  $\beta$ -lactamase enzymes, destroying bacteriostatic properties. To combat resistance,  $\beta$ -lactamase inhibitors have been developed and prescribed in conjunction with  $\beta$ -lactam antibiotics. Unfortunately, the lactam ring, common to both substrates and inhibitors, allows resistance to develop quickly. There is a dire need for novel  $\beta$ -lactamase inhibitors. Compounds were recently identified as structurally unique  $\beta$ -lactamase inhibitors, but the mechanism by which this inhibition occurs is not fully understood. By examining the X-ray crystal structure of the enzyme-inhibitor complex, the intricacies of these interactions will become clearer, paving the way for alleviating the antibiotic resistance problem.

KIRKHOF CENTER GRR 065

**Looking for Genetic Interactions Using Ectopic Expression of Protein Kinase-N in *Drosophila* Eye**

Participants attending 10:00 AM - 11:00 AM



Presenter: Navid Naraghi  
Mentor: Georgette Sass

The UAS/GAL4 system in *Drosophila melanogaster* is used to promote tissue-specific expression of a gene in order to look for potential genetic interactions between the expressed protein and endogenous proteins. We used the GMR-GAL4 driver to activate transcription of a *p k n* cDNA (UAS-PKN) in the *Drosophila* eye to look for genetic interactions that might address whether PKN's role as an effector of the signaling protein Rho1 GTPase is related to regulation of programmed cell death (PCD). We have found increased levels of cell death in eyes upon ectopic expression of the PKN protein. The cell death phenotype is not affected by reduced levels of the Rho1 signaling pathway or by a functional reduction of the Jun-N-terminal-Kinase (JNK) pathway, also implicated in PCD. Cell death is also unaffected by inhibition of HID, a crucial regulator of PCD. We conclude that PKN is not working through standard PCD pathways and additional testing is needed to characterize this PKN-specific pathway.

KIRKHOF CENTER GRR 066

**Evidence for a Jealousy-Envy Distinction in School-Age Children's Talk about Emotions**

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM, 2:00 PM - 3:00 PM

Presenter: Jessica Fritzler

Mentor: Naomi Aldrich

Jealousy and envy are characterized as separate emotions based on different causal frameworks; whereas jealousy is motivated by a perceived threat to a valuable relationship, envy stems from coveting others' possessions or traits. Our study is the first to compare children's talk about jealousy and envy. Five- to 11-year-olds (40 girls, 40 boys) were presented two jealousy (sibling, friendship) and two envy (possession, attribute) vignettes and were asked to identify and explain the main character's feelings. Children were also given measures of emotion comprehension, perspective-taking ability, and verbal intelligence. Although children used the term "jealous" for both, our findings indicate that children distinguish between the two emotions and display different developmental trajectories concerning feelings surrounding interpersonal rivalry. These findings have important implications for strategies for helping children to cope with issues of interpersonal rivalry and peer aggression.

KIRKHOF CENTER GRR 067

**Possible Existence of Nicotinic Cholinergic Receptors in Porcine Ophthalmic Artery**

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenters: Tyler Guinn, Jason King

Mentor: Francis Sylvester

While typical vascular smooth muscle contraction and relaxation in mammals is mediated by muscarinic cholinergic receptors, recent observations have suggested the presence of nicotinic cholinergic receptors in mammalian vascular smooth muscle. Specifically, we have noticed the possibility of these receptors in ophthalmic arteries in pigs. The presence of these receptors would indicate that the control of the ophthalmic artery in porcine is complex, allowing for greater control of vessels that supply blood to the retina. To test for these nicotinic cholinergic receptors, portions of the artery are excised for testing on a force transducer. A nicotinic cholinergic agonist is added in hopes of eliciting a contractile response. A positive contractile response would indicate that nicotinic cholinergic receptors are present in the porcine ophthalmic artery and provide insight into the role of acetylcholine in regulating vascular tone.

KIRKHOF CENTER GRR 068

Investigating Fine-Scale Spatial Genetic Structure of Eastern Box Turtles (*Terrapene carolina carolina*)

Participants attending 11:00 AM - 12:00 PM

Presenter: Breanna Gould, S3 Scholar  
Mentor: Jennifer Moore

Spatial genetic structure is a result of evolutionary processes, and a critical concern of conservation genetics. Understanding spatial genetic structuring provides insight about the natural or anthropogenic factors that affect gene flow and population isolation. For at-risk species, reduced gene flow and losses of genetic diversity can ultimately affect survival and reproduction via inbreeding depression. We investigated the spatial genetic structure of a geographic range-edge population of eastern box turtles in northern Michigan where they are a species of special concern. We genotyped individuals at 11 microsatellite loci and found a relatively high level of fine-scale genetic structuring within a relatively small geographic area. Therefore, in the future, we will investigate the putative effects of distance and landscape features, which may be responsible for the population structure exhibited.

KIRKHOF CENTER GRR 069

### **Events Organize Memory for Autobiographical Experience**

Participants attending 9:00 AM - 10:00 AM

Presenter: Logan Bezy

Mentor: Christopher Kurby

Although everyday ongoing experience is continuous people break their experiences down into discrete units or events. This suggests that not only do we perceive our experiences in terms of events but our memories of our experiences may also be organized by events. We hypothesized that asking participants to retrieve information about an event that occurred will increase their ability to remember other information for that event and will decrease their ability to access information outside of that event. We tested this by giving participants a tour of six different buildings, followed by a series of memory tasks. We found some evidence for within event priming: The activation of memory for an event increased memory accessibility for information within that event. We also found that differentially cueing the structure of events differentially affected memory retrieval. These findings suggest that memory for everyday experience is organized by the perception of boundaries between events.

KIRKHOF CENTER GRR 070

### **Genetic Influence in Nonalcoholic Fatty Liver Disease**

Participants attending 9:00 AM - 10:00 AM

Presenter: Jennifer Awad

Mentor: Lori Houghton-Rahrig PhD RN

Obesity-related Non-Alcoholic Fatty Liver Disease (NAFLD), a worldwide health concern, affects over 70 million people in the United States alone. Fatty liver disease is defined as fat deposits exceeding 5% of total liver weight and unrelated to alcohol usage. Severity of NAFLD can range from simple fatty liver to cirrhosis and liver failure. A literature review was conducted to develop a greater understanding of the influence of genetics in NAFLD. CINAHL, PubMed, Medline, and Web of Knowledge were searched resulting in over 270 articles; 15 articles were studied in depth. NAFLD is influenced by genetic and environmental factors. Polymorphism in the *PNPLA3* gene has been associated with higher incidence of disease progression. This literature search provides foundational knowledge for research assistant participation in Dr. Lori Houghton-Rahrig and Dr. Pei-Lan Tsou's study: *Symptoms, Genetics, and Health-Related Quality of Life in People with NAFLD*.

KIRKHOF CENTER GRR 071

### **Robustness of Dynamical Resonance to Biologically Realistic Conditions for Influenza**

Participants attending 9:00 AM - 10:00 AM

Presenter: Joshua Konecki

Mentor: Benjamin Holder

One mechanism proposed to explain the acute seasonal occurrence of influenza infections is a resonance effect, resulting from interplay between the periodic fluctuation in transmission rate and a natural underlying periodicity of infection dynamics. We have expanded a simple mathematical model of influenza population dynamics to reflect the natural behavior of viral transmission. In the original model, three interacting subpopulations were considered: susceptible, infectious, and recovered, assuming an immediate transfer from susceptible to infectious. As it is unlikely a susceptible person will immediately become infectious, the model was adjusted to include a period of latency. In place of a simple sinusoidal seasonality function, we employed a less smoothly changing function corresponding to the potential effect of a summer school closing. We investigated how these changes modified the underlying periodicity of the model dynamics and whether resonance behavior was achievable.

KIRKHOF CENTER GRR 072

**Formation of Ball and Pillow Structures in the Ordovician Fairview Formation in Northern Kentucky**

Participants attending 10:00 AM - 11:00 AM, 11:00 AM - 12:00 PM

Presenters: Joseph Cherluck, Tiffany Gentner, Yolanda Hamilton

Mentor: Peter Riemersma

Ball and pillow structures are sediment deformation masses interpreted in the literature to have formed due to shocks generated by earthquakes. The Fairview Formation was deposited in a marine environment as proven by the presence of brachiopods and other fossils. In our outcrop, ball and pillow structures are prevalent in three horizons and are comprised of rounded masses of clastic sediment set in a similar or finer grained matrix. They likely formed as a result of shock processes undergone by the collapse of carbonate sediments or semi-consolidated sands. We are going to examine thin sections and hand sample specimens from deformed ball and pillow structures and compare them to undeformed samples. In particular we are looking for evidence of seismically induced liquefaction (i.e., lower porosity, grain orientation).

KIRKHOF CENTER GRR 073

**An Assessment of the Stream Quality of Little Mac Ravine, Grand Valley State University**

Participants attending 4:00 PM - 5:00 PM

Presenter: Christina Hamilton

Mentors: Richard Rediske, Peter Wampler

Grand Valley State University was constructed on clay soils which caused, in combination with the dramatic increase in impervious surface, large volumes of stormwater to enter the ravines where it flowed to the Grand River. Due to extensive streambank erosion resulting from the amount of stormwater, GVSU diverted large portions of the stormwater away from the Little Mac Ravine to a constructed wetland in 2008. This study presents the results of macroinvertebrate and sediment samples that were collected from the Little Mac Ravine in 2013. A comparison with preconstruction samples in 2007 was also conducted, as well as a comparison with macroinvertebrate samples from a less impacted ravine. These comparisons will show how much improvement has been made in the stream quality, and how much improvement is yet to be made.

KIRKHOF CENTER GRR 074

**Television's Influence on the Normalization of Gay Marriage**

Participants attending 11:00 AM - 12:00 PM

Presenter: Alexandra Carr

Mentor: Kathleen Underwood

My project examines television portrayals of same sex marriage since 1991 to determine if those portrayals have changed. Television shows displaying same sex characters getting married will be analyzed to determine if the acceptance and normalization of gay marriage has changed over the years. Five American television

shows from 1991-2013 have been selected because of their gay marriage content. Media analysis will be done to determine if the attitudes of the heterosexual characters about the homosexual characters have been more accepting in the more recent years. In addition, the amount of air time devoted to gay characters and to them as a couple will be analyzed. The expected outcome of this study is that same sex characters getting married are more accepted in 2013 than they were in 1991, and that they get more air time in more recent years.

KIRKHOF CENTER GRR 075

**Synthetic Routes to Metal Olefin Complexes Exhibiting Asymmetry in the Metal to Olefin Bond**

Participants attending 10:00 AM - 11:00 AM, 1:00 PM - 2:00 PM

Presenter: Jacqueline Williams

Mentor: Stephen Matchett

Limited data in the literature suggest a relationship between the degree of asymmetry of a metal olefin bond and its susceptibility to attack by external nucleophiles. External nucleophilic attacks lie at the heart of many transition metal catalyzed reactions and hence are relevant to many industrial processes. To definitively demonstrate this relationship a series of olefin complexes of cyclopentadienyl iron (II) dicarbonyl (hereafter referred to as Fp+), systematically varying in metal olefin bond asymmetry, have been synthesized by students in our lab. To date these all involved Fp+(vinyl aniline) complexes which display high degrees of olefin bonding asymmetry. To sample the data where there is less asymmetry, the current work is attempting to produce Fp+(phenyl vinyl ether) complexes. There are several possible routes to these currently unknown complexes. Progress toward these Fp+(phenyl vinyl ether) complexes will be discussed.

KIRKHOF CENTER GRR 076

**Genetic and Functional Characterization of the Interaction Between *EER5* and *EIN2* of the Ethylene Signaling Pathway in *Arabidopsis thaliana*.**

Participants attending 4:00 PM - 5:00 PM

Presenter: Joshua Adkins

Mentor: Matthew Christians

All plants are highly dependent on the hormone ethylene for flowering, pathogen defense, germination, and many other metabolic processes. It has been reported that the PCI domain containing protein EER5 is involved in ethylene perception, and interacts with the C-terminus of EIN2 (CEIN2), a key component in the ethylene signaling pathway. The CEIN2 is cleaved off of the ER-localized N-terminal portion of EIN2 and translocates into the nucleus where it promotes ethylene responses. What role EER5 plays in this process is currently unknown. We propose to investigate the localization of EER5 by over-expressing GFP-EER5 in the model plant *A. thaliana* to understand EER5-CEIN2 interaction taking place. Since the cleavage of CEIN2 from the N-terminal portion of EIN2 is dependent upon phosphorylation, we also want to investigate the EER5-EIN2 interaction using phosphomimics and phospho-null versions of CEIN2. Our aim is to understand the role EER5 plays in ethylene signaling in *A. thaliana*.

KIRKHOF CENTER GRR 077

**Carbonmonoxy Myoglobin Vibrational Frequency Investigation**

Participants attending 9:00 AM - 10:00 AM, 2:00 PM - 3:00 PM

Presenter: Michael Esch

Mentor: Christopher Lawrence

A computational study of the vibrational frequency of carbon monoxide bound to myoglobin has been resumed with a new approach. Previously, the carbon monoxide vibration had been considered a local vibrational mode where only the oxygen oscillates along the bond and the carbon's position is fixed. New calculations now show that the vibration is more accurately represented by a normal mode where both the carbon and oxygen are

oscillating along the bond. Quantum mechanical calculations are being performed in order to characterize the vibration and relate it to other parameters, which can be used to generate a frequency trajectory from the classical mechanical simulation of carbonmonoxy myoglobin.

KIRKHOF CENTER GRR 078

**Periodized Strength and Conditioning Program for the Male Professional Boxer**

Participants attending 1:00 PM - 2:00 PM

Presenters: Jacqueline Drew, David Giese, Nathan Reichkitzer

Mentor: Amy Crawley

"Float like a butterfly, sting like a bee." A quote that many are familiar with, but what does it really take to be that dynamic? The purpose of this review was to discover the best techniques used effectively within a periodization program to ensure physical performance of the male professional boxer. The data presented was collected from various scholarly journals to ensure a broad range of models used effectively for speed, power, and agility when training the professional boxer. A limitation of this research was not being able to conduct an experiment firsthand. With such a popular sport, the research behind being light on your feet while being able to execute a deadly blow can be very beneficial to boxers and trainers interested in improving their game.

KIRKHOF CENTER GRR 079

**Protective Effects of nAChRs by Application of an Allosteric Modulator and nAChR Agonist to Retinal Ganglion Cells**

Participants attending 10:00 AM - 11:00 AM

Presenters: Sabreen Faqihi, Lindsey Lusardi, Jessica Myers, Lindsey Schroedter, Heidi Stultz

Mentor: David Linn

The cholinergic amacrine cells are the only cells in retina which synthesize and release acetylcholine (ACh, Masland & Mills, 1976). Activation of 7 nicotinic acetylcholine receptors (nAChRs) enables retinal ganglion cells to survive toxic culture conditions (Werwein et al., 2004). Previous results (Bader & Linn, 2007) showed that PNU-282987 displayed significant neuroprotective effects at concentrations in the low nanomolar range. More recently, we attempted to further exploit the protective effects of 7 nAChR activation by applying a selective modulator in combination with the agonist to isolated RGCs. The selective allosteric modulator, PNU-120596, enhanced the protective action of the agonist in a dose-dependent manner with maximal effects exceeding cell-survival seen under control conditions. Currently, experiments are being conducted with a mitotic inhibitor (Ara-C) to examine if the agonist/modulator combination is increasing RGC numbers by inducing cell division.

KIRKHOF CENTER GRR 080

**A More Sustainable Future Through New Biofuel Synthesis**

Participants attending 4:00 PM - 5:00 PM

Presenters: Joel Berglund, Nicholas Mortimer, Cameron Piszczek, Julie Stoscup

Mentor: Dalila Kovacs

Fossil fuels commonly used for the development of energy, particularly transportation, are diminishing rapidly. Current alternatives, including biomass-based hydrocarbon fuels, are reviewed throughout this poster. First, the implication of utilizing starch and triglyceride feedstocks from traditional crops to produce biomass via thermochemical routes is considered. Secondly, two areas with potential to improve the production of hydrocarbon fuels are studied: (i) the increase of energy density via reducing the substantial oxygen content of the parent feedstock and (ii) the increase of the molecular weight of hydrocarbon products by creating new C-C bonds between biomass-derived intermediates. Lastly, strategies and consumption management of hydrogen for biorefining are examined to ensure future independence from fossil fuels.



KIRKHOF CENTER GRR 081

**Representations of Mothers Within Women, Gender, and Feminism Studies**

Participants attending 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM

Presenter: Meryn McClelland

Mentor: Kathleen Underwood

I seek to answer the question, How has representation of mothering within introductory level Women, Gender, and Feminism courses changed over time? Through convenience and archival sampling it was determined that *Women's Voices, Feminist Visions* (Shaw & Lee) is the most popular text used within US universities. Using qualitative content analysis I will review five editions of this textbook to compare and contrast ways that mothers and topics surrounding mothering have been represented over time. Research will pay special attention to topics within which mothers are represented, ratio of representation of mothers compared to other subjects, and where mothering topics are covered in relation to other topics in the text. This study is strongly based on Ian Macgillivray and Todd Jennings' publication, "A Content Analysis Exploring Lesbian, Gay, Bisexual, and Transgender Topics in Foundations of Education Textbooks" published in 2008.

KIRKHOF CENTER GRR 082

**The Role of Speech-Language Pathologists on Interdisciplinary Teams that Assess and Treat Individuals with Autism Spectrum Disorder**

Participants attending 4:00 PM - 5:00 PM

Presenter: Kara Bodine

Mentor: Janine Schmedding-Bartley

The purpose of this literature review was to investigate the role of speech-language pathologists (SLP) on interdisciplinary teams in the assessment and treatment of children with autism spectrum disorder (ASD). Social interaction falls under the expertise of SLP's and is a key component of the diagnostic markers of ASD. However, literature regarding the involvement of SLP's on interdisciplinary teams is scarce. This review of over 15 scholarly articles revealed that SLP's have been excluded from many studies of teaming for children with developmental delays and ASD (Loutzenhiser & Hadjistavropoulos, 2008; Murata & Tan, 2009). Studies that did mention SLP's as part of a team generally listed the team members without discussing the specific role of the SLP (Provost, Lopez & Heimerl, 2007). This paper demonstrates the need for more research that evaluates assessment and intervention for children with ASD that is conducted by interdisciplinary teams with the inclusion of SLP's.

KIRKHOF CENTER GRR 083

**Progress Towards the Synthesis of N-[2-(2-aminoethyl) phenyl]-N -phenyl Urea and Like TAAR Activating Derivatives**

Participants attending 12:00 PM - 1:00 PM

Presenter: Alex Zuhl

Mentor: Matthew Hart

The thyroid excretes tyrosine based hormones that have a pivotal role in organism development and metabolism. The principle thyroid hormone exists in the body in its active form as triiodothyronine ( $T_3$ ) which increases metabolism. 3-iodothyronamine ( $T_1AM$ ) is a recently discovered derivative of  $T_3$  that acts as a potent agonist of trace amine associated receptor ( $TAAR_1$ ) but with inverse physiological effects of  $T_3$ . Previous studies have demonstrated the possibility of a regulatory relationship between  $T_3$  and  $T_1AM$ . Our lab has been developing derivatives of  $T_1AM$  to further study the regulatory mechanism of trace amines by examining the chemical structure activity relationship of  $T_1AM$ . Incorporating a para-linked aromatic urea system in place of the ether linkage in  $T_1AM$  has led to potent  $TAAR_1$  activation. Herein is reported progress towards the synthesis of a novel  $T_1AM$  derivative N-[2-(2-aminoethyl) phenyl]-N-phenyl urea as a principle compound for the generation of like analogues.



KIRKHOF CENTER GRR 084

**Assessing the Light Requirements for E3 Complex Assembly in *Arabidopsis thaliana***

Participants attending 9:00 AM - 10:00 AM

Presenter: Jacob Dec, S3 Scholar

Mentor: Matthew Christians

Phytochromes (Phy) are photoreceptors in plants that detect the far-red and red wavelengths. Exposure to red or far-red light changes Phy conformations from inactive to active states respectively, thus initiating downstream signaling responsible for many developmental processes. The Light Regulating BTB (LRB) complex ubiquitinates unknown target protein(s) within the Phy signaling pathway leading to their degradation. The E3 Ligase subunits Cullin3 and Light Response BTB have been shown to interact in red light (active complex) but not in darkness (inactive). This study aims to identify if far-red light can reverse red light effects and disassociate LRB from Cullin, thus inactivating the complex in a Phy dependent way. GFP-tagged LRB plants will be grown in red light and then transferred to far-red light. These plants will then be subject to a GFP immunoprecipitation and the presence of Cullin3 will be assessed to determine complex formation in different light environments.

KIRKHOF CENTER GRR 085

**Olympic Lifting for Beginners**

Participants attending 12:00 PM - 1:00 PM

Presenters: Stephanie Ervin, Zachary Galloway

Mentor: Amy Crawley

Olympic lifting is defined as a sport in which the primary goal is to lift the maximum amount of weight possible in one repetition without sacrificing good form. This discipline is geared towards athletes who wish to test their explosive full body strength capacity. Olympic lifting is a sport like many others that requires focus, patience and a great deal of determination as it demands stability, strength and power from the athlete. This demand can be risky for beginners who have no prior experience with lifting. Through accumulated research, the purpose of this study was to combine multiple lifting methods to create an effective program for beginner lifters, teaching proper technique and form. This research is beneficial for novice lifters as it is a well-developed, safe lifting protocol that is easy to implement.

KIRKHOF CENTER GRR 086

**Using Clay as a Catalyst for Green Chemical Processes: An Analysis of Zeolite Production**

Participants attending 12:00 PM - 1:00 PM, 1:00 PM - 2:00 PM, 2:00 PM - 3:00 PM, 3:00 PM - 4:00 PM

Presenters: Lyndsay Israel, Anthony Schnobel, Jordan Stedman, Kevin Walker

Mentor: Dalila Kovacs

This presentation focuses on new processes, currently in development stages, for the green production of zeolite catalysts. Zeolites are naturally occurring clays used as selective catalysts in chemical synthesis, mainly due to their porosity. Traditionally, the synthetic zeolites were obtained by hydrothermal synthesis; the process is effective but has low efficiency. Crystallized pores were formed by the use of organic templates but template usage requires either expensive removal or recovery. The combustion on non-recoverable templates produces greenhouse gases and risks harming the formed structure. This process can take up to twenty days even at high temperature and pressure, and therefore isn't well-loved for efficiency by the industrial sector. An analysis of new green alternatives for zeolites synthesis, how and why they follow green chemistry principles, and which green improvements may work to make zeolite production an affordable and efficient industry will be presented.

KIRKHOF CENTER GRR 087

**Repression of *hilA* in *Salmonella enterica* Using a Cyclic Peptide Library**

Participants attending 10:00 AM - 11:00 AM

Presenters: Clementina Asamoah, Patrick Schneider, Jordan Zhou

Mentor: Michael Baxter

*Salmonella enterica* serovar Typhimurium is a gram-negative bacterium that causes gastroenteritis upon ingestion. Pathogenesis is dependent upon the bacterium recognizing the correct environmental signals to activate the genes known as Salmonella Pathogenicity Island 1 (SPI-1,) which encodes for a type three secretion system (TTSS). The TTSS allows the bacterium to alter normal host cell function, allowing the bacterium to be drawn into and across the epithelial layer of the small intestine. The expression of SPI-1 is controlled by a central regulator known as hilA. We have acquired a plasmid library from Brad Jones at the University of Iowa which produces random cyclic peptides. We are screening the library against a hilA::lacZY reporter to identify cyclic peptides which inhibit hilA as way to determine potential alternatives to current antibiotics. Once the peptides are identified, they are characterized in order to demonstrate the effects on salmonella gene expression and invasion.

KIRKHOF CENTER GRR 088

**The Effect of Climate Change on Drivers of Coral Disease**

Participants attending 10:00 AM - 11:00 AM

Presenter: John Skutnik

Mentor: Elena Lioubimtseva

Global climate change is expected to exacerbate the already unfavorable conditions that tropical coral reef ecosystems survive in. As climate change continues, the frequency of coral bleaching or death by pathogenic infection is expected to rise. It has been shown that the following driving forces can cause and intensify pathogenicity in corals: sedimentation, nutrient runoff, ocean warming, and sea level rise. All these factors may be caused or influenced by climate change. I will use MAGICC/SENGEN to model changes in precipitation, sea level rise, and sea surface temperature which have direct effects on these drivers. Two SRES emission scenarios will be used, A1 and a B1 (representing different economic development pathways for the future world) and run under multiple models individually for the best fit. The results will help us to determine which driver of coral disease will be most influential under different climate change scenarios.

KIRKHOF CENTER GRR 089

**MARS: Testing Integration**

Participants attending 9:00 AM - 10:00 AM

Presenter: Jack Rosenhauer

Mentor: Zachary Kurmas

GVSU students who have taken CIS 162 or CIS 163 have learned that testing their projects is an important part of development. Thorough testing ensures that programs are reliable, efficient and accurate. Testing MARS (MIPS Assembly and Runtime Simulator) assembly programs in CIS251 is just as important but the current program lacks an automated testing feature. We were able to create a feature that uses a framework, JUnit Test, from the Java language to create an automated testing suite for MARS. This new feature allows the students to create tests in java for their MARS assembly programs. This tool gives students a familiar framework and language to test their projects. It also reduces the learning curve while learning assembly and further develops the students testing skills.

KIRKHOF CENTER GRR 090

**Building a Better Stockbroker: Constructing an Ontology-Based Financial Knowledge Base**

Participants attending 1:00 PM - 2:00 PM

Presenter: Logan Westrick

Mentors: Jie Du, Gregory Wolffe

Decision support systems are a rapidly growing class of computer programs used to assist middle and upper management in making decisions and planning. There are essentially three basic parts to any decision support system: the knowledge base, the model (that is, the part that does work on the data to make a decision), and the user interface. This project will focus on building a knowledge base for a financial decision support system. It will do so by creating an ontology, a formal representation (and abstract model) of knowledge as concepts within a domain such that it can be understood by a computer. This will be accomplished using the Web Ontology Language (OWL 2) in the Protégé knowledge framework together with a data acquisition driver written in Perl.

KIRKHOF CENTER GRR 091

**The Influence Of Asymmetric Metal Olefin Bonding On Chemical Reactivity: A Kinetic Study of Cyclopentadienyl Iron (II) Dicarbonyl Cation Vinyl Aniline Complexes Using UV-Vis Spectroscopy.**

Participants attending 9:00 AM - 10:00 AM, 1:00 PM - 2:00 PM

Presenter: Garrett MacLean

Mentor: Stephen Matchett

Asymmetry in the position of the metal along the olefin face has been proposed to greatly influence the susceptibility of the olefin to external nucleophilic attack. The supporting data is, however, very limited. The goal of this work is to firmly establish the relationship between the rates of external nucleophilic attack to the extent of metal olefin bond asymmetry. Synthetic work within our lab is producing a series of metal olefin complexes with systematically varying amounts of asymmetry in their bonding. One such series is composed of complexes with a cyclopentadienyl iron (II) dicarbonyl cation ( $Fp^+$ ) coordinated to various para substituted vinyl anilines. We have recently begun to use stop-flow UV-Vis spectroscopy to measure the reaction rates for nucleophilic attack on these complexes. The long term goal is to demonstrate how subtle changes in the bonding result in large changes in the reaction chemistry of these complexes. Preliminary kinetic data will be presented.

KIRKHOF CENTER GRR 092

**Biobased Epoxy Resins: Plastics of the Future**

Participants attending 9:00 AM - 10:00 AM

Presenters: Alyssa Katz, Tanner Remick, Nathaniel Stoller

Mentor: Dalila Kovacs

Biobased epoxy resins are made from biological feedstocks instead of the traditional petroleum based resources. Epoxy resins, both bio- and petroleum-based, are used in the production of polymers. These polymers are used to create thermoset biobased plastic materials. A comparison between biobased epoxy resins and petroleum-based resins will be presented, including their feedstocks, cost, product quality, waste, energy consumption, and their production processes. In order to produce biobased epoxy resins plant oils are mixed with a hardener. This mixture is stirred at room temperature in the presence of a catalyst. The liquid obtained goes through a curing process leading to epoxy resin. Once cured, the sheets of epoxy resins can be melted down and formed (shaped-thermoset) into many different plastic products. A company called Entropy Resins makes epoxy resins and uses them for the production of sporting equipment.

KIRKHOF CENTER GRR 093

**Medical Internship in Cameroon**

Participants attending 1:00 PM - 2:00 PM

Presenter: Rhonda Chungag

Mentor: Edward Aboufadel

In the summer of 2013, I spent approximately two months in Cameroon, a small West/Central nation to the east of Nigeria. The majority of my stay was in the capital city of Southwest Province, Buea. There, I interned in a small hospital, St. Luke's Hospital, along with nurses, medical residents, and lab technicians. St. Luke is a surgical

hospital specializing mainly in orthopedic surgeries and during my time, I was allowed to observe surgical procedures twice a week. While interning in at St. Luke's, I shadowed the head nurse of the male ward, Cecilia Dike. She was responsible for everything I learned during my internship. Overall, my stay was very educational and enjoyable.

KIRKHOF CENTER GRR 094

**Blueberry Farming in Michigan: Agriculture Working with Climate Change**

Participants attending 9:00 AM - 10:00 AM

Presenter: John Scott

Mentor: Elena Lioubimtseva

The purpose of this study is to determine if the changing climate, as in warming temperatures and precipitation trends, will cause a noticeable expansion of blueberry farms to northern counties in Michigan. Quantitative data collected at the county level will be examined to establish historical trends in blueberry farm northward expansion and its possible correlation with temperature and precipitation changes over time. Spatial data plotted in ArcGIS will provide insights on possible relationships between climatic conditions and blueberry farm numbers. MAGICC/SCENGEN 5.3 climate model will be used to develop future climate change scenarios for Michigan and predict potential future shifts of blueberry farming. Microsoft Excel will be used to examine the changes in the number of blueberry farms in the context of Michigan's climate change.

KIRKHOF CENTER GRR 095

**Bio-Oils Display Amazing Potential for Use as Biofuels**

Participants attending 2:00 PM - 3:00 PM

Presenters: Colleen Ahlers, Nathan Marckini, Kyle Tanis

Mentor: Dalila Kovacs

About 85% of all energy use in the United States comes from non-renewable resources. As the demand for energy grows there is a need to find new renewable sources for fuel. There is a renewed interest in the pyrolysis of biomass to create bio-oils that can be used for fuel. Due to the many sources of biomass, the composition of the bio-oils produced can change. This work will look at the potential use of seaweed, corn stalks, and other proteinaceous sources of biomass to create bio-oil.

KIRKHOF CENTER GRR 096

**Immunodetection of Isoforms of GAP-43**

Participants attending 9:00 AM - 10:00 AM

Presenter: Thomas Kneeshaw

Mentor: John Capodilupo

Growth Associated Protein-43 (GAP-43), found within the pre-synaptic terminals, has been shown to become phosphorylated due to increased activity of PKC (Protein Kinase C) during increased brain activity. The levels of phosphorylated forms of GAP-43 have been shown to increase following paradigms for learning and memory in a variety of species including primates, rats and mice. Current interests are to determine if significant changes in the levels of phosphorylated GAP-43 isoforms are associated with the dementing process of Alzheimer's disease (AD). If significant differences are detected, phosphorylated isoforms of GAP-43 could be used as a biomarker for cognition. 2D western blots, immunodetection and primate brain matter were used to enhance our resolution from a previous study. We hope to eventually determine a baseline value of phosphorylated GAP-43 proteins in baboon brain matter.

KIRKHOF CENTER GRR 097

**Chunking While Reading: The Relationship Between Working Memory and Event Segmentation**

Participants attending 4:00 PM - 5:00 PM  
Presenters: Justin Cospito, Shelby Navarre  
Mentor: Benjamin Swets

Does working memory impact how people segment events? When we read, we break information up into discrete events in order to better understand the material. Past research shows that working memory (WM) allows people to create larger linguistic representations. For example, people with higher WM plan a greater amount of speech in advance. We have also found that high-WM individuals are less likely to slow their reading at event boundaries, suggesting that WM is involved in event segmentation. Based on these previous findings, we wondered, do individuals with greater WM segment a text into larger events than an individual with less WM? To test this, we first measured participant's WM using reading and spatial span tasks. Participants were then given a text and asked to mark where one event ends and another begins. In our present study, we did not find a relationship between WM and event size. We will discuss the implications of these findings and offer some future research directions.

KIRKHOF CENTER GRR 098

**The Appearance of a Variant of the Orbicularis Oculi Muscle**

Participants attending 9:00 AM - 10:00 AM  
Presenters: Melissa Huiskens, Nathan Kalinowski, Eric Kersjes, Aria Kieft, Michael Nguyen  
Mentors: James Reed, Dawn Richiert, Timothy Strickler, Melissa Tallman

A bilateral variation of the orbicularis oculi muscle was uncovered during the dissection of the facial musculature of a seventy-three year old male cadaver. Typically, the orbicularis oculi muscle originates at the medial margin of the orbit and encircles the eye. This cadaver possessed an unusual band of muscle extending from the inferomedial aspect of both the right and left orbits to attach to the most lateral aspect of the maxillae near the zygomatic arch. The zygomaticus minor muscle, which normally extends from the lateral aspect of the orbicularis oris into the orbicularis oculi, attached to the orbicularis oculi muscle fiber variant as both muscles continued to the zygomatic arch. This project will look at potential explanations for this variant and discuss possible developmental reasons for its presence.

KIRKHOF CENTER GRR 099

**Investigation of Asymmetrical Internal Jugular Veins**

Participants attending 9:00 AM - 10:00 AM  
Presenters: Andrew Doorn, Devan Dykstra, Maria Edelhauser, Brian Forreider  
Mentors: James Reed, Dawn Richiert, Timothy Strickler, Melissa Tallman

During dissection of the neck of a 74 year old female it was noted that the left internal jugular vein (IJV) had a significantly larger diameter than the right IJV. Asymmetry of these veins in regards to each other is not uncommon, however it has been reported that in the majority of these cases the right IJV has the larger diameter. The condition of asymmetry of the IJVs is found typically in conjunction with asymmetry of the dural venous sinuses. Here we discuss the observed discrepancy in IJV diameter compared to observations of the cadaver's dural venous sinuses and the incidence of IJV asymmetry in an available population of cadavers.

KIRKHOF CENTER GRR 100

**High School Dress Codes: Decorum or Compulsory Normativity?**

Participants attending 1:00 PM - 2:00 PM  
Presenter: Meghan Cytacki  
Mentor: Kathleen Underwood



Dress codes are sets of rules that govern what is acceptable for students to wear in school. Gender, sexuality, individual expression, and cultural traditions can be left out in students' handbooks on dress codes. In other cases, dress codes can target as inappropriate specific articles of clothing that students of a particular gender, sexuality, or culture might wear. This study compares ten student handbooks and/or dress code policies in Michigan public schools to understand if and how gender-specific articles of clothing are targeted and to what extent those guidelines are enforced. The results of this study will contribute to an understanding the extent to which school dress code policies uphold social decorum or reinforce normativity.

KIRKHOF CENTER GRR 101

**Deferred Decision Making and the Stopping Rule Selection (SRS) Theory**

Participants attending 9:00 AM - 10:00 AM

Presenters: Kelly Dillon, Tessa Johnson, Kylie Loudenslager, Krysta Rydecki, Jeremy Winget, Angele Yazbec

Mentor: Mario Fific

The critical step facing every decision maker is when to stop collecting evidence and make a decision. This is known as the stopping rule. Over the years several unconnected explanations have been proposed that suggest nonoptimal approaches can account for some of the observable violations of the optimal stopping rule. The current research proposes a unifying explanation for these violations based on a new stopping rule selection (SRS) theory. The main innovation here is the assumption that a decision maker draws from a large set of different kinds of stopping rules and is not limited to the use of a single one. The SRS theory hypothesizes that there is a storage area for stopping rules called the decisions operative space (DOS)-and a retrieval mechanism that is used to select stopping rules from the DOS. The SRS theory has proven itself to be a good fit to challenging data published in the relevant literature.

KIRKHOF CENTER GRR 102

**Injury Prevention In Water Polo Athletes Through Periodization**

Participants attending 9:00 AM - 10:00 AM

Presenters: Chad Hughes, Joshua Johnston

Mentor: Amy Crawley

Water polo takes a great amount of strength, endurance, and physicality, which places it in a more relevant category for sport related injury. How can a water polo athlete recover quickly from such injuries and can these injuries be prevented from occurring again? The purpose of this study was to prescribe a training regimen focused on rehab and injury prevention using cross training techniques such as Therabands, cable/free weight exercises, and stretching. The regimen was designed to strengthen muscles and joints that are at high risk of injuries and overused during water polo. Limitations of this study would include it being based solely on previous research and what implications this data might hold when applied to men's water polo. Benefits of this research are applicable not only for water polo athletes, but other sports that deal with strength, endurance, and physicality in such a challenging environment as water.

KIRKHOF CENTER GRR 103

**Monitoring the Effects of Docosahexaenoic Acid on Neurogenesis**

Participants attending 9:00 AM - 10:00 AM

Presenter: Kasey Mckay

Mentor: Merritt Taylor

The driving factor behind Neural Stem Cell (NSC) differentiation and self-renewal is a major question in neurodevelopmental biology. Docosahexaenoic Acid (DHA) is a primary fatty acid present in the brain that plays a crucial role in brain function and development. NSC are located near the central canal, where DHA



is present in high concentrations. The effect of DHA on NSC differentiation or proliferation is unclear. We examined the effects of DHA via *in vivo* injection of DHA into embryonic chick neural tubes. Counts of sectioned spinal cords indicate DHA injection showed increase in the number of neurons significant to developmental stage. This increase indicates that DHA plays a role in directing the NSC differentiation. Further testing is required to verify results, as well as to identify the exact DHA molecular role. The effect of DHA has implications in furthering understanding of the NSC differentiation mechanism, as well as offering new routes for CNS therapeutic intervention.

KIRKHOF CENTER GRR 104

**Eating Organic: Organic Matter Budgets in Creeks with Fringing Wetlands**

Participants attending 9:00 AM - 10:00 AM

Presenter: Melissa Overweg

Mentor: Eric Snyder

In river ecosystems, floodplain connectivity helps to maintain natural river structure and function and strongly contributes to high bio-productivity and biodiversity. Fringing wetlands—one landscape feature of these river floodplain corridors—are particularly common in the river systems of south central Michigan due to glaciation. Our project focused on organic matter processes in three fringing wetlands located on three river systems, Cedar, Augusta, and Glass Creeks. Five out of the six Organic Matter samplings recorded found wetlands systems exporting organic matter. Glass Creek averaged an export of 1.65 g/m<sup>3</sup>. Augusta Creek averaged an export of 4.02 g/m<sup>3</sup>. Cedar Creek showed signs of storage in one sample, while export in another, when averaged it resulted in an average of 1.54 g/m<sup>3</sup> being exported. These results in part contradict the usual assumed role of wetlands. This functional role reversal is not surprising given their natural flow regime and flood pulse cycles.

KIRKHOF CENTER GRR 105

**Modeling Strain Mutation and Competition of Within-Host HIV**

Participants attending 9:00 AM - 10:00 AM

Presenter: Shawn Avery

Mentor: Benjamin Holder

Mathematical models of human immunodeficiency virus-type 1 (HIV) have improved our understanding of the disease and guided treatment, leading to a significant reduction in HIV mortality and morbidity. However, the complete elimination of an HIV infection has not been achieved. While simple viral-kinetic models representing the interaction between the HIV virus and host cell populations have successfully guided the development of more effective treatment, many aspects of the virus-host dynamic require further investigation. Building on prior models, we explore the influence of HIV strain mutation and selection on virus replication from the time of initial infection of a host to the onset of the infected steady state. While data on strain mutation and dominance during this period is in short supply, we will evaluate any relevant data with our chosen model.

KIRKHOF CENTER GRR 106

**Detection of Histidine Decarboxylase in *Drosophila* using Epitope Tagging**

Participants attending 9:00 AM - 10:00 AM

Presenters: Anthony Hage, Maxwell Mianeki

Mentors: Debra Burg, Martin Burg

Histamine is a critical neurotransmitter for sight and mechanosensation in *Drosophila*, synthesized by the enzyme histidine decarboxylase (HDC.) Detection of HDC is critical for understanding the location of the protein in the cell and also to determine the size of the protein, which could lead to further studies of HDC

regulation. Previous attempts to produce an antibody against HDC were unsuccessful, so an epitope tagging approach using the FLAG epitope was taken. An internal insertion of the FLAG epitope in the Hdc gene structure does not disrupt the protein's function. The FLAG-HDC construct allows direct detection of the HDC protein *in vivo* and enables western blot analysis. Using a FLAG antibody, immunofluorescent detection of the FLAG-HDC protein has allowed co-localization with histamine in a variety of tissues examined. Additional work examining the size of the protein, using immunoprecipitation techniques, will also be presented.

## ORAL PRESENTATIONS, ABSTRACTS & SCHEDULE

BEGINNING AT 9:00 AM

KIRKHOF CENTER 1104

### **Music as a Therapeutic Intervention for Children with Autism Spectrum Disorder**

Presenters: Kristyn Meines, Bethany Stacey, Katelyn Winslow

Mentor: Teresa Beck

Since ancient time, music has been used for its therapeutic value. Outcomes of music as a therapeutic intervention include, but are not limited to, reducing anxiety, increasing healing rates from surgery, decreasing stress, enhancing mood, decreasing pain, lowering blood pressure, decreasing agitation, increasing communication skills and building relationships. Autism Spectrum Disorder is characterized, in varying degrees, by difficulties in social interaction, verbal and nonverbal communication and repetitive behaviors. Many of those on the autism spectrum have exceptional abilities in visual, music and academic skills. This study will examine existing research for the therapeutic outcomes of using music as an intervention for children with autism spectrum disorder.

KIRKHOF CENTER 1142

### **Potential Effects of Climate Change on Bumble Bee Distributions in the Eastern United States**

Presenter: Trisha Witte

Mentor: Carol Griffin

Species distributions fluctuate over time, as accelerated climate change disrupts the natural environment causing rapid variations. This leaves little time for bumble bee populations to adapt to the hastened changes in the biotic community due to abiotic fluctuations. With the aid of geographic information systems (GIS), I used georeferenced occurrence records and 19 bioclimatic variables to forecast dynamics in bumble bee distributions. To predict the potential impacts, I compared current bioclimatic datasets with projected datasets for 2050. I identified the most significant environmental layers with the aid of MaxEnt and correlation statistics. I expect that my results will indicate bumble bee distributions will be affected by projected climate variables. The results of my research can aid managers in creating adaptive management strategies to ensure bumble bees continue to provide services to the biotic community.

KIRKHOF CENTER 2201

### **Assessing the Character of a Community: A Group Study of Fair Housing in Grand Rapids, Michigan**

Presenters: Christopher Davenport, Landon Hughes, Sian Mehl, Casey Overway, Carolyn Sandvig

Mentor: Rachel Campbell

Students discuss benefits and challenges of qualitative community-based research in a team setting. In conjunction with the West Michigan Fair Housing Center and Grand Valley's Office for Community

Engagement, researchers used an asset mapping approach to determine the functional, non-problematic aspects of a southeast Grand Rapids neighborhood that has experienced housing discrimination. Data was obtained through several interviews with community leaders and organization members. Researchers utilized a combination of inductive and deductive approaches to data analysis in order to expand on already conducted research and contribute new knowledge. Students will present on their experiences with team research more broadly; topics include division of labor, flexibility, accountability, and conflict resolution. Students will also discuss challenges facing community-based research with an outside organization and ways to address issues that arise.

#### KIRKHOF CENTER 2215

##### **Managing the Prevalence and Distribution of *Baylisascaris procyonis* in Raccoon Populations at Pierce Cedar Creek Institute in Barry County, MI and Off Site Locations**

Presenter: Michelle DeMuro

Mentor: Erik Nordman

*Baylisascaris procyonis* is a species of ascarid worm that lives within the intestinal tract of the common raccoon (*Procyon lotor*). Eggs are expelled through defecation, and millions can accumulate at latrine sites habitually used by raccoons. Many animals, including humans, serve as intermediate hosts to the indirect development of the nematode. If ingestion of eggs occurs they can develop into ocular, visceral and neural migrans which leads to severe brain damage and if untreated, mortality. Systematic searches for roundworm were conducted on Pierce Cedar Creek's property May-August 2012. Raccoon latrine sites were located and fecal samples were collected and examined for presence of *B. procyonis* eggs. If PCCI or other sites have raccoon roundworm, medicinal baiting may be put in place to reduce infection rates of the raccoons which would reduce the infection rates of the intermediate hosts (Snyder and Fitzgerald 1985) and increase overall ecological health.

#### KIRKHOF CENTER 2216

##### **Habitat Suitability for White-Tailed Deer in Norton Shores, MI**

Presenter: Jesse Grysen

Mentor: Erik Nordman

The purpose of this project is to gather baseline data on the current fall and winter food habitat suitability index for whitetail deer. The property is located at 9160 Martin Rd., Norton Shores, MI. The fall and winter food suitability index is calculated by the index of mast and browse quality. Three sample plots of information were gathered to determine site index, age distribution and stocking density. Those three variables were used to develop a forest management plan to increase and maintain a browse and mast habitat suitability index score of 0.8 or higher.

#### KIRKHOF CENTER 2259

##### **Trunk Position as a Function of Anatomical Scaling in Epiphytic Ferns**

Presenter: Jared Toogood, S3 Scholar

Mentors: Gary Greer, Jennifer Winther

This study investigated the relationship between anatomical traits governing water supply to water demand and the vertical distribution of epiphytic pteridophytes. Communities occurring on eighty-eight trees along the basal three meters were surveyed. At mid-elevation, this trunk area represents a gradient of decreasing humidity from the base of the tree upwards. Each plant within this zone was identified to species and two sample plants were collected, a voucher specimen and the other for anatomical analyses. A variety of techniques were used (e.g. microscope slide making and image analyses) to measure external and internal anatomical traits that reveal capacities for rapid growth versus drought tolerance, as well as capacity to migrate to more favorable microhabitats. Our analyses produced rankings of the anatomical traits from least to most influential to the frequency and abundance of a species along the vertical axis of a tree as well as among neighboring trees and

tree clusters.

KIRKHOF CENTER 2263

**Claiming Turf: The Nature of Graffiti/Street Art in Southeast Grand Rapids, MI**

Presenter: Alyson Mabie

Mentor: Kin Ma

This paper examines the cultural and geospatial nature of gang-related graffiti and non gang-related graffiti/street art in Grand Rapids, MI. The point locations of various types of graffiti were obtained by means of ground GPS data collection and months of observation. These points were applied to a Grand Rapids street map. The spatial differences in gang- and non gang-related graffiti are striking. Researching the comment sections of graffiti related articles in online forums specific to West Michigan and conducting informal interviews determined the public perception of graffiti. These outlets suggest that graffiti is associated with gang activity or "bad neighborhoods." A lack of public knowledge about graffiti generates unnecessary leeriness and can have a negative effect on the perception of a neighborhood's health to the detriment of commerce and community. The ideas of creating a working definition of graffiti and tangible discrimination of symbology are discussed.

KIRKHOF CENTER 2266

**STA 319 Consulting Experience: Investigating Student Usage of the Math and Statistics Center**

Presenters: Ali Powell, Lily Wyble

Mentors: Marcia Frobish, John Gabrosek

The math and statistics tutoring centers are coordinated by Marcia Frobish. Both centers require the students to sign in and provide information pertaining to their visit. The data collected included sign-ins from Fall 2012, Winter 2013, and Fall 2013. Our job as consultants was to determine the proper number of tutors to staff the centers at a given time of the day/week/month/semester. Along with this, we looked at the number of sign-ins for each class to see which classes had the highest frequencies. We discuss some results and what we learned about statistical consulting.

KIRKHOF CENTER 2270

**Examining The Raptidian and its Capacity to Improve Civic Engagement in Grand Rapids**

Presenter: Marie Orttenburger

Mentor: Karen Zivi

While voluntarism and other forms of civic engagement are prevalent in Grand Rapids, the problem of political apathy on both a local and federal level persists. Local voter turnouts are low, either because voters don't feel they have the information they need to make a qualified decision or because they feel they can't change a government run by lobbyists and corporations. Scholars of civic engagement believe that encouraging the youth to volunteer is no longer enough to make them invested in the success of their communities. While some individuals gain fulfillment from these activities, they have not proven to result in an important political investment in their community, as scholars such as Alexis de Tocqueville may have previously implied. As such, there is a call for a form of civic engagement that enables the public to deliberate on the problems facing their communities in a way that enables them to see change through. My research project seeks to determine the ways in which the Grand Rapids citizen-powered news outlet, *The Raptidian*, answers this call.

BEGINNING AT 9:30 AM

KIRKHOF CENTER 1104

**Evidence Based Practice of Wilderness Therapy**

Presenters: Angelica Furman, Devyn Kruisenga, Elle Morton, Victoria Schreur  
Mentor: Teresa Beck

Wilderness therapy is an emerging intervention and treatment to assist adolescents in overcoming emotional, adjustment, addiction, and psychological problems. The wilderness therapy process involves immersion in an unfamiliar environment, group living with peers, individual and group therapy sessions, and educational curricula, including a mastery of primitive skills such as fire-making and backcountry travel, all designed to address problem behaviors and foster personal and social responsibility and emotional growth of clients. This study will examine the evidence that supports wilderness therapy as having therapeutic outcomes.

KIRKHOF CENTER 1142

**Eurasian Milfoil Control Practices in Michigan**

Presenter: Benjamin Halbersma

Mentor: Carol Griffin

Eurasian Milfoil in Michigan lakes have been an issue since their introduction in the 1940s. This invasive plant can take over and choke out native aquatic plants. Over the years, there have been many methods used to control this problem plant. I am including a study of what treatment methods are the most efficient for controlling Eurasian milfoil year to year in my study area. I have been collecting data over the past three years while working for Progressive AE in their water resources department. Other reports have shown a positive efficiency in controlling Eurasian Milfoil using chemicals such as Sonar, Aquathol, and Reward.

KIRKHOF CENTER 2201

**A Study of Oboe Reeds**

Presenter: Julia Gjebic, S3 Scholar

Mentors: Karen Gipson, Marlen Vavrikova

Professional oboists spend more time making reeds than they do playing the oboe. Therefore, a high value is placed on reed-making in the oboe community. In this study, a controlled batch of reed cane (internodes of the grass *Arundo donax*) was selected based on microscopic inspection of cellular composition as well as macroscopic physical characteristics. For most of the participants, the cane was then processed identically to the stage known as a blank, after which the participants finished their reeds according to their usual methods. The sound spectra of recordings of each participant playing on his/her respective reeds were analyzed, as was a spectrum of the crow (sound without the oboe attached) of each reed in an anechoic chamber. These spectra were compared to one another in an attempt to discern trends.

KIRKHOF CENTER 2215

**Integrated Nutrient and Hydrologic Assessment of the Deer Creek Watershed, Muskegon and Ottawa Counties, Michigan.**

Presenter: Brian Scull

Mentor: Erik Nordman

Deer Creek is a tributary to the Lower Grand River basin, and drains a 34 square mile watershed located in southeastern Muskegon and northeastern Ottawa Counties in western Michigan. Agricultural land use comprises 85% of the landscape. Water temperatures are stable enough to support a cool water fishery. However, Deer Creek faces environmental challenges such as the loss of riparian vegetation, an unstable hydrology, and increased nutrient, bacterial, and sediment loadings, which degrade water quality, and macro-invertebrate and fish habitats. The purpose of this project was to collect hydrologic and water quality data in an effort to develop an overall watershed management plan that limits runoff, reduces nutrient loads, and stabilizes hydrology. The collection of data is an important step in determining the best management practices (BMPs) needed to restore

the water quality in Deer Creek to levels which will support a cool water fishery.

KIRKHOF CENTER 2216

**Stream Management Proposal**

Presenter: Casey Davenport

Mentor: Erik Nordman

A stream segment flows westward through forest, swamp, gardens and orchard groves, into Mona Lake from a small property in Norton Shores, MI. Non-permeable surfaces, such as the airport and parking lot located north of the property, increase runoff, causing pollution deposition and accelerated erosion. Development has caused adverse effects on the stream ecosystem; therefore, a management plan that promotes aquatic ecosystem functionality is essential. Sampling of the macroinvertebrate community is a good indication of stream health. A water sample will be taken for analysis of pollutant concentrations. Velocities and discharge will be calculated twice to gather bankflow and baseflow data. To reveal the extent to which local land uses impact the stream these procedures must be performed upstream of the property, at a yet to be determined location, for comparison. With a better understanding of the impairments, management techniques can be prescribed to promote a healthy ecosystem.

KIRKHOF CENTER 2259

**"Variations Under Domestication": Female Identity and Agency Within the BBC America Series *Orphan Black***

Presenter: Julia Raap

Mentor: Kathleen Underwood

Drawing upon third wave feminist media critiques, quality television theories, and feminist analysis of science fiction, this paper examines the first season of the BBC America series *Orphan Black*. Representations of the female identity on television are often restricted to tropes with characters lacking in complexity and agency. I argue that clones of *Orphan Black*, all played by Tatiana Maslany, offer a remedy to such one-dimensional characters by providing a diverse representation of female identities on television that both reflects and challenges aspects of traditional femininity. The clones battle for agency and control, a struggle that makes them stronger characters by forcing them to take active roles. Through an in-depth analysis of the agency and identities of several of the clones, this paper demonstrates that these characters collectively represent some of the most positive female portrayals on contemporary television.

KIRKHOF CENTER 2263

**La Ciudad, la Naturaleza y los Seres Humanos.**

Presenter: Kayla Pedrolini

Mentor: Zulema Moret

La relación entre las ciudades, la naturaleza y el ser humano es complicada y compleja. Este ensayo investiga la relación entre la ciudad, la naturaleza y los seres humanos, a partir del análisis de la película *Medianeras* (2012), a la luz de la teoría de Néstor García Canclini, sobre ciudades postmodernas; para ello analizaré un conjunto de textos culturales enfatizando en la relación entre los seres humanos y las ciudades postmodernas.

KIRKHOF CENTER 2266

**An Adaptive Management Plan for Restoring the Ecological Integrity of Bass River Recreational Area**

Presenter: Gloria Anderson

Mentor: Erik Nordman

Bass River is a multipurpose recreational area that is approximately 1,600 acres of forested land located in Ottawa County, MI. Due to the lack of information on this property, the forest's current health status is unknown.



Therefore, I sampled three random thirty-seven and a half feet in diameter circular plots in which I collected the following measurements: tree species, DBH, tree height, canopy cover, number of down woody debris, number of snags, and basal area. All of the data I collected was compared to vegetation one should expect to find based on three abiotic components: climate, physiography, and soil factors. Based on my results, I put together an adaptive management plan to help enhance the recreational opportunities at Bass River by improving the native biodiversity and restoring ecosystem integrity in the forests; starting with the removal of invasive species and selective harvesting or thinning, followed by planting new native vegetation.

KIRKHOF CENTER 2270

**Airborne LiDAR and Ancient Landscapes: An Archaeological Application in Ottawa County, Michigan**

Presenter: Kelsey Hanson

Mentor: Kin Ma

Since its introduction in the 1960s, LiDAR has proven to be a uniquely suitable tool for archaeological research, particularly in the identification of previously unrecorded sites. By removing vegetation that often obscures aerial imagery, LiDAR offers a model of the bare earth beneath. The present research project represents an application of this technique in selected areas in Ottawa County, Michigan using 2004 LiDAR data that compares unusual surface phenomena with previously recorded archaeological sites. The area in question includes Connor Bayou, a recently discovered multi-component prehistoric site, and an area of similar temporal and cultural affiliation discovered during excavation of US-231 located nearby. Both areas are located along the Grand River and feature unique surface phenomena. This preliminary application of LiDAR data in these two areas has yielded interesting results that further inform our current understanding of the archaeology in this region.

BEGINNING AT 10:00 AM

KIRKHOF CENTER 1104

**Therapeutic Outcomes of Camping Programs for Youth with Disabilities**

Presenters: Jessica Ferrigan, Parker Fitzsimons, Stephanie Hamacher

Mentor: Teresa Beck

In the context of everyday life, youth with disabilities don't always have the same opportunities to access recreation and leisure and to test their skills in that environment. However, a camping program designed for youth with disabilities provides that environment with the adaptation, modifications and support necessary to participate in camping activities. The American Camping Association (ACA) studies report that people who participate in camping and recreation experiences are healthier and have fewer problems as a result of their experiences. This study will examine the outcomes received by youth with disabilities who participate in a camping program.

KIRKHOF CENTER 1142

**The Impact of Recreational Activity on the Pitchers Thistle in the Nordhouse Dunes Wilderness Area**

Presenter: Aaron Torres

Mentor: Carol Griffin

The Pitchers Thistle is one of two threatened species within the Nordhouse Dunes Wilderness in the northern Lower Peninsula of Michigan. Human recreational and developmental activities have a potential impact on the critical habitat of this plant. GIS and GPS could be used to create a map showing the scope of this impact. GPS points of user created campsites as well as hiking trails will be overlaid on a map of the pitchers thistle habitat. A buffer zone between these factors will display a direct impact zone in the dunes, and could be used to propose

new campsite restriction zones or to divert hiking trails to avoid encroachment in the pitchers thistle habitat.

#### KIRKHOF CENTER 2201

##### **Immunodetection of GAP-43 Isoforms**

Presenter: Dana Collins

Mentor: John Capodilupo

The continued investigation of GAP-43 (growth associated protein) seeks to isolate and image phosphorylated isoforms extracted from baboon brain tissue using 2D gel electrophoresis. Western blot analysis was used to specifically detect both the phosphorylated isoform and the protein itself by using antibodies sensitive for either version of GAP-43. The goal of the study was to improve resolution of previous GAP-43 detections (Capodilupo, 2012) and qualitatively detect the phosphorylated forms of the protein. GAP-43 has been reported to contain one (and possibly more) phosphorylation sites causing it to create two or more spots upon immunodetection. The various spots were previously understood to coincide with the phosphorylated isoforms of GAP-43. Since phosphorylation of GAP-43 has been shown to increase paradigms of learning and memory, we hope to eventually quantify the levels of phosphorylated GAP-43 in baboon brain tissue prior to applying the technique to human Alzheimer brain tissue. If a quantifiable change is detected, this protein can serve as a potential biomarker of cognition which would prove useful for examining effectiveness of new drugs engineered to treat the profound memory impairment associated with Alzheimer's disease. Further studies will utilize the aforementioned techniques upon Alzheimer's brain tissue.

#### KIRKHOF CENTER 2215

##### **Adaptive Management Plan for Emerald Ash Borer on a Golf Course in Corunna, Michigan**

Presenter: Danner Molnar

Mentor: Erik Nordman

Emerald ash borer has infected the ash trees at Corunna Hills Golf Course in Corunna, Michigan. This adaptive restoration plan will be used to examine the issue and hopefully restore the aesthetic value of the course that is being taken away by the ash borer. The plan will include investigating whether or not the ash trees can be saved through pesticide application/treatment or by other means. In addition, this plan will outline any ash trees that are not deemed salvageable or are already dead and will arrange how these trees can be properly removed and replaced with healthy tree species that are not susceptible to pests or disease.

#### KIRKHOF CENTER 2216

##### **Blandford Nature Center Ecosystem Recovery**

Presenter: Eric Lipski

Mentor: Erik Nordman

Blandford Nature Center is an organization that helps educate people in the area of environmental understanding, engages people so that they can help the natural world, and empowers people to embrace nature. Maintaining the environmental integrity of BNC and their land is very important, so they can continue their mission. At BNC they recently had an outbreak of an invasive species known as Buckthorn which has destroyed a lot of the ecosystem that they try to protect and maintain. The hope of this project is to restore the land which has been degraded so that it can continue to function to its potential. We hope to get on pace so that at least 90% of the area affected is restored by 2016. If this is completed it will allow the ecosystem to be healthy and make the area more user friendly for those wishing to learn and experience nature.

#### KIRKHOF CENTER 2259

##### **"The Path to Knowledge": The Revival of Intellectual Culture under Charlemagne and its Larger Place in Pre-Modern Scholarly Traditions**

Presenter: Katrina Maynes  
Mentor: Alice Chapman

Although scholars have debated the foundations, motives, and long-term impact of the revival of learning under Charlemagne (r. 768 – 814), this paper argues that his reign facilitated a rebirth in the importance of education as a means to moralize society and reinforce Christian values. Through the championing of intellectual affairs and the widespread establishment of learning institutions, Charlemagne's efforts led to a relatively standardized curriculum centered on the liberal arts. In turn, a rich scholastic culture spread throughout the Continent, ultimately forming the basis for the founding of universities in the twelfth century. This paper offers further insight into the historical roots of educational pedagogy in the Middle Ages, and explores the medieval foundation of the university system based on the seven liberal arts.

KIRKHOF CENTER 2263

### **Stem Cells and Paradigms**

Presenter: Joseph Bielecki  
Mentor: Merritt Taylor

Stem cell research is a relatively new field of science and is ripe for an analysis of its proceedings. My presentation will focus on analysing it from a perspective of science as put forth by Thomas Kuhn in his book *The Structure of Scientific Revolutions*. I intend to put forth evidence for Kuhn's model by analysing the gross history of stem cell research and continue that analysis into an ongoing project in the field today. To do this I will extensively highlight Kuhn's model in addition to giving a short synopsis of the history of stem cells before giving a literary analysis of the field. I will then present examples of paradigm shifts and the characteristics present in order to show evidence of Kuhn's model.

KIRKHOF CENTER 2266

### **Can the Lack of Histamine Suppress the 'Bang-Sensitive' Phenotype in *Drosophila*?**

Presenter: Maria Edelhauser  
Mentor: Martin Burg

A number of mutations in *Drosophila melanogaster* have been identified that induce a seizure when stimulated with mechanical vibrations and can serve as a model to study the basic mechanisms of how seizures arise. These 'bang-sensitive' mutations, which cause a fly to develop a seizure when stimulated with a mechanical vibration, are caused by mutations in genes that have also been implicated in human seizure disorders. As mechanoreceptor cells in flies contain the neurotransmitter histamine, we are interested to determine whether fly mutants that lack histamine (*Hdc*<sup>JK910</sup> mutants) interfere with the vibration-induced seizure of the bang-sensitive mutants. Double mutant combinations between *Bss*, *eas*, or *sda* and the *Hdc*<sup>JK910</sup> mutants were constructed to enable behavioral testing, which should reveal whether histamine is needed for the seizure disorder to be generated in bang-sensitive mutants.

KIRKHOF CENTER 2270

### **The Impact of WRT098 on Student Success**

Presenters: Caitlin Siluk, Curtis Wind  
Mentors: John Gabrosek, Keith Rhodes

The Writing Department at Grand Valley State University is interested in the impact of the course WRT098. They want to know who is self-placing into the course, and if it is benefiting them. Likewise, they want to know who isn't placing themselves into it when maybe they should be. Our client Dr. Keith Rhodes would like to use the results of our analysis for future incoming Grand Valley students to have a more structured system to advise incoming students about which WRT course to begin with. We discuss some results of the data analysis and our

experiences as statistical consultants.

BEGINNING AT 10:30 AM

KIRKHOF CENTER 1104

**The Effect of Biofeedback on the Management of Pain in Children**

Presenters: Angela Grit, Ashton Veihl

Mentor: Teresa Beck

Over the past 40 years, the use of biofeedback to help control pain in children has increased. While pain may not be able to be eliminated, it can often be reduced to tolerable levels that allow a child to carry on with his/her daily life activities. Biofeedback involves training a person to control physiological processes such as muscle tension, blood pressure, and heart rate. Biofeedback is a popular choice over drugs as it does not have any significant risks or cause undesirable side effects. This study will examine the evidence that supports biofeedback as an intervention for pain and its outcomes.

KIRKHOF CENTER 1142

**Management Plan for the Little Mac Stream on Grand Valley State University's Campus**

Presenter: Christina Hamilton

Mentor: Carol Griffin

Urban development has led to the degradation of many streams. In Michigan, less than 6% of the stream miles are designated as natural streams. Natural streams are designated for their values: aesthetics, free-flowing condition, and fisheries and wildlife habitat. The number of buildings and parking lots at Grand Valley State University led to increased stormwater runoff into the Little Mac ravine. This unnatural flow of water in the Little Mac stream caused erosion and the stream banks to become very steep and unsuitable for vegetation. The lack of vegetation made the banks more susceptible to further erosion. This research examines what can be done to improve the Little Mac stream. Data have been collected to determine the degree of degradation of the water quality, and research will help provide potential solutions to the problem.

KIRKHOF CENTER 2201

**Religious Influence on the Spartan Military**

Presenter: Melissa Houghton

Mentor: William Morison

Religious law was a formidable force in ancient Sparta that was seen as a pillar of Spartan strength. Their famous lawgiver, Lycurgus, had established a series of religious *rhetras* or ordinances that permeated all aspects of Spartan society, even extending to warfare. However, Sparta's extreme devotion to the gods could also be seen as a detriment to her military in times of war. Indeed, religious restrictions could sometimes prove so potentially damaging in wartime that a Spartan army once failed to show up in time, and another force was too small and was wiped out as a result. Furthermore, a Delphic oracle's prophecy profoundly affected Spartan military decisions so much that a king and 300 elite warriors went willingly to their deaths. The prediction stated that either Sparta would fall or she would suffer the death of a king, meaning that the famous last stand at Thermopylae was a suicide mission from the start; a sacrifice of 300 because of their unfailing piety.

KIRKHOF CENTER 2215

**Habitat Improvement for Spawning Salmon in the Betsie River**

Presenter: Zachary Traylor

Mentor: Erik Nordman

What will be accomplished in this project is that I am going to reverse the effect of sedimentation of gravel beds in the Betsie River. Right now the loss of gravel beds to sedimentation is occurring at a rapid rate and the problem has to be addressed before some of the best salmon spawning areas in the state are lost. I will be redesigning trails for smarter fisherman access and blocking off some existing ones. I will also be doing some instream work around the gravel beds. I am going to implement natural debris to redirect sediment in the areas where it is occurring rapidly. In areas of slow moving water where fish spawn I am going to put protective rocks in front. Many little efforts such as these will compose the project and I expect to see major change within the next five years within the study area.

KIRKHOF CENTER 2216

**Conserving the Grand Valley Ravine System to Protect Against Further Erosion**

Presenter: Chelsea Bartman

Mentor: Erik Nordman

Grand Valley State University is located next to a ravine system. Consequently the the ravine system has been eroding significantly since the campus was established. With focus on the ravine behind Padnos Hall of Science, an adaptive management plan will be conducted. Limiting excess storm water from flowing down the ravine slopes is the final goal of the adaptive management plan. Decreasing impermeable surfaces, along with constructing rain gardens and green rooftops will reduce excess runoff, protecting the ravine slopes from erosion. After implementation the pre-project data will be compared to post-protect data to assess the success of the plan.

KIRKHOF CENTER 2259

**An Adaptive Management Plan for Muskegon County Wastewater Management System's Filtration Marsh**

Presenter: Cory Bodziak

Mentor: Erik Nordman

Storm flood events and agriculture related pollution have increased significantly in areas surrounding and adjacent to Muskegon County Wastewater Management System. In order to reduce the impact of these problems, the Wastewater System has created a flow-through filtration marsh, to retain flood water, and filter pollutants. The main goal of this project is to develop a comprehensive testing regime, to analyze the success and evaluate efficiency of the marsh. The testing regime will include sampling points at multiple locations within the marsh and at various inflows and outflows. The testing regime will also need to include multiple parameters at each testing location. The plan will span ten years and will need approval for funding from the DEQ.

KIRKHOF CENTER 2263

**Checking an Industrial Process**

Presenter: Ashton Baker

Mentor: Edward Aboufadel

In this talk, we will describe our entry to this year's contest from the French Federation of Mathematical Games. The problem involves an imaginary company which produces metal disks composed of the elements nickel and chromium. The manufacture of these disks is subject to strict regulation, which imposes harsh penalties if the composition of a disk falls outside certain allowable percentages of nickel and chromium. Our solution uses statistical tools to examine the expected fines paid by the company. This research was conducted as part of an independent study in mathematics, under the mentorship of Prof. Ed Aboufadel.

KIRKHOF CENTER 2266

**A bioassessment of the butterflies and leafhoppers of the Maxton Plains Alvars**

Presenter: Max Spencer

Mentor: James Dunn

The alvar is an extremely rare ecosystem with remnants occurring only in the Great Lakes region of North America and Northern Europe. These northern grassland communities are found on bare limestone pavements (exposed bedrock) with little mineral soil remaining from glaciation. These sites are critically imperiled worldwide and alvars found on Drummond Island, Michigan are the largest remaining high quality sites in North America. This preserve contains an unusual mix of rare prairie and arctic species of which several species are considered threatened with extinction. Our objective was to perform an inventory of key bioindicators, the Lepidoptera (butterflies) and Homoptera (leafhoppers) which form close associations with host plants and their assessed richness of species reflect the overall ecological integrity ("health") of these sites. Preliminary results indicate the occurrence of rare butterflies and prairie endemic leafhoppers.

KIRKHOF CENTER 2270

**Dosage Effects of Histidine Decarboxylase in *Drosophila*: How Much is Too Much?**

Presenter: Seth Rice

Mentor: Martin Burg

Previous work has suggested that the Histidine decarboxylase (*Hdc*) gene in *Drosophila melanogaster* may be subject to a unique mode of gene regulation. When a fusion gene was made between the promoter for *Hdc* and the eGFP protein, 4 copies of the resulting pHdc-eGFP transgene caused both it and the endogenous *Hdc*<sup>+</sup> gene activity to become suppressed. Efforts to understand what could cause this suppression led us to develop duplications of the normal *Hdc*<sup>+</sup> gene, such that the entire gene can be increased in number. Flies containing 2, 4, and 6 copies of the normal *Hdc*<sup>+</sup> gene are currently being constructed and will be examined for levels of histamine, which is the product of the HDC protein activity. If suppression of HDC activity is observed when 6 copies of the *Hdc*<sup>+</sup> gene are present, this result would suggest that the promoter and associated regulatory areas of the *Hdc* gene may be responsible for the suppression observed.

BEGINNING AT 11:00 AM

KIRKHOF CENTER 1104

**The Use of Guided Imagery as an Effective Intervention for Post Traumatic Stress Disorder**

Presenters: Nicholas Chinzi, Kayla Pedrolini, Nicole Reams

Mentor: Teresa Beck

Guided imagery is a program of directed thoughts and suggestions that guide one's imagination toward a relaxed, focused state. Individuals can achieve a relaxed state when they imagine all the details of a safe, comfortable place, such as a beach or a garden. This relaxed state may aid healing, learning, creativity, and performance. It can also help individuals feel more in control of their emotions and thought processes, which may improve their attitude, health, and sense of well-being. This session will examine the evidence in the literature that supports guided imagery as an effective intervention to use with persons diagnosed with Post Traumatic Stress Disorder (PTSD).

KIRKHOF CENTER 1142

**Use of Constructed Wetlands in Noordeloos Creek to Remove Pollutants, Nutrients, and Sediment from Runoff**

Presenter: Bradley Bordewyk

Mentor: Carol Griffin

In urban areas, impervious surfaces can increase amounts of runoff going into streams. Constructed wetlands can be incorporated into stream systems as storage sites for excess runoff, and can reduce pollutants, nutrients,



and sediment going into streams. The study area will be a constructed wetland of Noordeloos Creek at the Zeeland High School in Zeeland, MI. The main focus is to determine if the wetland is functioning to reduce the negative impacts of runoff. The determination of the stream water quality will be based on macroinvertebrate assemblages that are captured using D-nets. The macroinvertebrates will be identified and classified as pollution tolerant or pollution intolerant. A final water quality score will be calculated for each site based on the macroinvertebrates that are captured. The water quality score for the stream portion after the wetland is expected to be higher than that of the stream portion before the wetland.

#### KIRKHOF CENTER 2201

##### **An Analysis of Extra-pair Paternity in Tree Swallows**

Presenter: Jessica Pontow, S3 Scholar

Mentors: Michael Lombardo, Patrick Thorpe

Tree Swallows (*Tachycineta bicolor*) are socially monogamous passerines that participate in extra-pair copulations. While the benefits that males receive from extra-pair mating are well understood, the benefits that females receive are not well known. We performed a paternity analysis of 19 families to determine the proportion of extra-pair offspring in this population. Comparison of extra-pair young to within-pair young may offer insight into the benefits females receive through extra-pair mating.

#### KIRKHOF CENTER 2215

##### **Evaluating and Improving Security Cover for White-Tailed Deer in Norton Shores**

Presenter: Zachary Hartzell

Mentor: Erik Nordman

The purpose of this study is to improve the security cover for white-tailed deer in Norton Shores, MI. Current security cover will be assessed and measured on randomly selected plots throughout the forest. Security cover attributes to be measured are woody stem densities associated with shrub/sapling stand, stand density (>4" DBH) based on basal area, and the total amount of security cover present. A forest management plan will be constructed to achieve a woody stem density in the shrub/sapling stand greater than or equal to 3000 per hectare, at least 625 trees (>4" DBH) per hectare, and a total amount of security area greater than or equal to 40%.

#### KIRKHOF CENTER 2216

##### **Adaptive Management of American Marten in the Manistee National Forest**

Presenter: Aubriana Spenski

Mentor: Erik Nordman

After being reintroduced into the Upper Lower Peninsula of the State of Michigan, the American marten population has not grown as expected. An adaptive management plan was developed to maximize population growth in the Manistee National Forest. With a population of approximately 200 individuals the main objective is to increase the population to 400 individuals by the year 2024. Within those 10 years several management practices will be put into place. Logging in prime marten habitat of old-growth forests with closed canopies will be decreased. This provides more continuous habitat to diminish exposure to aerial predators and facilitate better dispersal of juveniles so they can establish their own home ranges. There is also the possibility of another introduction of 50 martens from other locations, with equal gender ratios, to diversify the marten gene pool. This could lead to more successful breeding and maximize the chances of reaching the main objective of this management plan.

KIRKHOF CENTER 2263

**Grand Valley State University's Upward Bound Program: Effectiveness of Early Awareness Programs on a Localized Level**

Presenter: Isiah Dodd

Mentor: Kathleen Underwood

This year marks the 50th anniversary of President Lyndon Johnson's "War on Poverty." A key component of the War on Poverty legislation was the educational initiatives, including TRiO. In 1978, Grand Valley became an active site for TRiO programs. My study focuses on GVSU's first TRiO initiative, Upward Bound, and specifically on the alumni of that program. I will conduct oral history/focus group interviews with alumni as well as current students and staff, as a means to understand the significance of such an intervention in their undergraduate experiences and in their subsequent careers. These interviews will take place at the TRiO Student Leadership Conference. I plan to analyze the responses using a feminist perspective to understand how alumni view the importance of their experience. I also plan to work with a videographer to edit the interviews into a short film. Per university requirements, I will be obtaining releases from everyone interviewed or photographed.

KIRKHOF CENTER 2270

**The Effects of Copulation on the Microbial Assemblages in the Female Tree Swallow's Cloaca**

Presenter: Kari Thomas

Mentors: Michael Lombardo, Patrick Thorpe

The high frequency of extra-pair copulations in Tree Swallows provides an opportunity for males to directly influence a female's assemblage of cloacal microbes and thereby potentially affecting female health. I examined the bacterial assemblages within the cloacae of breeding male and female Tree swallows in 2013. I obtained cloacal microbe samples from 9 pairs before and after the mating season and used modern molecular techniques to document the transfer of sexually transmitted microbes between mates. Patterns suggest that female cloacal microbe assemblages within monogamous pairs will become more similar to those of their social mates and inversely that the cloacal microbe assemblages of polyandrous females will become more dissimilar to those of their social mates. This pattern may suggest a degree of polyandry within the current population and shed light on why females participate in extra-pair copulations despite some inherent fitness risks.

BEGINNING AT 11:30 AM

KIRKHOF CENTER 1104

**The Effect of a Sensory Stimulation Program on Recovery from a Coma Due to Traumatic Brain Injury**

Presenters: Brandon Beck, Andrea Kober, Courtney McCarary, Amanda Praet, Caitlyn Shann

Mentor: Teresa Beck

Traumatic Brain Injury (TBI) occurs when a sudden trauma causes damage to the brain. Trauma to the brain can be severe resulting in a coma or near coma state. Sensory stimulation is a term that refers to interventions designed to stimulate one or more of the senses (auditory, visual, tactile, olfactory, kinesthetic, and taste). Its purpose is to attempt to stimulate all of the senses, and vary the stimuli in nature and intensity to maximize the possibility of increasing arousal and bring the patient out of a coma state more quickly. This study will examine the evidence in the literature to determine the effectiveness of sensory stimulation as an intervention in the recovery process of persons in a coma or near coma state as a result of a TBI.

KIRKHOF CENTER 1142

**An Analysis of Habitat Suitability for Cavity-Nesting Birds in an Old-Growth Forest in Southwestern Michigan**

Presenter: Kyle Gallagher

Mentor: Carol Griffin

Approximately 95% of the primeval forests in Michigan were clearcut during the latter half of the 19<sup>th</sup> century. The few remaining old-growth forests serve as nesting habitat for resident bird species that utilize the cavities of mature trees and snags. Duncan Park is a 40 acre old-growth forest located in Grand Haven, Michigan. The purpose of this research is to provide a habitat suitability analysis for cavity-nesting bird species within Duncan Park. Data were collected using a random sampling method to determine forest composition, canopy cover, average DBH of trees and snags, density of suitable nesting trees and snags, and total area of nesting and foraging habitat. The data were interpreted using existing habitat suitability index models for common cavity-nesting bird species. It is expected that Duncan Park provides suitable nesting habitat for a variety of cavity-nesting bird species.

KIRKHOF CENTER 2215

**Regrowth of a West Michigan Forest Stand**

Presenter: Andrew Smith

Mentor: Erik Nordman

Forest health and aesthetics are important to the stakeholders of Camp Michawana, but emerald ash borer (*Agrilus planipennis*) has blemished their forests. Therefore, an adaptive management plan was undertaken in order to determine a course of action to replace their stand of dead ash (*Fraxinus spp.*). Camp Michawana is located ten miles southwest of Hastings, Michigan. A large stand of ash surrounding an amphitheater has experienced heavy tree mortality due to emerald ash borer. This study collected data on site history, soil survey information from the Natural Resource Conservation Service (NRCS), and current soil conditions including pH, texture, and percent organic matter. A mix of shade tree species were chosen based on the data collected to ensure optimum viability.

KIRKHOF CENTER 2216

**Holland State Park User Management**

Presenter: Bradley Ardelean

Mentor: Erik Nordman

After every summer season has passed State Parks enter what is called "The Off Season." I plan to create an adaptive management plan to increase the participation and recreation of people during this period. The reason for this is because state parks were created to be used for recreation and if during almost half the year very few people attend this is a problem. What I will do is determine how many people currently are there and then construct ways to help intrigue people to come.

KIRKHOF CENTER 2263

**Committed to Art Education: Non-Traditional Place, People and Pedagogy**

Presenters: Amber Anderson, Heather Harrington, Logan Richardson

Mentor: Katalin Zaszlavik

Grand Valley State University Art Education students prepared and lead two studio art workshops at a local museum. The workshops were based on the current show "Committed to Paper: Master Drawings and Prints By Sculptors." The process included a) visit to the exhibition and discussion with the museum's Director of Art Education, b) research on three concepts: preparatory, meditative, and related, c) developing project ideas using alternative drawing materials and techniques, and d) implementation of meaningful art practice in a museum setting for intergenerational visitors. Data included GVSU Art Education students' personal reflections, visual documentation and survey from the workshop participants. Conclusions advocate for reflective art teaching, service based art education for intergenerational audience at a non-traditional environment as well as the

transition of this practice to a K-12 art room.

BEGINNING AT 12:00 PM

KIRKHOF CENTER 1104

**Benefits of Animal Assisted Therapy with the Older Adult**

Presenters: Kristie Bower, Lesley Noll, Erin Ozark, Jodie Parker, Jeffrey Sant

Mentor: Teresa Beck

The use of animals to offset emotional and even physical problems and to improve quality of life can be therapeutic for older adults, who as a group often experience loneliness, depression, and loss of mobility. A growing body of research is describing the psychological and physiological benefit that animals can have on people of all ages – especially the older adult. This presentation will provide an overview of the research of animal assisted therapy and the outcomes it has for the elderly population.

KIRKHOF CENTER 1142

**Likelihood of Invasive Snakehead Fish (*Channa argus*) Establishing in the Great Lakes and Effects on Largemouth Bass (*Micropterus salmoides*)**

Presenter: Madison Ball

Mentor: Carol Griffin

Many people travel to enjoy the beauty of the Great Lakes. Consequently, many interest groups are active in maintaining the Great Lakes by protecting them from degradation. One major threat to the Great Lakes is the establishment of invasive species, which tend to out-compete native species. Invasive snakehead fish (*Channa argus*), originally from Southeast Asia, have established themselves in many areas in the United States. Because of their ability to adapt to a wide range of environments, their lack of competition and predators, and their top-down influences on food webs, they have caused damage to US freshwater ecosystems. If *C. argus* enter the Great Lakes and are able to establish themselves they could have damaging effects, especially to native fish species such as largemouth bass (*Micropterus salmoides*). This research was conducted using scientific literature involving *C. argus* and *M. salmoides*, their habitat and dietary preferences, and Great Lakes ecosystems.

KIRKHOF CENTER 2201

**Reviving German-American Musical Culture: The Works of William Henry Pommer**

Presenter: Holly Cassell, S3 Scholar

Mentor: Lisa Feurzeig

William Henry Pommer (1851-1937) was a versatile German-American composer and musician of St. Louis. He held various musical positions as an educator, director, and performer. He was also an active composer with almost 500 works to his credit, composed in a variety of styles that reflect the variety of the different positions he held. Through archival work in St. Louis and by studying and playing through Pommer's music, we have identified different styles that he composed in and have chosen music for performances to best represent his work. In addition to performances, recordings of these performances will be on display as a permanent auditory exhibit in Hermann, Missouri at the Deutschheim Historic Site, the Pommer family house. This presentation will further discuss Pommer's music and what role he played in the German-American community in Missouri.

KIRKHOF CENTER 2215

**An Adaptive Management Plan for the Reestablishment of Native Hardwoods on a Degraded 40 Acre Plot of**

## **Land in Branch Michigan**

Presenter: Alexander Lance

Mentor: Erik Nordman

In the 1970's a company planted a hybrid poplar tree plantation in Branch Michigan, intending to use these incredibly fast growing trees as cheap crate wood. Today the 40-acre private plot of land that is the restoration area harbors almost exclusively scraggly hybrid poplar trees. The primary purpose of this plan is to restore the natural hardwood vegetation to create a healthier more aesthetically pleasing ecosystem. To achieve this the hybrid poplar trees and invasive autumn olive that currently outcompete native saplings must be removed through pulling, cutting, and chemical spray. The secondary goal is to optimize the property for deer hunting; a conflict of goals arises here because autumn olive is great deer habitat. Therefore, the criteria for tree species chosen for replanting will be those that promote deer habitat. The 40 acres has two different habitats, a wetlands and a sandy meadow. This along with soil properties is taken into account when choosing the species to plant.

## **KIRKHOF CENTER 2216**

### **Groundwater Withdrawal Adaptive Management Plan**

Presenter: Kamya Woodard

Mentor: Erik Nordman

As the need for natural gas steadily increases, so does the amount of water needed to obtain that gas increase. Hydraulic fracturing is currently one of the most practiced methods to extract natural gas from Earth's deep crust. Its process uses a substantial amount of water and causes nearly the same amount of damages. The plan's overall goal is to monitor groundwater withdrawal rates and see how these rates are affected when a hydraulic fracturing well is introduced into the local ecosystem. The study area is Ottawa County, MI. The tool that will be used to monitor the amount of water being withdrawn is Michigan's Water Withdrawal Assessment Tool. The results will hopefully show that groundwater withdrawal rates increased significantly due to hydraulic fracturing. Ottawa County and other parts of Michigan are left with less water and also contaminated water. These results are only some of the reasons why an adaptive management plan for hydraulic fracturing is needed.

## **KIRKHOF CENTER 2259**

### **Statistical Consulting Experience: Investigating Gender Pronoun Usage in Stories About Transgender Homicide Victims**

Presenters: Margaret Klein, Shane Nichoson

Mentors: John Gabrosek, Laurel Westbrook

Dr. Laurel Westbrook of Grand Valley State University's Sociology Department is investigating the likelihood of newspapers using the pronoun of choice for transgender homicide victims. One of the main goals is to assess if the usage of the pronoun of choice has changed over time and also how certain factors such as region of newspaper, type of article, the victim's gender identity, etc. has affected the pronoun use. The hope is that we can provide statistical evidence that the United States has become more accepting of the victim's new identity and encourage the media to appropriately use the pronoun of choice. We will discuss some results and our experiences as statistical consultants.

## **KIRKHOF CENTER 2263**

### **Effects of Climate Change on Lake-Effect Snowfall & Implications for Surrounding Areas**

Presenter: Devan Dodge

Mentor: Elena Lioubimtseva

Lake-effect snow is a common symptom of winter for the Great Lakes region, induced by the rapid moistening and warming of Arctic air masses that travel over the warm lakes. High-resolution Weather Research and

Forecasting Model simulations can be produced to investigate the sensitivity of Great Lakes lake-effect snowfall to changes in lake ice cover and surface temperature. Three sensitivity tests were conducted that indicated that removal of ice cover and an increase in lake temperatures increase lake-effect snow amount in areas downwind and alongside the lake front. An arrow points at climate change as a trigger for severe snowfall. Using general circulation models, climate spatial transpositions, historical climate analogs and various other studies, the implications of climate change on the lake-effect snow of Great Lakes were examined concluding in, but not limited to, the loss of vegetative communities, shift in ecosystem dynamics, economic losses and public safety.

KIRKHOF CENTER 2266

**Understanding Change in Cover in Differing Tundra Vegetation Communities Across a Soil Moisture Gradient**

Presenter: Jessica Gregory

Mentor: Robert Hollister

Long term study of the North Slope of Alaska has documented change in percent cover resulting from climate warming for decades but it is uncertain which mechanism—plant growth or number of individuals (density)—is a stronger driver of this change. My objective is to determine whether measures of plant growth or density more effectively reflect recorded changes in cover within differing vegetation types. Regressions and analysis of variance were used to examine relationships between density, leaf length, inflorescence length, canopy height, and cover in dominant functional groups in two community types. In wet meadow tundra vegetation measures generally were correlated for deciduous shrubs and graminoids but not for forbs. In dry heath tundra vegetation measures were highly variable with few predominant patterns. This information is valuable for understanding specific ways in which different vegetation types respond to climate change and will strengthen predictions of future change.

KIRKHOF CENTER 2270

**Practices and Considerations for Oncology Treatment of Christian, Jewish, Islamic, and Buddhist Patients**

Presenter: Rachelle Moore

Mentor: Sheldon Kopperl

With the vast number of cancer diagnoses each year, it is crucial that comprehensive oncology care provides the best possible treatment for all patients. In addition to traditional palliative care, understanding the religious beliefs and practices of these patients is integral for providing comfort and a personalized, integrative treatment plan. Specifically, this presentation explores the various religious practices and considerations for cancer treatment of Christian, Jewish, Islamic, and Buddhist individuals, and how healthcare providers can best care for these diverse patients.

BEGINNING AT 12:30 PM

KIRKHOF CENTER 1104

**Aquatic Therapy Outcomes as an Intervention for Persons with Multiple Sclerosis**

Presenters: Melissa Beemer, Marissa Ellswood, Kathleen Phillips, Edita Totaj

Mentor: Teresa Beck

Water properties of buoyancy, viscosity, hydrostatic pressure, and ability to control water temperature allow persons with multiple sclerosis to move in ways in water that they may not be able to on land. Aquatic therapy includes balance exercises, stretching and relaxing, and strengthening exercises. This study will identify the physical, social, and affective outcomes associated with aquatic therapy including a determination whether certain aquatic activities are more effective than others.



KIRKHOF CENTER 1142

**Algorithms for the Traveling Salesman Problem**

Presenter: Ashton Baker

Mentor: David Austin

In this talk, we will discuss some algorithms designed to approach the Traveling Salesman Problem, such as the nearest-neighbor algorithm and the greedy algorithm. In particular, we will discuss the implementation of these algorithms, and some of the limitations they face. This research was conducted as part of an independent study in mathematics, under the mentorship of Professor David Austin.

KIRKHOF CENTER 2201

**Utilizing Theory: The First-Wave Feminist Movement and Classical Liberal Political Theory**

Presenter: Landon Hughes

Mentor: Rachel Campbell

This primary source analysis of the first-wave Feminist Movement considers how the theory of universal human rights, as envisioned by Thomas Paine in his book *Rights of Man*, provided a framework in which the Feminist Movement conceptualized and later actualized particular goals of the movement. This textual analysis examines works by Mary Wollstonecraft, Elizabeth Cady Stanton, and Margaret Fuller, moreover the ways in which these thinkers advocated on behalf of women using Paine's liberal conception of human rights. This paper briefly touches upon how the Feminist Movement is not unique in its use of rights. This paper briefly touches upon how the Feminist Movement is not unique in its use of this theory, as its impact has been seen in several movements around the world.

KIRKHOF CENTER 2215

**Controlling Storm Water Runoff and Erosion of Grand River Ravines Behind Lake Ontario Hall on Grand Valley State's Allendale Campus**

Presenter: Amanda Ramirez

Mentor: Erik Nordman

An increase in the total amount of impermeable surfaces on Grand Valley State University's campus has had a drastic effect on the rate of runoff and ravine growth. One area where this is of serious concern is in the ravine that extends behind Lake Ontario Hall (LOH). This study addresses concerns about the long term stability of LOH by providing an adaptive management plan to slow stormwater runoff into the ravine and temporarily stabilize the slopes until a permanent control structure can be installed. Specifically this presentation will address the effectiveness of combining a green roof on LOH with a heavily vegetated buffer strip at the top of the ravine as a way of decreasing runoff volume and velocity. The findings show that this combination of stormwater control methods is the most cost-effective and efficient way to decrease runoff and improve infiltration. The long term benefits of this will be decreases in erosion, pollutant runoff and downstream flooding.

KIRKHOF CENTER 2216

**Rouge River Health via Tributary**

Presenter: Daniel Kransberger

Mentor: Erik Nordman

The goal of this project is to see whether or not Cedar Creek is adding additional pollutants to the Rouge River. This will be done by looking at the bioindicator, aquatic insect species found in Cedar Creek. From the findings in the creek an alternative management plan will be devised in order to maintain or improve its quality as it enters the stream.

KIRKHOF CENTER 2263

**Betraying Judas and Tempting Satan: The Roots of Anti-Semitism in the New Testament**

Presenter: Ross Argir

Mentor: Alice Chapman

This paper will consider the way Satan and Judas Iscariot were depicted by the writers of the New Testament. Particular attention will be paid to the way these characters were used to demonize those considered internal and external enemies to early Christian biblical writers. This project compares the New Testament figure of Satan with a similar concept found in the Hebrew Tanakh and will trace the evolution of the Judas narrative throughout the gospel texts.

KIRKHOF CENTER 2266

**Framing the Public in Public Space**

Presenter: Zachary Trank

Mentor: Joel Stillerman

How do municipalities exclude certain populations from public spaces? I propose that cities frame the dangers of these groups in the public mind in order to justify their exclusion, and then use various methods to actualize this discrimination. In this study I will use existing literature on various examples of "undesirable" populations being excluded from public spaces as well as observations and structured interviews of Grand Rapids during and after the annual city-wide art event, Art Prize. I found that cities portray their "undesirables" as dangerous and illegitimate users of public space which then justifies the use of force and crowding out tactics. Force can take the form of police action or sanctioned actions of private security forces. Crowding out tactics include filling the space with "legitimate" users in order to push other users of public space to the marginal regions of the city.

BEGINNING AT 1:00 PM

KIRKHOF CENTER 1104

**The Benefits of Sports Participation for Persons with Physical Disabilities**

Presenters: Shae Mulder, Margaret Whaley

Mentor: Teresa Beck

Sports for persons with physical disabilities began to be organized in the United States in the late 1960s. A wide range of sports have been adapted to be played by people with various disabilities, as well as several that are unique to disabled athletes. Today there are a multitude of organizations providing adapted sporting programs, including the Paralympic Games which immediately follow the Olympic Games and are sanctioned by the International Olympic Committee. Research has long identified the benefits of participating in sports for persons without disabilities. The presentation will review the research that has been conducted on sports participation for persons with physical disabilities and identify the outcomes of participation.

KIRKHOF CENTER 1142

**Techniques for Approaching the Traveling Salesman Problem**

Presenter: Michelle Fox

Mentor: David Austin

The Traveling Salesman Problem attempts to find the shortest route to visit  $n$ -cities exactly once and return to the starting location. This presentation will provide an overview of the Traveling Salesman Problem and methods of solving. The focus will be on the use of linear and nonlinear programming to find solutions to the problem.

KIRKHOF CENTER 2201

**Exploring the Sensitivity of Microsatellite Data for Detecting Population Declines**

Presenter: Susan Munster

Mentor: Amy Russell

Genetic diversity is important for maintaining the genetic health of species and is of great concern for species whose numbers are in decline. Over the past decade, genetic diversity measures, particularly from microsatellite loci, have become a commonly-used proxy for monitoring population size. Because the methods used in these applications have typically been designed for small populations with little diversity, it is unclear how sensitive they are to catastrophic population declines in large, diverse populations. Through the use of simulated data, for which the evolutionary parameters are known, we evaluate the sensitivity of genetic population monitoring based on microsatellite data. We explore the effect of varying demographic parameter values (initial population size, magnitude of decline), changes in sampling strategy (sample size, number of loci), and analytical approach (summary statistics, coalescent methods, approximate Bayesian computation).

KIRKHOF CENTER 2215

**Habitat Suitability for Southwestern Willow Flycatchers**

Presenter: Matthew Bullard

Mentor: Erik Nordman

The middle reach of the Rio Grande near Socorro, New Mexico, has been invaded with an invasive plant called Salt Cedar (*Tamarix ramosissima*). The Salt Cedar can outcompete native vegetation and replace native vegetation such as Coyote Willow (*Salix exigua*) and decrease wildlife habitat. A small songbird, southwest willow flycatcher (*Empidonax traillii*), has adapted to nesting in Coyote Willow, but with the willow declining due to invasive vegetation the birds' populations have also been decreasing. Vegetation surveys were conducted throughout designated sites along the Rio Grande and were digitized on a computer program (ArcMap). Using ArcMap I will be able to analyze the impact the Salt Cedar is having on the southwest willow flycatchers and implement possible control methods depending on specific areas. Various areas will call for either biological, chemical, or mechanical controls based on spatial features.

KIRKHOF CENTER 2216

**Riley Trails Wetland Restoration**

Presenter: Jade Kane

Mentor: Erik Nordman

Riley trails is a 300-acre Ottawa County park in Holland, Michigan. The park has been through many phases of construction in order to benefit park-goers and reduce negative environmental impacts caused by the retired landfill on the south end of the property. One of the solutions that was put into place was to build a pond, next to the retired land fill, to capture runoff, filter the groundwater, and to improve aesthetics of the area. Since the pond was built, there have been numerous issues with the health of the water and the vegetation around the pond is not consistent with a healthy wetland. Data will be gathered about the quality of the water and the number of species and species richness of flora in the pond area. A plan will be proposed to restore the pond to a healthier, better functioning wetland.

KIRKHOF CENTER 2259

**A Statistical Consulting Experience: Evaluating Harvest Profiles in the Balkans**

Presenters: Keenan Barber, Kelsey Manoogian

Mentors: Elizabeth Arnold, John Gabrosek

Dr. Elizabeth Arnold (Anthropology - GVSU) and Dr. Haskel Greenfield (University of Manitoba) have analyzed

archaeological animal remains from the Balkan region that permits the ageing of animals and analysis of herd management patterns. The age at which the animal was harvested correlates to the primary use of the animal in a specific time period - for milk, meat, or wool. Drs. Arnold and Greenfield have established a variety of graphs comparing and contrasting the management of pigs, cattle, sheep and goats over multiple time periods that must be evaluated through statistical analyses. We discuss this statistical analysis of the data as well as our experiences as statistical consultants.

KIRKHOF CENTER 2263

**Using the ARTFL Database to Analyze Mentions of Locke in Diderot's *Encyclopédie***

Presenter: Scott St Louis

Mentor: David Eick

The Enlightenment was a European intellectual movement marked by an interest in inalienable rights, an idea (closely linked to modern democracy) articulated in 1690 by English political philosopher John Locke in his *Second Treatise of Government*. The *Encyclopédie*, published between 1751 and 1772, included support for this concept in articles by Voltaire, Rousseau, and Diderot. The size of the *Encyclopédie* (74,000 articles) has long prevented scholars from fully understanding how it was shaped by ideas from Locke and other early theorists. Now an online database, *American and French Research on the Treasury of the French Language* (ARTFL), makes possible a more thorough examination of this monumental publication, enabling scholars to search the entire work in its original French for a particular word or phrase. A search of "Locke" yields 116 references. This presentation will use these references, along with current scholarship involving 18th century studies and the digital humanities, to develop new insights about the citation strategies employed by contributors to the *Encyclopédie*.

KIRKHOF CENTER 2266

**Enhancing Site/Visitor Interaction at Hadrian's Villa, Tivoli, Italy**

Presenter: Michelle Lenartz

Mentor: Melissa Morison

Ancient archaeological sites are important because they are physical reminders of our shared cultural heritage. Unfortunately, visitors to heritage sites often become bored or do not appreciate these places due to the poor quality of the educational materials available to them upon arrival. In order to address this problem, a customizable audio tour was created for use at an ancient Roman heritage site (Hadrian's Villa in Tivoli, Italy). The audio tour is a compelling way for visitors to experience a large ancient site like this because the interactive format encourages self-discovery and personal engagement, enabling visitors to choose their own paths through the site and to construct their own understanding of it. In addition to learning about the ancient ruins and other physical aspects of the site, visitors can listen to modern biographies of Hadrian, Hadrian's own writing, and other ancient works that illuminate life at the Villa in antiquity.

KIRKHOF CENTER 2270

**Creating a Modern Performance Edition of a Sousa Operetta**

Presenter: Lisa Keeney, S3 Scholar

Mentor: Kevin Tutt

While composer John Philip Sousa is widely known for his marches, his operettas are relatively unknown and unperformed. This is due to a lack of published editions of these operettas. The goal of this project was to input hand-written scores of an operetta by Sousa into notational software to be published and performed. The original manuscripts are not currently performable, as they are inconsistent, difficult to read, and only available as copies from the archives by request. The score "Selections from The Bride Elect," an arrangement for wind band by Sousa of numbers from his operetta, was input and edited into a new performance edition. By creating

notation that is edited, easy to read, and readily available, a modern performance of the operetta is possible. This process required editing to unify inconsistencies throughout the parts and alignment of the manuscript score with a published reduction of the operetta in order to ensure a performance as close to the original score as possible.

## BEGINNING AT 1:30 PM

### KIRKHOF CENTER 1142

#### **The American Bison: A Reintroduction on Public Land in Central-Western States**

Presenter: Drew Niederluecke

Mentor: Carol Griffin

The historic range of the American Bison was considerably larger than it is today. America's largest land mammal once populated a majority of our country, supporting an estimated 20 million bison at the population's peak. With now only roughly 500,000 bison in all of North America, the population has dropped considerably. After assessing the quantity of potential roaming area for the American Bison in the states of Colorado, Wyoming, Nebraska, and Kansas, this research will show that reintroduction is possible. Using research on Yellowstone National Park's bison population, bison herd characteristics were recorded, such as: herd size, home range, nutrient requirements, and reproductive success. By using these characteristics, I am able to determine if there is enough suitable public land and resources to sustain a sizable bison herd comparable to that of Yellowstone.

### KIRKHOF CENTER 2201

#### **Statistical Consulting on Verb Attribution Between Males and Females**

Presenters: Thomas Herin, Erin Knochenhauer, Wyatt Stahl

Mentors: John Gabrosek, Josita Maouene-Cavin

The current project is focused on the student statistical consulting experience. For this project the student consultant worked with Dr. Josita Maouene's undergraduate research assistants of the Psychology Department on a project studying how verbs may be attributed to a certain gender, and if this is moderated by the gender of the respondent. The clients posed a number of research questions and requirements for the consultant in regards to the project at hand. The student consultant was responsible for working with the clients to determine the best way of analyzing the clients' data so as to answer the research questions. Elements of the process included maintaining frequent contact with the clients, manipulating data in preparation for a given analysis, and completing specified analyses in order to achieve the clients' goal.

### KIRKHOF CENTER 2216

#### **Ring-Neck Pheasant Habitat Management**

Presenter: Nicholas Schimmel

Mentor: Erik Nordman

The purpose of this project is to show how to create quality ring-neck pheasant habitat on small areas of private land. I will illustrate how to take marginal habitat and turn it into quality habitat that can support a viable population of pheasants for the landowners to hunt. The main goal is to increase the amount of nesting cover and winter cover. Nesting cover is the most important factor in increasing pheasant numbers. I am going to map out vegetation/habitat type for the property before and after my management plans. The goal is to have two pheasants per acre of usable habitat. This will provide quality hunting opportunities for the landowners and habitat that can support a sustainable ring-neck population.

KIRKHOF CENTER 2259

**Chinese Veterinary Internship: A Reflection**

Presenter: Skylar Welti

Mentor: Terry Trier

This presentation discusses my internship experiences at the International Center for Veterinary Services in Beijing, China. The reasons behind my decision to do an international veterinary internship and methods of research to find an opportunity will be explained. I also will share some of my colorful and unique experiences, both veterinary related and cultural. This internship and experience presented many challenges, as well as rewards, and I will share the lessons I learned about China, international veterinary medicine, and living in a different culture.

KIRKHOF CENTER 2263

**3rdMind: The Scientific Social Network**

Presenter: Kyle Zimmer

Mentors: Mario Fific, Joel Quamme

In forming opinions and making decisions, we scientifically minded individuals all seek to identify, critically evaluate, and apply observations that we feel are relevant. Whenever possible, we like to quantify dimensions and apply mathematical rigor to our definitions and assertions. Traditionally, official results are published in peer-reviewed journals, and for good reasons these are the writings that we consider reliable. We would be well served however, if we could somehow make more incremental, casual contributions to the scientific community, and have peer-reviewed results be more dynamically integrated. Currently, citations and discussion alone link official results together. The 3rdMind Project will utilize themes from discrete mathematics, semantic networking theory, and modern social media to create a peer-reviewed relational database that integrates casual speculation with evidence based claims.

KIRKHOF CENTER 2266

**Studying Techniques Used to Keep Alumni Connected: A Statistical Consulting Experience**

Presenters: Trent Chappell, Cristine Waite

Mentors: John Gabrosek, Abigayle Sloan

One of the main objectives of Grand Valley State's alumni relations department is to keep in touch with former students. They use many different techniques, including email and social media. The Assistant Director of Alumni Relations, Abigayle Sloan, commissioned a project to find out which techniques work the best. In this presentation we will elaborate on our experience as first time statistical consultants.

KIRKHOF CENTER 2270

**Creating International Conversations: Writing Centers Across National and Cultural Borders**

Presenter: Erin Terbrack

Mentor: Laurence Jose

This presentation explores writing center theory and practices in international and cross-cultural contexts. Through a methodical comparison between US-based and select European Writing Centers, I will unveil the cultural embeddedness of writing research and the limits of a monolingual approach. Drawing from literacy studies and recent composition theories on multilingualism and the globalization of US classrooms, I will discuss the benefits but also the challenges of expanding the scope of writing center practices from a local to a global level. Ultimately, I will argue for a perspective that recognizes the contextual nature of writing and favors a dialogical approach to the internationalization of writing center practices.



BEGINNING AT 2:00 PM

KIRKHOF CENTER 1142

**Solutions for Reversing Desertification in Kenya**

Presenter: Samantha Brodley

Mentor: Carol Griffin

Desertification is an increasingly large threat to semi-arid and arid ecosystems and the people who depend on those ecosystems around the world. Kenya's ecosystems and the wildlife they support are significant contributors to the country's economy. With desertification threatening the ecosystems and economy, Kenyans' livelihoods are also threatened. Desertification is caused by overgrazing, soil exposure, incorrect irrigation methods, and climate change. I analyzed primary literature regarding desertification, its effects, and possible solutions. The literature showed that climate change and overgrazing have the strongest influence on the increasingly rapid spread of desertification. The revegetation of native grasses, coupled with responsible grazing practices, are the best management techniques in reversing desertification of the land, thereby increasing biodiversity.

KIRKHOF CENTER 2201

**Predicting Landscape Heterogeneity in Thaw Depth in Arctic Alaska**

Presenters: Michaela Clingaman, Andrew Smith

Mentor: Robert Hollister

With warming, thaw depth is expected to deepen in the Arctic. Deeper thaw could result in the metabolism of archaic carbon and significant feedback to climate change. However, thaw depth is very complex and is controlled by more variables than temperature alone. Therefore, this project will determine the susceptibility of thaw depth across the landscape. In 2010, long-term plots were established near Barrow and Atkasuk, Alaska to monitor change. These plots are 1 m<sup>2</sup>, spaced 100 m apart, creating a 1km<sup>2</sup> grid. In the summer of 2013, soil moisture, percent organic matter, vegetation cover, canopy height, and thaw depth were collected. ArcGIS was utilized to examine spatial relationships between these variables and make predictions through the processes of kriging and regression models. We hypothesize that areas containing low organic matter and less vegetation cover will be more susceptible to warming and thaw deeper than areas containing high organic matter and dense vegetation cover.

KIRKHOF CENTER 2215

**Re-assessment of Brown Trout Survival in the Pigeon River and Implications for Future Management**

Presenter: Justin Wegner

Mentor: Erik Nordman

The Pigeon River is a small stream in western Michigan's Ottawa County that runs through two county parks and a mixture of residential and agricultural land before flowing into Lake Michigan. Historically the Pigeon River has been subject to water quality degradation that resulted in the extirpation of brown trout (*Salmo trutta*) in the 1980s. Various habitat restoration efforts have been made to improve the Pigeon Rivers water quality that allowed for the re-introduction of brown trout by the Michigan Department of Natural Resources in 2003. The Pigeon River has been stocked with brown trout annually since. This study evaluates brown trout survival, habitat, and water quality in the Pigeon River using age class distribution, physical and visual surveys, and rapid bioassessments. Results are compared to previous studies of the Pigeon River in an effort to determine the effectiveness of recent restoration efforts and to guide future restoration and management operations.

KIRKHOF CENTER 2216

**Muskegon River Bank Restoration**

Presenter: Kristina Preble  
Mentor: Erik Nordman

The banks of the Muskegon River are slowly being undercut and eroded. A restoration plan will be developed around the results found after assessing a section of property along the river in Grant. The purpose of this management plan is to increase the stability of the river bank. To improve the condition of the banks at the study site there are two problems that must be addressed. The first is the excess of material that is introduced to the river by a construction company. The heavy sediment load erodes and undercuts the banks drastically. The second problem is that the bank itself is unstable because of problems with vegetation. The trees that grew there naturally are infected and dying, which is jeopardizing the stability of the bank. After management practices are found to best address both problems, the restoration of the banks on the Muskegon River is achievable. The management plan will promote decreased erosion, and therefore increase bank stabilization at the study site.

KIRKHOF CENTER 2259

**Cena Vettiorum: Negotiating Social Mobility in the Early Roman Empire**

Presenter: Megan Esparsa  
Mentor: Melissa Morison

Modern representations of the Roman world often focus on the elite members of this strongly hierarchical ancient society, glossing over the struggles and contributions of other groups. Yet, in the early imperial period, freed slaves were rapidly gaining wealth and power -- a process that led to unease amongst elite families who had traditionally held the upper hand. Spatial analysis in several houses at Pompeii (with particular focus on a house owned by two freed slaves, Aulus Vettius Conviva and Aulus Vettius Restitutus) provides evidence for strategies used by freed slaves to negotiate their climb to the top of the social ladder. Wall paintings, architectural remodeling, and reuse of space in the house show how the recently freed Vettii understood and chose to advertise their new social roles. In contrast, analysis of Petronius' *Cena Trimalchionis* provides evidence for a notably negative response to these strategies on the part of the traditional elite.

KIRKHOF CENTER 2266

**Power has Passed: Union Surgeon George M. Trowbridge's Evolutionary Perceptions of Freedmen During the American Civil War**

Presenter: Alice Munday, MS3 Scholar  
Mentor: Scott Stabler

One of the most permanent effects of the American Civil War (1861-1865) was the 1865 13<sup>th</sup> Amendment that gave 10 million slaves their freedom. While most of the Union soldiers did not enlist to end slavery, after time, they began to witness the nefarious traits of slavery themselves while seeing the humanity of the thousands of slaves that fled to freedom in their Union lines. This exposure to freedmen changed many soldiers' perspectives on slavery and African Americans as a whole. Our research on the nearly 200 sagacious letters George M. Trowbridge, an Assistant Surgeon in the 19<sup>th</sup> Michigan Infantry, wrote to his wife from 1863-65 exposes the complexities and the evolution of one soldier's ideas about slavery, race, education and the war's aims. While anti-slavery from the time he joined the war, Trowbridge goes from being provincial and almost indifferent towards African Americans to inevitably becoming more tolerant and excited to see African American troops fight courageously. Trowbridge's letters reveal a personal and vivid picture of the larger narrative of slavery and the Civil War.

BEGINNING AT 2:30 PM

KIRKHOF CENTER 1142

**Management Issues at the Boundaries of Wilderness Areas**

Presenter: Taryn Rigterink

Mentor: Carol Griffin

One of the most important things to understand when studying wilderness is that they are not isolated from the rest of the world: wilderness ecosystems interact with the greater ecosystems they reside within, making management very difficult. The boundaries surrounding wilderness can be either public or private land, and the public land may be managed by one of four different government agencies - the Bureau of Land Management, Forest Service, Fish and Wildlife Service, or National Park Service. However, wilderness boundaries do not always protect the interior. The purpose of my research is to identify relationships between wilderness areas and neighboring land, the problems they create, and what they protect. I will determine what kind of land wilderness is bordered by in the United States, and the advantages and disadvantages of being bordered by public or private land. I will be talking with wilderness managers around the country, professors at Grand Valley State University, and doing research online. This research will allow for better understanding and management of wilderness.

KIRKHOF CENTER 2201

**Federalism as a Defense Against Semi-Authoritarian Control in the Rump Yugoslavia**

Presenter: Samuel Hanna

Mentor: Heather Tafel

In 2006 Montenegro became the first entity of the former Yugoslavia in fourteen years to declare independence, but Vojvodina did not follow suit. I argue that this difference was due to the different administrative statuses of these territories after 1990. This understanding addresses a rarely-studied variable of semi-authoritarian regimes by showing that federal systems can undermine their own stability. Milošević solidified his control of Serbia by stripping Vojvodina and Kosovo of their autonomy in 1990, but Montenegro's continuing federal relationship with Serbia allowed Montenegrin political elites to increase their autonomy in order to shield themselves from Milošević's growing tyranny, eventually leading to full independence. Without that option, leaders of Vojvodina focused on supporting the mainstream Serbian opposition. Thus the final dissolution of the Yugoslav federation was the result of local leaders using the federal system as an antidote to tyranny.

KIRKHOF CENTER 2215

**Management Plan for GVSU's Ravine Opossums**

Presenter: Matthew Dornan

Mentor: Erik Nordman

The purpose of this management plan is to optimize the overall opossum population in the Grand Valley ravine ecosystem. Opossums can become pests if their populations become too large; however, they are an important ecosystem contributor. Using radio telemetry data of collared possums, population distribution can be assessed and determined for optimization. If the population of opossums is too large, traps can be placed and removal of the opossums would benefit biodiversity. Conversely, if data show that the opossum population is too small for the ravine ecosystem, synthetic dens can be established for habitat development. An adaptive management approach would be used.

KIRKHOF CENTER 2216

**Adaptive Management Plan for Increasing Quality of Snowmobile Recreation by Reducing Illegal Wheeled**

## Vehicle Use

Presenter: Steven Sawyer

Mentor: Erik Nordman

This study focuses on increasing the quality of snowmobile recreation by eliminating the illegal use of wheeled vehicles on snowmobile trails located within the Manistee National Forest, Michigan. Currently, there are issues with wheeled vehicles driving on snowmobile trails when the conditions of the trail allow them to. This issue leads to poor trail conditions as well as an issue of safety between snowmobiles and wheeled vehicles. Here we identify areas that are currently impacted by illegal wheeled vehicle use and areas that present future issues. Objectives have been designed for both direct and indirect management techniques to prevent further conflict and reduce the number of wheeled vehicles illegally using snowmobile trails.

KIRKHOF CENTER 2270

## A Comparison of the Treatment of Reality Between Du Fu and Li Bo

Presenter: Catherine Lee

Mentor: Yan Liang

Du Fu (712 – 770) and Li Bo (701- 762) are acknowledged as the two greatest poets of the Tang Dynasty (618 – 907). Although they are contemporaries, their styles of writing are significantly different. This paper specifically looks into the distinct treatment of reality between Du Fu and Li Bo. This research was done through a close reading of their poetry, a historical study of their time, and an investigation of the literary criticisms of their works. This paper argues that Du Fu's poetry portrays reality in a concrete way by describing events in a factual, matter-of-fact form. On the other hand, the poetry of Li Bo detaches from true reality and immerses the reader in his own constructed reality which fuses fantasy, and literary and historical allusions as if they were of actual existence.

BEGINNING AT 3:00 PM

KIRKHOF CENTER 2215

## An Examination of Ruffed Grouse Drumming Use in Response to Management Practices in the Northeastern Lower Peninsula of Michigan.

Presenter: Melissa Buzzard

Mentor: Michael Lombardo

Ruffed Grouse (*Bonansa umbellus*) are an important game bird in Michigan and provide hours of enjoyment and income to areas that support thriving populations. Ruffed Grouse prefer early successional habitat dominated by aspen as well as deciduous and mixed hardwoods. The Huron-Manistee National Forest managed by the US Forest Service (USFS) has utilized various manipulations to provide adequate habitat for wildlife, including Ruffed Grouse, but have no data to determine their success. Using data from past drumming surveys I will analyze population trends and relate them to USFS management practices. This season at newly established drumming points I will analyze if manipulations successfully created usable habitats for grouse. Results will provide the USFS with previously un-recorded information, a determination of successful manipulations, and aid managers in making appropriate decisions regarding prescriptions for wildlife management.

KIRKHOF CENTER 2216

## NRM 495 Capstone

Presenter: Neal Beauchamp

Mentor: Erik Nordman

The purpose of this project is to take baseline measurements of an erosion problem due to flooding onto the

farm's dirt road from the drainage system at Chestnut Farm in Coopersville Michigan in order to design a plan to stop the dirt road from being eroded and deteriorated. An interview with the owner Richard Winkel will give me useful information on what conditions cause the drainage ditch to flood, levels of severity, and how often the problem occurs. Mr. Winkel also has forest management plans from NRCS that give information on species in each management area, soil type, and slope. Interviewing the drainage commissioner of Ottawa County will give information on what actions and plan are within the law as well as discussion of potential solutions. An important measurement that needs to be taken is the width of the dirt road (from the ditch center-line to the ditch center-line) to evaluate and monitor the erosion of the road through the adaptive resource management plan.

KIRKHOF CENTER 2263

**A Statistical Consulting Experience: Determining the Effect Meditation Has on Happiness, Mindfulness, and Anxiety in College Students**

Presenters: Lisa Nguyen, Alyssa Woodwyk

Mentors: Claire Crowley, John Gabrosek, Dana Munk

Meditation is denoted as a practice of "reflection, contemplation, or spiritual introspection." Those who practice this discipline may use it as a therapeutic approach to many cognitive ailments. Claire Crowley, a faculty member in GVSU's Movement Science Department, instructs classes in meditation and yoga. Students that have participated in her classes have exclaimed that meditation was very beneficial in improving their overall well-being since college life can be very stressful. This brought Claire to wonder if meditation practice supports college students with respect to increasing their level of mindfulness, increasing their level of happiness, and/or decreasing their perceived anxiety. Our role in this endeavor as statistical consultants is to analyze the data collected from the students who were enrolled in the classes of interest and determine if there are any statistically measurable differences between the meditating and non-meditating groups relating to the three attributes aforementioned. We discuss some results of the analysis and our experiences as statistical consultants.

BEGINNING AT 3:30 PM

KIRKHOF CENTER 1142

**Defining Ideal Habitat to Improve Populations of Neo-Tropical Migratory Birds at Blandford Nature Center**

Presenter: Kayla Christopoulos

Mentor: Carol Griffin

The presence of neo-tropical migratory birds is an excellent indicator of an ecosystem's biodiversity. This project compiles research with the purpose of defining the ideal habitat for specific neo-tropical migratory species of bird, specifically the Scarlet Tanager and Wood Thrush. This information will be analyzed to see how Blandford Nature Center can attract them to its land. The research includes suitability factors such as typical nesting sites, dietary requirements, and habitat preferences. The data are organized into a management plan specifically tailored to the four ecosystems found on Blandford's land, including northern hardwood forest, central hardwood forest, meadow, and coniferous forest.

KIRKHOF CENTER 2201

**Pharmaceutical Advertisements for Arthritis: The Portrayal of Disability and Gender**

Presenter: Casey Overway

Mentor: Rachel Campbell

The goal of this qualitative, exploratory study was to address arthritis advertisements and the messages of health, ability, and gender that surround them. The messages were addressed through a content analysis

of 53 pharmaceutical advertisements for 14 different arthritis drugs that are advertised to treat moderate to severe arthritis. These advertisements came from 21 issues of the "Arthritis Today" magazine (2010-2013). Key themes were health, ability, and gender. Findings reflect that a majority of depictions are of able-bodied rather than disabled people, show people in nature, and reflect women and men fulfilling traditional gender norms. Thus, the messages portray an idealization of the need to be able-bodied, healthy and active, and to uphold stereotypical gender norms and roles. The information learned about what messages are being presented in these pharmaceutical advertisements could lead to further research as it could apply to other disabilities and disorders.

KIRKHOF CENTER 2263

### **Using the iPad to Promote Self-Management for Students with Autism Spectrum Disorders (ASD)**

Presenters: Kenneth Pierson, Stephanie Spruit

Mentor: Jamie Owen-DeSchryver

Tablet devices have tremendous potential as a tool when designing interventions for children and young adults with autism spectrum disorders (ASD). In particular, the ramifications of adapting traditional self-management systems to tablet devices are immense. This creative pairing could effectively promote independence while providing a potentially valuable tool for educators and support providers. In a culture where technology is ubiquitous, the coupling of evidence-based practice with technological innovation is largely unexplored. This presentation aims to: identify the need for increased study regarding the use of technology in supporting special populations, review existing literature pertaining to the topic, explore potential areas for further research and practice, and highlight an ongoing project that the presenters are conducting assessing the potential of the iPad as a medium for self-management of behavior.

BEGINNING AT 4:00 PM

KIRKHOF CENTER 1104

### **Generating Functions of Context-Free Grammars**

Presenter: Tanner Swett

Mentor: Edward Aboufadel

In mathematics, a *context-free grammar* is a set of rules classifying sequences of symbols as either "valid" or "invalid." For each grammar, there is a corresponding *counting sequence* specifying the number of valid strings of each possible length. In this talk, we will describe our research investigating the counting sequences of context-free grammars by means of generating functions. This research was conducted as part of a senior thesis in mathematics under the mentorship of Dr. Ed Aboufadel.

KIRKHOF CENTER 1142

### **Restoring Degraded Habitat In the Grand River**

Presenter: Joshua Dreska

Mentor: Carol Griffin

Restoring degraded habitats in the Grand River will be beneficial to native species and will renew economic opportunities. Making the Grand River more suitable for fish allows for a greater diversity of native species providing a more sustainable ecosystem. Dams play a major role in degraded water system habitats; therefore, the first step in restoring a river to a more suitable environment is the removal of dams. Dams alter the flow of nutrients through the river, prevent fish from being able to migrate upstream, and change the water's temperature. Currently, the bottom of the Grand River is level, so adding boulders and gravel of different sizes to the river will not only provide the much-needed habitat for fish species, but will also enhance the river's aesthetic appeal.



The improved habitat of the Grand River will accommodate a larger and more diversified fish population, thereby improving the river's economic value.

KIRKHOF CENTER 2201

**What Does it Mean to be a Man? Current Conceptions of Masculinity**

Presenter: Christopher Davenport

Mentor: Rachel Campbell

The idea of a dominant and hegemonic masculinity has been heavily reported on in social science literature. It often describes the "proper" way a man should act, as well as describing specific attributes the man should possess. Interviews were conducted with college-aged men to see if they endorse the same behaviors and attributes dictated by the hegemonic masculinity. Participants responded to stock-photos that either portrayed a typical masculine man (financial success, physical strength) or a man that violates typical masculinity (employed in a female dominated occupation, lack physical strength, or appear androgynous). The participants' responses were recorded, transcribed, and thematically coded to see what traits were valued and devalued. Participants were then invited to share their own thoughts on what it means to be a man. The current ideation of hegemonic masculinity will be explored with these findings, including ways it is being reinforced or challenged.

KIRKHOF CENTER 2259

**Dramaturgical Study of Diane Samuels's *Kindertransport***

Presenter: Amanda Furstenberg

Mentor: Karen Libman

During the Fall 2013 semester as part of her Senior Honors Project, Theatre major Amanda Furstenberg served as the student dramaturg for the department's Main Stage production of Diane Samuels's *Kindertransport*. Samuels's work is based on Great Britain's rescue operation termed "Kindertransport" that saved nearly 10,000 Jewish children from the Holocaust. For a theatrical production, the dramaturg is responsible for historical research and education of the cast, production team and, ultimately, the audience. This presentation will cover Furstenberg's process, her findings and the manner in which she synthesized the information.

BEGINNING AT 4:30 PM

KIRKHOF CENTER 1142

**Hydraulic Fracturing's Effects on Michigan's Fresh Water System**

Presenter: Shelby Hanchera

Mentor: Carol Griffin

In recent years, sustainable energy alternatives have become increasingly important. Advancements in the search for an alternative energy source have led to hydraulic fracturing. Hydraulic fracturing, often referred to as fracking, is the breaking of rock via pressurized liquid to release natural gas stored in deep dwelling bedrock. Michigan residents have expressed concern for the potential loss and contamination of the Great Lakes water caused by fracking. A study of previously published literature regarding hydraulic fracturing, its effects, and possible solutions has been conducted. The research will show negative impacts on the Great Lakes fresh water system. Millions of gallons of fresh water will be displaced and the wastewater will pollute adjacent ecosystems and contaminate drinking water. This report will examine the amount of water used for each frack, reveal the consequences, and give managers a better understanding of how to regulate fracking in the future.

KIRKHOF CENTER 2216

**Grammar vs. Style: A Stylistic Analysis of Published Academic Essays**

Presenter: Nicole Fisher  
Mentor: Shinian Wu

As a consultant at the Fred Meijer Center for Writing and Michigan Authors, I have noticed that students often have difficulty differentiating between “grammatical rules” and “appropriate stylistic choices.” Each genre of writing has accepted sets of stylistic patterns, and academic writing is no exception. My research project analyzes patterns in sentence-structure in a range of published academic journals (e.g. humanities, social sciences, hard sciences, etc.) and compares/contrasts the stylistic choices employed by the authors. During my oral presentation, I will also distribute a handout I have created overviewing the stylistic trends evident in these journals. The end goal of this research is to share this handout with the writing center so consultants can more confidently engage students in conversations of “style” and “genre.”

KIRKHOF CENTER 2263

**Take the Stairs Campaign**

Presenters: Callie Smith, Morgan Sparber  
Mentors: Lindsey DesArmo, John Gabrosek

Health and wellness specialist Lindsey DesArmo is promoting physical fitness among students and faculty at Grand Valley State University. The Take the Stairs campaign is designed to promote a healthier lifestyle by encouraging students and faculty to be more physically active by taking the stairs instead of elevators. We discuss some results to determine if there is a change in activity level based on signage for the last two years. We also discuss what we learned about consulting from the experience.

KIRKHOF CENTER 2266

**Promoting Independence for Students with Developmental Disabilities by Raising Classroom Expectations in a Center-Based School**

Presenters: Heather Hester, Kenneth Pierson  
Mentor: Amy Matthews

The education of children and young adults with significant disabilities requires the implementation of strategies that promote skills relevant to lifelong independence. This presentation will explore the use of evidence-based practices for classrooms and individual students including the use of data-based decision making for programming decisions. Specifically, the presenters will discuss evaluation and intervention successes and barriers during an independent study with students at the Ottawa Area Center school. Data demonstrating progress with classroom interventions will be shared along with a case study.

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## PANEL PRESENTATIONS, ABSTRACTS & SCHEDULE

BEGINNING AT 9:00 A.M.

MARY IDEMA PEW LIBRARY MULTIPURPOSE ROOM

***La muerte y la doncella: El impacto de dictadura en la gente***

Presenters: Jenna Dominique, Emily Rasch, Madeline Vaughn  
Mentor: Zulema Moret

Jenna Dominique

*La muerte y la doncella*: El impacto de dictadura en la gente

*La muerte y la doncella* (1990), escrito por Ariel Dorfman, es una obra dramática que destaca la transición difícil en un país entre una dictadura y una democracia. Se puede decir que esta obra dramática funciona para destacar los horrores que la gente inocente sufren de bajo el régimen militar y cómo estos eventos traumáticos siempre son marcados en sus memorias. Específicamente, quiero enfocar en Paulina, la protagonista de la obra, que fue torturada durante la represión de Augusto Pinochet. Paulina, como otras víctimas, siempre vive con este trauma marcado en su memoria; nunca puede ganar su libertad de los horrores del pasado. Quiero explorar cómo esta obra destaca la injusticia que sufren la gente inocente que viven durante un régimen militar y las consecuencias que estas experiencias causan a las víctimas.

*La muerte y la doncella*: La venganza

*La muerte y la doncella* demuestra la sociedad chilena después de la dictadura de Augusto Pinochet y explora el tema de la justicia. Los tres personajes, Paulina, Gerardo y Roberto, expresan las ideas de la justicia y la venganza. Paulina era víctima de la dictadura y quiere matar a Roberto para lograr la venganza. Su esposo, Gerardo, trabaja para el gobierno nuevo y lucha para la creación de un Chile "nuevo," sin los problemas de Pinochet. Para hacerlo, él cree que todos deben olvidar y seguir con la vida. Roberto cree que la venganza no es necesaria. Roberto, el médico, presenta un problema porque Dorfman nunca explica a los lectores si, en realidad, Roberto es culpable para la tortura de Paulina, o si las acusaciones de ella son inválidas. Paulina representa todas las víctimas de una dictadura que no reciben la justicia. Roberto pinta los criminales que viven sin repercusiones después de la dictadura.

*La muerte y la doncella*: El machismo y los roles del género

La dominación del hombre y la subordinación de la mujer han tenido una larga historia en las sociedades latinoamericanas. La obra de teatro *La muerte y la doncella* de Ariel Dorfman destaca algunos roles tradicionales presentes en la sociedad chilena durante y después de la dictadura de Pinochet. En esta presentación, voy a investigar cómo Paulina, una mujer educada con sus propias aspiraciones, puede ser víctima de la dominación de su marido y de su torturador durante la transición de la dictadura a la democracia entre los años 1970 y 1990.

Emily Rasch

*La muerte y la doncella*: El machismo y los roles del género

La dominación del hombre y la subordinación de la mujer han tenido una larga historia en las sociedades latinoamericanas. La obra de teatro *La muerte y la doncella* de Ariel Dorfman destaca algunos roles tradicionales presentes en la sociedad chilena durante y después de la dictadura de Pinochet. En esta presentación, voy a investigar cómo Paulina, una mujer educada con sus propias aspiraciones, puede ser víctima de la dominación de su marido y de su torturador durante la transición de la dictadura a la democracia entre los años 1970 y 1990.

Madeline Vaughn

*La muerte y la doncella*: La venganza

*La muerte y la doncella* demuestra la sociedad chilena después de la dictadura de Augusto Pinochet y explora el tema de la justicia. Los tres personajes, Paulina, Gerardo y Roberto, expresan las ideas de la justicia y la venganza. Paulina era víctima de la dictadura y quiere matar a Roberto para lograr la venganza. Su esposo, Gerardo, trabaja para el gobierno nuevo y lucha para la creación de un Chile “nuevo,” sin los problemas de Pinochet. Para hacerlo, él cree que todos deben olvidar y seguir con la vida. Roberto cree que la venganza no es necesaria. Roberto, el médico, presenta un problema porque Dorfman nunca explica a los lectores si, en realidad, Roberto es culpable para la tortura de Paulina, o si las acusaciones de ella son inválidas. Paulina representa todos los víctimas de una dictadura que no reciben la justicia. Roberto pinta los criminales que viven sin repercusiones después de la dictadura.

*La muerte y la doncella*: El machismo y los roles del género

La dominación del hombre y la subordinación de la mujer han tenido una larga historia en las sociedades latinoamericanas. La obra de teatro *La muerte y la doncella* de Ariel Dorfman destaca algunos roles tradicionales presentes en la sociedad chilena durante y después de la dictadura de Pinochet. En esta presentación, voy a investigar cómo Paulina, una mujer educada con sus propias aspiraciones, puede ser víctima de la dominación de su marido y de su torturador durante la transición de la dictadura a la democracia entre los años 1970 y 1990.

BEGINNING AT 4:30 P.M.

MARY IDEMA PEW LIBRARY MULTIPURPOSE ROOM

### **Latin American Documentaries**

Presenters: Leah Carlson, Ian Felten, Lucas Gerard, Mitchell Haynes, Rebecca Hulst, Grace Irwin, Elena Winger, Emily Wolters, Caitlin Zokvic

Mentors: Medar Serrata, David Stark

Three documentaries on aspects of Latin American culture and history:

Malintzin Malintzin was the principal interpreter for the Spanish Conquest of Latin America. We discovered information about her childhood, how she learned many languages, and her relationship with Cortés. We researched her life after the conquest, the birth of her son, and her death.

Atahualpa: Fool or Not? Atahualpa was the emperor of the Incas during the Spanish Conquest and the subsequent fall of the Empire. We debunked several myths associated with him, researched the details of what happened during his life, and learned why Atahualpa was not foolish when he decided not to attack the Spanish.

Inca Coca Bag One of the most common visual symbols was the Coca Bag. Our research focused on the many aspects of the Coca Bag such as the production of coca, elements of the bag, physical symbols as well as the symbolic meaning. We connect the visual appearance of the bag to its role and function within Incan society.

# EXHIBITION OF ART

BEGINNING AT 9:00 A.M.

MARY IDEMA PEW LIBRARY EXHIBITION SPACE 01

## **Medium Study #11**

Participants attending 10:00 AM - 11:00 AM

Presenter: Daniel Rolfe

Mentors: Stafford Smith, Anthony Thompson

Medium Study #11 belongs to a series of images that seek to avoid the mimetic or representational function common to visual communication. The images are process-driven inquiries, sans subject matter, that offer the viewer an opportunity to set aside tangible definitions and see the photographs as blank slates. Each example in the body of work is a separate meditation on the medium outside of its typical utility as a recording device. Each is a singular and unique object that only seeks to describe itself.

MARY IDEMA PEW LIBRARY EXHIBITION SPACE 02

## **Pinus Jeffreyi**

Participants attending 3:00 PM - 4:00 PM

Presenter: Megan Sinderson

Mentor: Anthony Thompson

Charlotte Cotton is a British photography curator who divides photography into different categories, one being "Something and Nothing". This concept pushes the boundaries of what is considered a credible visual subject. For my photograph, I wanted to create a visual something out of nothing— in this case, create a piece of art out of something we pass by and ignore on a daily basis. By taking the pinecone out of its natural forest environment and enlarging the photograph to a size a pinecone could never physically be, I am able to show the immense detail and beauty the pinecone holds, and essentially create something out of nothing.

MARY IDEMA PEW LIBRARY EXHIBITION SPACE 05

## **A Walk Down Memory Lane**

Participants attending 9:00 AM - 10:00 AM, 4:00 PM - 5:00 PM

Presenter: Kayla Sullivan

Mentor: Anthony Thompson

For a moment think back on your childhood. What memories come to mind? It is likely that some memories are more vivid than others. Looking back on my childhood, there are a lot of happy moments involving playing and spending time with friends and family. I decided to go back in time and visit some of those happy moments and where they took place. These are some memories that are vivid to me.

# FILM / VIDEO

BEGINNING AT 3:30 P.M.

MARY IDEMA PEW LIBRARY EXHIBITION SPACE 01

## **Medium Study #11**

Participants attending 10:00 AM - 11:00 AM

Presenter: Daniel Rolfe

Mentors: Stafford Smith, Anthony Thompson

MARY IDEMA PEW LIBRARY MULTIPURPOSE ROOM

## **Bound**

Presenter: Natalie Phillips

Mentor: Danielle Leek

"Bound" is an interactive light-based piece that detects motion to control its light source. Movement causes light to dim; stillness creates light and visibility. The piece is a simulation of one aspect of epilepsy. While seizing, persons with epilepsy lose consciousness and visibility. Only when the body stops moving, and shifts to partial paralysis (stillness,) is visibility regained.

This perspective piece is designed to explore a connection between body movement and visibility, and the frustration that can cause .

Materials: Max 6, Microsoft Kinect, Projector

Participant: James Howard



# INDEX OF PRESENTERS AND MENTORS

(SORTED BY LAST NAME)

## A

Aboufadel, Edward	Mentor	1:00 p.m.	Kirkhof Center GRR 093
Aboufadel, Edward	Mentor	10:30 a.m.	Kirkhof Center 2263
Aboufadel, Edward	Mentor	4:00 p.m.	Kirkhof Center 1104
Adkins, Joshua	Student	4:00 p.m.	Kirkhof Center GRR 076
Ahlers, Colleen	Student	2:00 p.m.	Kirkhof Center GRR 095
Ahn, Eunice	Student	9:00 a.m.	Henry Hall Atrium 086
Albert, Robert	Student	9:00 a.m.	Henry Hall Atrium 069
Alderink, Gordon	Mentor	9:00 a.m.	Kirkhof Center GRR 063
Aldrich, Naomi	Mentor	10:00 a.m.	Kirkhof Center GRR 066
Aldrich, Naomi	Mentor	9:00 a.m.	Henry Hall Atrium 055
Alexander, Brandy	Student	10:00 a.m.	Kirkhof Center GRR 013
Ambrose, Bradley	Mentor	3:00 p.m.	Henry Hall Atrium 014
Anderson, Amber	Student	11:30 a.m.	Kirkhof Center 2263
Anderson, Gloria	Student	9:30 a.m.	Kirkhof Center 2266
Ardelean, Bradley	Student	11:30 a.m.	Kirkhof Center 2216
Argir, Ross	Student	12:30 p.m.	Kirkhof Center 2263
Arnold, Elizabeth	Mentor	12:00 p.m.	Kirkhof Center GRR 048
Arnold, Elizabeth	Mentor	1:00 p.m.	Kirkhof Center 2259
Asamoah, Clementina	Student	10:00 a.m.	Kirkhof Center GRR 038
Asamoah, Clementina	Student	10:00 a.m.	Kirkhof Center GRR 087
Aschenbach, Todd	Mentor	4:00 p.m.	Henry Hall Atrium 038
Aschenbach, Todd	Mentor	3:00 p.m.	Henry Hall Atrium 057
Ashlock, Sara	Student	9:00 a.m.	Kirkhof Center GRR 040
Atanasova, Lina	Student	2:00 p.m.	Kirkhof Center GRR 053
Austin, David	Mentor	12:30 p.m.	Kirkhof Center 1142
Austin, David	Mentor	1:00 p.m.	Kirkhof Center 1142
Avery, Shawn	Student	9:00 a.m.	Kirkhof Center GRR 105
Awad, Jennifer	Student	9:00 a.m.	Kirkhof Center GRR 070

## B

Bailey, Matthew	Student	1:00 p.m.	Kirkhof Center GRR 033
Baker, Ashton	Student	10:30 a.m.	Kirkhof Center 2263
Baker, Ashton	Student	12:30 p.m.	Kirkhof Center 1142
Ball, Madison	Student	12:00 p.m.	Kirkhof Center 1142
Ballew, Brittany	Student	4:00 p.m.	Henry Hall Atrium 025
Banta, Stephanie	Student	9:00 a.m.	Henry Hall Atrium 082
Barber, Keenan	Student	1:00 p.m.	Kirkhof Center 2259
Barnes, Amanda	Student	10:00 a.m.	Henry Hall Atrium 001
Barrette, Andrew	Student	10:00 a.m.	Henry Hall Atrium 081
Bartman, Chelsea	Student	10:30 a.m.	Kirkhof Center 2216
Baxter, Michael	Mentor	10:00 a.m.	Kirkhof Center GRR 038

Baxter, Michael	Mentor	10:00 a.m.	Kirkhof Center GRR 087
Beauchamp, Neal	Student	3:00 p.m.	Kirkhof Center 2216
Beaudoin, Christina	Mentor	9:00 a.m.	Henry Hall Atrium 086
Beck, Brandon	Student	11:30 a.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	9:00 a.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	9:30 a.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	10:00 a.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	10:30 a.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	11:00 a.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	11:30 a.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	12:00 p.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	12:30 p.m.	Kirkhof Center 1104
Beck, Teresa	Mentor	1:00 p.m.	Kirkhof Center 1104
Beemer, Melissa	Student	12:30 p.m.	Kirkhof Center 1104
Bennett, Sophie	Student	10:00 a.m.	Kirkhof Center GRR 054
Bennison, Anna	Student	9:00 a.m.	Henry Hall Atrium 069
Berglund, Joel	Student	4:00 p.m.	Kirkhof Center GRR 080
Bergman, Daniel	Mentor	1:00 p.m.	Henry Hall Atrium 006
Bergman, Daniel	Mentor	9:00 a.m.	Henry Hall Atrium 043
Bevier, Kassandra	Student	9:00 a.m.	Henry Hall Atrium 069
Bevier, Kristena	Student	1:00 p.m.	Henry Hall Atrium 022
Bezy, Logan	Student	9:00 a.m.	Kirkhof Center GRR 069
Bianchi, Sarah	Student	9:00 a.m.	Kirkhof Center GRR 056
Biddanda, Bopaiah	Mentor	10:00 a.m.	Henry Hall Atrium 035
Bidwell, Samantha	Student	9:00 a.m.	Kirkhof Center GRR 011
Bielecki, Joseph	Student	10:00 a.m.	Kirkhof Center 2263
Biella, Silvia	Student	9:00 a.m.	Henry Hall Atrium 046
Biros, Shannon	Mentor	9:00 a.m.	Henry Hall Atrium 034
Biros, Shannon	Mentor	10:00 a.m.	Kirkhof Center GRR 047
Biros, Shannon	Mentor	10:00 a.m.	Henry Hall Atrium 049
Biros, Shannon	Mentor	10:00 a.m.	Henry Hall Atrium 066
Biros, Shannon	Mentor	11:00 a.m.	Henry Hall Atrium 039
Bjorkman, Beth	Student	9:00 a.m.	Kirkhof Center GRR 023
Blanchette, Taylor	Student	9:00 a.m.	Henry Hall Atrium 017
Blucher, Justin	Student	4:00 p.m.	Kirkhof Center GRR 060
Bodine, Kara	Student	4:00 p.m.	Kirkhof Center GRR 082
Bodziak, Cory	Student	10:30 a.m.	Kirkhof Center 2259
Bordewyk, Bradley	Student	11:00 a.m.	Kirkhof Center 1142
Bougher, Emily	Student	9:00 a.m.	Henry Hall Atrium 086
Bouza, Alexandra	Student	12:00 p.m.	Henry Hall Atrium 018
Bower, Kristie	Student	12:00 p.m.	Kirkhof Center 1104
Boyd, Madeline	Student	9:00 a.m.	Kirkhof Center GRR 009
Brady, Ashley	Student	10:00 a.m.	Henry Hall Atrium 080
Brady, Ashley	Student	12:00 p.m.	Kirkhof Center GRR 039
Brashler, Janet	Mentor	9:00 a.m.	Kirkhof Center GRR 020

Braun, Trever	Student	2:00 p.m.	Kirkhof Center GRR 036
Breen, Kacie	Student	2:00 p.m.	Kirkhof Center GRR 044
Brodley, Samantha	Student	3:00 p.m.	Henry Hall Atrium 057
Brodley, Samantha	Student	2:00 p.m.	Kirkhof Center 1142
Brown, Jessica	Student	9:00 a.m.	Henry Hall Atrium 020
Bullard, Matthew	Student	1:00 p.m.	Kirkhof Center 2215
Burg, Debra	Mentor	9:00 a.m.	Kirkhof Center GRR 106
Burg, Martin	Mentor	11:00 a.m.	Kirkhof Center GRR 051
Burg, Martin	Mentor	9:00 a.m.	Kirkhof Center GRR 106
Burg, Martin	Mentor	9:00 a.m.	Henry Hall Atrium 082
Burg, Martin	Mentor	10:00 a.m.	Kirkhof Center 2266
Burg, Martin	Mentor	10:30 a.m.	Kirkhof Center 2270
Burge, Rebekah	Student	11:00 a.m.	Henry Hall Atrium 030
Buzzard, Melissa	Student	3:00 p.m.	Kirkhof Center 2215
○			
Callegari, Brittany	Student	9:00 a.m.	Henry Hall Atrium 082
Caminata, Andrew	Student	4:00 p.m.	Kirkhof Center GRR 060
Campbell, Eric	Student	12:00 p.m.	Kirkhof Center GRR 042
Campbell, Rachel	Mentor	9:00 a.m.	Kirkhof Center 2201
Campbell, Rachel	Mentor	1:00 p.m.	Henry Hall Atrium 051
Campbell, Rachel	Mentor	12:30 p.m.	Kirkhof Center 2201
Campbell, Rachel	Mentor	3:30 p.m.	Kirkhof Center 2201
Campbell, Rachel	Mentor	4:00 p.m.	Kirkhof Center 2201
Canada, Kelsey	Student	9:00 a.m.	Henry Hall Atrium 090
Capodilupo, John	Mentor	9:00 a.m.	Kirkhof Center GRR 022
Capodilupo, John	Mentor	9:00 a.m.	Kirkhof Center GRR 096
Capodilupo, John	Mentor	10:00 a.m.	Kirkhof Center 2201
Cargo, Delaney	Student	9:00 a.m.	Henry Hall Atrium 027
Cargo, Kristen	Student	1:00 p.m.	Henry Hall Atrium 075
Carlson, Abigail	Student	1:00 p.m.	Henry Hall Atrium 006
Carlson, Leah	Student	4:30 p.m.	LIB Multipurpose Room
Carr, Alexandra	Student	11:00 a.m.	Kirkhof Center GRR 074
Cassell, Holly	Student	12:00 p.m.	Kirkhof Center 2201
Chamberlain, Jeffrey	Mentor	3:00 p.m.	Kirkhof Center GRR 037
Chapman, Alice	Mentor	10:00 a.m.	Kirkhof Center 2259
Chapman, Alice	Mentor	12:30 p.m.	Kirkhof Center 2263
Chappell, Trent	Student	1:30 p.m.	Kirkhof Center 2266
Cherluck, Joseph	Student	10:00 a.m.	Kirkhof Center GRR 072
Chernoby, Katie	Student	12:00 p.m.	Henry Hall Atrium 054
Chinzi, Nicholas	Student	11:00 a.m.	Kirkhof Center 1104
Chittenden, Sara	Student	1:00 p.m.	Henry Hall Atrium 097
Christians, Matthew	Mentor	9:00 a.m.	Kirkhof Center GRR 084
Christians, Matthew	Mentor	4:00 p.m.	Kirkhof Center GRR 076
Christopoulos, Kayla	Student	3:30 p.m.	Kirkhof Center 1142
Chungag, Rhonda	Student	1:00 p.m.	Kirkhof Center GRR 093

Churches, Christopher	Student	9:00 a.m.	Henry Hall Atrium 063
Clasman, Jozlyn	Student	9:00 a.m.	Henry Hall Atrium 044
Clingaman, Michaela	Student	2:00 p.m.	Kirkhof Center 2201
Clingerman, Evelyn	Mentor	9:00 a.m.	Henry Hall Atrium 009
Coburn, Katherine	Student	9:00 a.m.	Henry Hall Atrium 034
Colligan, Alexis	Student	9:00 a.m.	Kirkhof Center GRR 040
Collins, Dana	Student	10:00 a.m.	Kirkhof Center 2201
Cone, Brady	Student	12:00 p.m.	Henry Hall Atrium 064
Cook, Paul	Mentor	4:00 p.m.	Kirkhof Center GRR 049
Cooley, Tyler	Student	9:00 a.m.	Henry Hall Atrium 095
Corrello, Sarah	Student	9:00 a.m.	Kirkhof Center GRR 020
Corrello, Sarah	Student	9:00 a.m.	Kirkhof Center GRR 019
Cospito, Justin	Student	4:00 p.m.	Kirkhof Center GRR 097
Couture, Grace	Student	1:00 p.m.	Henry Hall Atrium 022
Crawley, Amy	Mentor	12:00 p.m.	Kirkhof Center GRR 042
Crawley, Amy	Mentor	1:00 p.m.	Henry Hall Atrium 061
Crawley, Amy	Mentor	1:00 p.m.	Henry Hall Atrium 033
Crawley, Amy	Mentor	12:00 p.m.	Kirkhof Center GRR 027
Crawley, Amy	Mentor	9:00 a.m.	Henry Hall Atrium 070
Crawley, Amy	Mentor	11:00 a.m.	Henry Hall Atrium 096
Crawley, Amy	Mentor	9:00 a.m.	Kirkhof Center GRR 102
Crawley, Amy	Mentor	12:00 p.m.	Kirkhof Center GRR 085
Crawley, Amy	Mentor	1:00 p.m.	Henry Hall Atrium 075
Crawley, Amy	Mentor	1:00 p.m.	Kirkhof Center GRR 078
Crawley, Amy	Mentor	9:00 a.m.	Henry Hall Atrium 098
Crawley, Amy	Mentor	2:00 p.m.	Kirkhof Center GRR 036
Crawley, Amy	Mentor	2:00 p.m.	Kirkhof Center GRR 029
Cronin, Rebecca	Student	9:00 a.m.	Henry Hall Atrium 043
Crowley, Claire	Mentor	3:00 p.m.	Kirkhof Center 2263
Culley, Korinne	Student	3:00 p.m.	Kirkhof Center GRR 037
Curry, Zachary	Student	9:00 a.m.	Henry Hall Atrium 092
Cytacki, Meghan	Student	1:00 p.m.	Kirkhof Center GRR 100
D			
Danielson, Sigrid	Mentor	1:00 p.m.	Kirkhof Center GRR 034
Davenport, Casey	Student	9:30 a.m.	Kirkhof Center 2216
Davenport, Christopher	Student	9:00 a.m.	Kirkhof Center 2201
Davenport, Christopher	Student	4:00 p.m.	Kirkhof Center 2201
Davis, Rebecca	Mentor	10:00 a.m.	Kirkhof Center GRR 013
DeMuro, Michelle	Student	9:00 a.m.	Kirkhof Center 2215
DeYoung, John	Student	9:00 a.m.	Henry Hall Atrium 092
Dean, Kristy	Mentor	2:00 p.m.	Henry Hall Atrium 084
Deaner, Robert	Mentor	11:00 a.m.	Henry Hall Atrium 083
Deaner, Robert	Mentor	10:00 a.m.	Henry Hall Atrium 001
Dec, Jacob	Student	9:00 a.m.	Kirkhof Center GRR 084
DesArmo, Lindsey	Mentor	4:30 p.m.	Kirkhof Center 2263

Desautels, Allison	Student	10:00 a.m.	Henry Hall Atrium 015
Devitt, Elise	Student	4:00 p.m.	Kirkhof Center GRR 060
Dharmapuri, Santhosh	Student	9:00 a.m.	Henry Hall Atrium 029
Dietrich, Margaret	Mentor	9:00 a.m.	Kirkhof Center GRR 059
Dietrich, Margaret	Mentor	12:00 p.m.	Henry Hall Atrium 021
Dietrich, Margaret	Mentor	3:00 p.m.	Henry Hall Atrium 068
Dietrich, Margaret	Mentor	12:00 p.m.	Henry Hall Atrium 011
Dillard, Amanda	Mentor	2:00 p.m.	Henry Hall Atrium 023
Dillard, Amanda	Mentor	9:00 a.m.	Henry Hall Atrium 016
Dillard, Amanda	Mentor	3:00 p.m.	Kirkhof Center GRR 024
Dillard, Amanda	Mentor	10:00 a.m.	Henry Hall Atrium 015
Dillon, Jacob	Student	12:00 p.m.	Kirkhof Center GRR 039
Dillon, Kelly	Student	9:00 a.m.	Kirkhof Center GRR 101
Dodd, Isiah	Student	11:00 a.m.	Kirkhof Center 2263
Dodge, Devan	Student	12:00 p.m.	Kirkhof Center 2263
Dominique, Jenna	Student	9:00 a.m.	LIB Multipurpose Room
Doorn, Andrew	Student	9:00 a.m.	Kirkhof Center GRR 099
Dornan, Matthew	Student	2:30 p.m.	Kirkhof Center 2215
Dowd, Elizabeth	Student	9:00 a.m.	Henry Hall Atrium 070
Doyle, Daniel	Student	9:00 a.m.	Henry Hall Atrium 082
Dreska, Joshua	Student	4:00 p.m.	Kirkhof Center 1142
Drew, Jacqueline	Student	1:00 p.m.	Kirkhof Center GRR 078
Driscoll, Conor	Student	2:00 p.m.	Henry Hall Atrium 058
Du, Jie	Mentor	1:00 p.m.	Kirkhof Center GRR 090
Dunn, James	Mentor	10:30 a.m.	Kirkhof Center 2266
Dykstra, Devan	Student	9:00 a.m.	Kirkhof Center GRR 099
Dykstra, Devan	Student	12:00 p.m.	Henry Hall Atrium 099

## E

Edelhauser, Maria	Student	9:00 a.m.	Kirkhof Center GRR 099
Edelhauser, Maria	Student	10:00 a.m.	Kirkhof Center 2266
Edick, Mathew	Mentor	4:00 p.m.	Kirkhof Center GRR 005
Ehlich, Joshua	Student	10:00 a.m.	Henry Hall Atrium 080
Eick, David	Mentor	1:00 p.m.	Kirkhof Center 2263
Ellswood, Marissa	Student	12:30 p.m.	Kirkhof Center 1104
Elzinga, Sabrina	Student	12:00 p.m.	Kirkhof Center GRR 041
Ervin, Stephanie	Student	12:00 p.m.	Kirkhof Center GRR 085
Esch, Michael	Student	9:00 a.m.	Kirkhof Center GRR 077
Esparsa, Megan	Student	2:00 p.m.	Kirkhof Center 2259

## F

Fackelman, Devinne	Student	10:00 a.m.	Henry Hall Atrium 078
Faqihi, Sabreen	Student	10:00 a.m.	Kirkhof Center GRR 079
Farris, John	Mentor	12:00 p.m.	Kirkhof Center GRR 028
Felten, Ian	Student	4:30 p.m.	LIB Multipurpose Room
Felty, Terry	Student	12:00 p.m.	Kirkhof Center GRR 039
Ferguson, Roger	Mentor	12:00 p.m.	Henry Hall Atrium 079

Fernandez, Nicolas	Student	3:00 p.m.	Henry Hall Atrium 048
Ferrigan, Jessica	Student	10:00 a.m.	Kirkhof Center 1104
Feurzeig, Lisa	Mentor	12:00 p.m.	Kirkhof Center 2201
Fific, Mario	Mentor	9:00 a.m.	Kirkhof Center GRR 101
Fific, Mario	Mentor	1:00 p.m.	Kirkhof Center GRR 004
Fific, Mario	Mentor	1:30 p.m.	Kirkhof Center 2263
Fisch, Alexander	Student	10:00 a.m.	Henry Hall Atrium 091
Fisher, Mitchell	Student	1:00 p.m.	Henry Hall Atrium 022
Fisher, Nicole	Student	4:30 p.m.	Kirkhof Center 2216
Fitzsimons, Parker	Student	10:00 a.m.	Kirkhof Center 1104
Flaquer, Lindsey	Student	2:00 p.m.	Kirkhof Center GRR 062
Formberg, Christa	Student	12:00 p.m.	Kirkhof Center GRR 050
Forreider, Brian	Student	9:00 a.m.	Kirkhof Center GRR 099
Forster, Kevin	Student	9:00 a.m.	Kirkhof Center GRR 040
Foulks, Zachary	Student	10:00 a.m.	Henry Hall Atrium 062
Fox, Michelle	Student	1:00 p.m.	Kirkhof Center 1142
Francoeur, Paul	Student	12:00 p.m.	Henry Hall Atrium 067
Fritzler, Jessica	Student	10:00 a.m.	Kirkhof Center GRR 066
Frobish, Marcia	Mentor	9:00 a.m.	Kirkhof Center 2266
Frostick, Challie	Student	9:00 a.m.	Henry Hall Atrium 055
Furman, Angelica	Student	9:30 a.m.	Kirkhof Center 1104
Furstenberg, Amanda	Student	4:00 p.m.	Kirkhof Center 2259



Gabrosek, John	Mentor	9:00 a.m.	Kirkhof Center 2266
Gabrosek, John	Mentor	10:00 a.m.	Kirkhof Center 2270
Gabrosek, John	Mentor	12:00 p.m.	Kirkhof Center 2259
Gabrosek, John	Mentor	1:00 p.m.	Kirkhof Center 2259
Gabrosek, John	Mentor	1:30 p.m.	Kirkhof Center 2201
Gabrosek, John	Mentor	1:30 p.m.	Kirkhof Center 2266
Gabrosek, John	Mentor	3:00 p.m.	Kirkhof Center 2263
Gabrosek, John	Mentor	4:30 p.m.	Kirkhof Center 2263
Galen, Luke	Mentor	12:00 p.m.	Kirkhof Center GRR 025
Gallagher, Kyle	Student	11:30 a.m.	Kirkhof Center 1142
Galloway, Zachary	Student	12:00 p.m.	Kirkhof Center GRR 085
Garbini, John	Student	11:00 a.m.	Henry Hall Atrium 037
Gardner, Tyler	Student	12:00 p.m.	Henry Hall Atrium 099
Gasparotto, Vincent	Student	11:00 a.m.	Kirkhof Center GRR 051
Gebben, Taylor	Student	9:00 a.m.	Henry Hall Atrium 027
Geers, Carli	Student	12:00 p.m.	Kirkhof Center GRR 032
Gentner, Tiffany	Student	10:00 a.m.	Kirkhof Center GRR 072
Gerard, Lucas	Student	4:30 p.m.	LIB Multipurpose Room
Gerken, Nathan	Student	11:00 a.m.	Henry Hall Atrium 010
Gibbs, Tiffany	Student	1:00 p.m.	Henry Hall Atrium 059
Giese, David	Student	1:00 p.m.	Kirkhof Center GRR 078
Gipson, Karen	Mentor	9:30 a.m.	Kirkhof Center 2201



Gjebic, Julia	Student	9:30 a.m.	Kirkhof Center 2201
Glass, Stephen	Mentor	9:00 a.m.	Henry Hall Atrium 017
Glass, Stephen	Mentor	9:00 a.m.	Henry Hall Atrium 069
Glass, Stephen	Mentor	1:00 p.m.	Henry Hall Atrium 022
Golden, Oliver	Mentor	1:00 p.m.	Henry Hall Atrium 074
Gomer, Caleb	Student	12:00 p.m.	Henry Hall Atrium 079
Gould, Breanna	Student	11:00 a.m.	Kirkhof Center GRR 068
Grant, Nkrumah	Student	9:00 a.m.	Henry Hall Atrium 094
Gravelyn, John	Student	12:00 p.m.	Kirkhof Center GRR 028
Greer, Gary	Mentor	9:00 a.m.	Kirkhof Center 2259
Gregory, Jessica	Student	12:00 p.m.	Kirkhof Center 2266
Griffin, Carol	Mentor	9:00 a.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	9:30 a.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	10:00 a.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	10:30 a.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	11:00 a.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	11:30 a.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	12:00 p.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	1:30 p.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	2:00 p.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	2:30 p.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	3:30 p.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	4:00 p.m.	Kirkhof Center 1142
Griffin, Carol	Mentor	4:30 p.m.	Kirkhof Center 1142
Grit, Angela	Student	10:30 a.m.	Kirkhof Center 1104
Grousd, Jennifer	Student	10:00 a.m.	Henry Hall Atrium 101
Grousd, Jennifer	Student	12:00 p.m.	Kirkhof Center GRR 041
Grysen, Jesse	Student	9:00 a.m.	Kirkhof Center 2216
Guinn, Tyler	Student	1:00 p.m.	Kirkhof Center GRR 067
Gulgin, Heather	Mentor	12:00 p.m.	Henry Hall Atrium 064

## H

Hage, Anthony	Student	9:00 a.m.	Kirkhof Center GRR 106
Halbersma, Benjamin	Student	9:30 a.m.	Kirkhof Center 1142
Hamacher, Stephanie	Student	10:00 a.m.	Kirkhof Center 1104
Hamersma, Zachary	Student	10:00 a.m.	Kirkhof Center GRR 010
Hamilton, Christina	Student	4:00 p.m.	Kirkhof Center GRR 073
Hamilton, Christina	Student	10:30 a.m.	Kirkhof Center 1142
Hamilton, Yolanda	Student	10:00 a.m.	Kirkhof Center GRR 072
Hanchera, Shelby	Student	4:30 p.m.	Kirkhof Center 1142
Hanna, Samuel	Student	2:30 p.m.	Kirkhof Center 2201
Hanson, Kelsey	Student	9:30 a.m.	Kirkhof Center 2270
Harrington, Heather	Student	11:30 a.m.	Kirkhof Center 2263
Harris, Danielle	Student	10:00 a.m.	Kirkhof Center GRR 046
Hart, Dawn	Mentor	10:00 a.m.	Kirkhof Center GRR 002
Hart, Dawn	Mentor	12:00 p.m.	Kirkhof Center GRR 007

Hart, Dawn	Mentor	2:00 p.m.	Henry Hall Atrium 026
Hart, Jordan	Student	1:00 p.m.	Henry Hall Atrium 075
Hart, Matthew	Mentor	9:00 a.m.	Kirkhof Center GRR 021
Hart, Matthew	Mentor	10:00 a.m.	Kirkhof Center GRR 057
Hart, Matthew	Mentor	12:00 p.m.	Kirkhof Center GRR 083
Hartzell, Zachary	Student	11:00 a.m.	Kirkhof Center 2215
Haynes, Mitchell	Student	4:30 p.m.	LIB Multipurpose Room
Hecht, Steven	Mentor	3:00 p.m.	Kirkhof Center GRR 037
Hefferan, Tara	Mentor	12:00 p.m.	Kirkhof Center GRR 048
Herin, Thomas	Student	9:00 a.m.	Henry Hall Atrium 088
Herin, Thomas	Student	1:30 p.m.	Kirkhof Center 2201
Herzhaft, Chelsee	Student	2:00 p.m.	Henry Hall Atrium 023
Hessler, John	Student	12:00 p.m.	Kirkhof Center GRR 032
Hessler, John	Student	10:00 a.m.	Henry Hall Atrium 071
Hester, Heather	Student	4:30 p.m.	Kirkhof Center 2266
Heuer, Jacquelyn	Student	12:00 p.m.	Kirkhof Center GRR 048
Hisler, Garrett	Student	2:00 p.m.	Henry Hall Atrium 023
Hodge, Jonathan	Mentor	9:00 a.m.	Kirkhof Center GRR 023
Hoinski, Mary	Student	9:00 a.m.	Henry Hall Atrium 029
Holder, Benjamin	Mentor	9:00 a.m.	Kirkhof Center GRR 105
Holder, Benjamin	Mentor	9:00 a.m.	Kirkhof Center GRR 071
Holder, Benjamin	Mentor	1:00 p.m.	Kirkhof Center GRR 058
Hollett, Benjamin	Student	12:00 p.m.	Kirkhof Center GRR 041
Hollister, Robert	Mentor	12:00 p.m.	Kirkhof Center 2266
Hollister, Robert	Mentor	2:00 p.m.	Kirkhof Center 2201
Hood, Andrew	Student	9:00 a.m.	Kirkhof Center GRR 064
Hoogmoed, Ryan	Student	12:00 p.m.	Henry Hall Atrium 077
Houghton, Melissa	Student	10:30 a.m.	Kirkhof Center 2201
Houghton-Rahrig, Lori	Mentor	9:00 a.m.	Kirkhof Center GRR 070
Hughart, Rachel	Student	1:00 p.m.	Henry Hall Atrium 053
Hughes, Chad	Student	9:00 a.m.	Kirkhof Center GRR 102
Hughes, Landon	Student	9:00 a.m.	Kirkhof Center 2201
Hughes, Landon	Student	12:30 p.m.	Kirkhof Center 2201
Huisken, Melissa	Student	9:00 a.m.	Kirkhof Center GRR 098
Hull, Brent	Student	2:00 p.m.	Kirkhof Center GRR 029
Hulst, Rebecca	Student	4:30 p.m.	LIB Multipurpose Room
Hutton, Adam	Student	12:00 p.m.	Kirkhof Center GRR 027
I			
Irwin, Grace	Student	4:30 p.m.	LIB Multipurpose Room
Israel, Lyndsay	Student	12:00 p.m.	Kirkhof Center GRR 086
J			
Jacquot, Joseph	Mentor	9:00 a.m.	Henry Hall Atrium 024
Jacquot, Joseph	Mentor	1:00 p.m.	Henry Hall Atrium 053
Janardan, Veena	Student	9:00 a.m.	Henry Hall Atrium 089
Jarman, Sorscha	Student	4:00 p.m.	Kirkhof Center GRR 060

Johnson, Tessa	Student	9:00 a.m.	Kirkhof Center GRR 101
Johnson, Victoria	Student	2:00 p.m.	Henry Hall Atrium 058
Johnston, Joshua	Student	9:00 a.m.	Kirkhof Center GRR 102
Jones, Devin	Student	10:00 a.m.	Henry Hall Atrium 101
Jose, Laurence	Mentor	1:30 p.m.	Kirkhof Center 2270
Jousma, Austen	Student	11:00 a.m.	Henry Hall Atrium 007

## K

Kahler, Benjamin	Student	12:00 p.m.	Henry Hall Atrium 099
Kalinowski, Nathan	Student	10:00 a.m.	Henry Hall Atrium 050
Kalinowski, Nathan	Student	9:00 a.m.	Kirkhof Center GRR 098
Kamgang, Ronald	Student	12:00 p.m.	Henry Hall Atrium 021
Kane, Jade	Student	1:00 p.m.	Kirkhof Center 2216
Kaneshiro, April	Student	10:00 a.m.	Henry Hall Atrium 101
Karavas, Nicholas	Student	10:00 a.m.	Henry Hall Atrium 073
Karlik, Dustin	Student	9:00 a.m.	Henry Hall Atrium 069
Karwan, Lauren	Student	1:00 p.m.	Henry Hall Atrium 022
Kastura, Michaela	Student	2:00 p.m.	Henry Hall Atrium 058
Katz, Alyssa	Student	9:00 a.m.	Kirkhof Center GRR 092
Keeney, Lisa	Student	1:00 p.m.	Kirkhof Center 2270
Keenlance, Paul	Mentor	9:00 a.m.	Henry Hall Atrium 024
Keenlance, Paul	Mentor	1:00 p.m.	Henry Hall Atrium 053
Kenney, Geoffrey	Student	4:00 p.m.	Kirkhof Center GRR 001
Kersjes, Eric	Student	9:00 a.m.	Kirkhof Center GRR 098
Kieft, Aria	Student	9:00 a.m.	Kirkhof Center GRR 098
Kilburn, Whitt	Mentor	4:00 p.m.	Kirkhof Center GRR 016
King, Jason	Student	1:00 p.m.	Kirkhof Center GRR 067
Kirkendall, Dustin	Student	11:00 a.m.	Henry Hall Atrium 065
Klein, Margaret	Student	12:00 p.m.	Kirkhof Center 2259
Kneeshaw, Thomas	Student	9:00 a.m.	Kirkhof Center GRR 096
Knochenhauer, Erin	Student	9:00 a.m.	Henry Hall Atrium 088
Knochenhauer, Erin	Student	1:30 p.m.	Kirkhof Center 2201
Kober, Andrea	Student	11:30 a.m.	Kirkhof Center 1104
Konecki, Joshua	Student	9:00 a.m.	Kirkhof Center GRR 071
Kopperl, Sheldon	Mentor	9:00 a.m.	Kirkhof Center GRR 056
Kopperl, Sheldon	Mentor	12:00 p.m.	Kirkhof Center GRR 031
Kopperl, Sheldon	Mentor	12:00 p.m.	Kirkhof Center 2270
Korich, Andrew	Mentor	10:00 a.m.	Kirkhof Center GRR 010
Korich, Andrew	Mentor	2:00 p.m.	Kirkhof Center GRR 062
Kosak, Talon	Student	1:00 p.m.	Kirkhof Center GRR 015
Kovacs, Dalila	Mentor	9:00 a.m.	Kirkhof Center GRR 092
Kovacs, Dalila	Mentor	11:00 a.m.	Kirkhof Center GRR 052
Kovacs, Dalila	Mentor	11:00 a.m.	Henry Hall Atrium 047
Kovacs, Dalila	Mentor	12:00 p.m.	Kirkhof Center GRR 039
Kovacs, Dalila	Mentor	12:00 p.m.	Kirkhof Center GRR 086
Kovacs, Dalila	Mentor	2:00 p.m.	Kirkhof Center GRR 095

Kovacs, Dalila	Mentor	4:00 p.m.	Kirkhof Center GRR 080
Kransberger, Daniel	Student	12:30 p.m.	Kirkhof Center 2216
Krcmar, Maja	Mentor	3:00 p.m.	Henry Hall Atrium 052
Krikke, James	Mentor	11:00 a.m.	Kirkhof Center GRR 052
Kruisenga, Devyn	Student	9:30 a.m.	Kirkhof Center 1104
Kruk, Katie	Student	1:00 p.m.	Kirkhof Center GRR 058
Kulesza, Alyssa	Student	11:00 a.m.	Henry Hall Atrium 039
Kurby, Christopher	Mentor	9:00 a.m.	Kirkhof Center GRR 069
Kurjiaka, David	Mentor	11:00 a.m.	Henry Hall Atrium 072
Kurmas, Zachary	Mentor	9:00 a.m.	Kirkhof Center GRR 089
L			
Lance, Alexander	Student	12:00 p.m.	Kirkhof Center 2215
Lantz, Andrew	Mentor	1:00 p.m.	Kirkhof Center GRR 030
Lantz, Andrew	Mentor	2:00 p.m.	Kirkhof Center GRR 035
Lawrence, Christopher	Mentor	9:00 a.m.	Kirkhof Center GRR 077
Le, Kelly	Student	10:00 a.m.	Kirkhof Center GRR 017
LeCompte, Nikole	Student	11:00 a.m.	Henry Hall Atrium 083
LeCompte, Nikole	Student	2:00 p.m.	Henry Hall Atrium 084
Leach, Erin	Student	11:00 a.m.	Henry Hall Atrium 039
Lee, Catherine	Student	2:30 p.m.	Kirkhof Center 2270
Leek, Danielle	Mentor	3:30 p.m.	LIB Multipurpose Room
Leestma, David	Student	9:00 a.m.	Henry Hall Atrium 013
Leins, David	Student	12:00 p.m.	Kirkhof Center GRR 048
Lenartz, Michelle	Student	1:00 p.m.	Kirkhof Center 2266
Lenters, Geoffrey	Mentor	11:00 a.m.	Henry Hall Atrium 007
Leonard, David	Mentor	9:00 a.m.	Henry Hall Atrium 044
Levi, Clinton	Student	9:00 a.m.	Kirkhof Center GRR 022
Liang, Yan	Mentor	2:30 p.m.	Kirkhof Center 2270
Libman, Karen	Mentor	4:00 p.m.	Kirkhof Center 2259
Linn, David	Mentor	1:00 p.m.	Henry Hall Atrium 036
Linn, David	Mentor	10:00 a.m.	Kirkhof Center GRR 079
Lioubimtseva, Elena	Mentor	9:00 a.m.	Kirkhof Center GRR 094
Lioubimtseva, Elena	Mentor	10:00 a.m.	Kirkhof Center GRR 088
Lioubimtseva, Elena	Mentor	12:00 p.m.	Kirkhof Center 2263
Lipski, Eric	Student	10:00 a.m.	Kirkhof Center 2216
Locher, Alexandra	Mentor	10:00 a.m.	Kirkhof Center GRR 054
Lockmiller, Kayla	Student	11:00 a.m.	Kirkhof Center GRR 008
Lombardo, Michael	Mentor	9:00 a.m.	Henry Hall Atrium 027
Lombardo, Michael	Mentor	11:00 a.m.	Kirkhof Center 2201
Lombardo, Michael	Mentor	11:00 a.m.	Kirkhof Center 2270
Lombardo, Michael	Mentor	3:00 p.m.	Kirkhof Center 2215
Lopes, Ercilia	Student	1:00 p.m.	Henry Hall Atrium 033
Lord, Richard	Mentor	9:00 a.m.	Kirkhof Center GRR 011
Lord, Richard	Mentor	1:00 p.m.	Kirkhof Center GRR 015
Lord, Richard	Mentor	10:00 a.m.	Kirkhof Center GRR 012

Lorenz, Joshua	Student	11:00 a.m.	Kirkhof Center GRR 051
Loudenslager, Kylie	Student	9:00 a.m.	Kirkhof Center GRR 101
Loutzenhiser, Derek	Student	3:00 p.m.	Henry Hall Atrium 100
Lowis, Ashleigh	Student	10:00 a.m.	Henry Hall Atrium 002
Lown, Deborah	Mentor	1:00 p.m.	Henry Hall Atrium 005
Lown, Deborah	Mentor	1:00 p.m.	Kirkhof Center GRR 003
Lown, Deborah	Mentor	3:00 p.m.	Henry Hall Atrium 012
Lown, Deborah	Mentor	4:00 p.m.	Henry Hall Atrium 025
Lusardi, Lindsey	Student	10:00 a.m.	Kirkhof Center GRR 079
Lutz, Alexander	Student	11:00 a.m.	Henry Hall Atrium 096

## M

Ma, Kin	Mentor	9:00 a.m.	Kirkhof Center 2263
Ma, Kin	Mentor	3:00 p.m.	Henry Hall Atrium 042
Ma, Kin	Mentor	11:00 a.m.	Henry Hall Atrium 076
Ma, Kin	Mentor	9:30 a.m.	Kirkhof Center 2270
Mabie, Alyson	Student	9:00 a.m.	Kirkhof Center 2263
MacLean, Garrett	Student	9:00 a.m.	Kirkhof Center GRR 091
Maddalena, Michael	Student	9:00 a.m.	Henry Hall Atrium 032
Madden, Gwyn	Mentor	9:00 a.m.	Kirkhof Center GRR 019
Madden, Gwyn	Mentor	10:00 a.m.	Henry Hall Atrium 002
Madden, Gwyn	Mentor	11:00 a.m.	Henry Hall Atrium 004
Madsen, Caitlyn	Student	3:00 p.m.	Henry Hall Atrium 012
Maisel, Sebastian	Mentor	9:00 a.m.	Henry Hall Atrium 013
Majumdar, Kingshuk	Mentor	11:00 a.m.	Henry Hall Atrium 010
Majumdar, Kingshuk	Mentor	12:00 p.m.	Henry Hall Atrium 008
Malinoski, Holly	Student	9:00 a.m.	Henry Hall Atrium 043
Manke, Derek	Student	3:00 p.m.	Henry Hall Atrium 100
Manoogian, Kelsey	Student	1:00 p.m.	Kirkhof Center 2259
Maouene-Cavin, Josita	Mentor	9:00 a.m.	Henry Hall Atrium 090
Maouene-Cavin, Josita	Mentor	9:00 a.m.	Henry Hall Atrium 088
Maouene-Cavin, Josita	Mentor	10:00 a.m.	Henry Hall Atrium 085
Marcinkowski, Nicholas	Student	1:00 p.m.	Henry Hall Atrium 061
Maouene-Cavin, Josita	Mentor	1:30 p.m.	Kirkhof Center 2201
Marckini, Nathan	Student	2:00 p.m.	Kirkhof Center GRR 095
Marshall, Aaron	Student	11:00 a.m.	Henry Hall Atrium 047
Martin, Emma	Student	1:00 p.m.	Henry Hall Atrium 005
Matchett, Stephen	Mentor	9:00 a.m.	Kirkhof Center GRR 091
Matchett, Stephen	Mentor	10:00 a.m.	Kirkhof Center GRR 075
Matthews, Amy	Mentor	4:30 p.m.	Kirkhof Center 2266
Maynes, Katrina	Student	10:00 a.m.	Kirkhof Center 2259
McBane, George	Mentor	1:00 p.m.	Henry Hall Atrium 028
McCarary, Courtney	Student	11:30 a.m.	Kirkhof Center 1104
McClelland, Meryn	Student	1:00 p.m.	Kirkhof Center GRR 081
McGee, Connor	Student	1:00 p.m.	Henry Hall Atrium 033
McMillan, Adam	Student	10:00 a.m.	Henry Hall Atrium 035

Mckay, Kasey	Student	9:00 a.m.	Kirkhof Center GRR 103
Mead, Michael	Student	9:00 a.m.	Henry Hall Atrium 016
Meadows, Austin	Student	2:00 p.m.	Henry Hall Atrium 058
Medina, Joel	Student	1:00 p.m.	Kirkhof Center GRR 030
Mehl, Sian	Student	9:00 a.m.	Kirkhof Center 2201
Mehl, Sian	Student	1:00 p.m.	Henry Hall Atrium 051
Meines, Kristyn	Student	9:00 a.m.	Kirkhof Center 1104
Meirow, Danielle	Student	3:00 p.m.	Henry Hall Atrium 019
Mercado-Idziak, Natosha	Student	11:00 a.m.	Henry Hall Atrium 030
Messina, Andrew	Student	9:00 a.m.	Henry Hall Atrium 082
Mianecki, Maxwell	Student	9:00 a.m.	Kirkhof Center GRR 106
Michael, Angela	Student	11:00 a.m.	Henry Hall Atrium 047
Miller, Jordan	Student	9:00 a.m.	Henry Hall Atrium 082
Mohamed, Mohamed	Student	1:00 p.m.	Henry Hall Atrium 061
Mohr, Amy	Student	3:00 p.m.	Henry Hall Atrium 052
Molnar, Danner	Student	10:00 a.m.	Kirkhof Center 2215
Moore, Eric	Student	10:00 a.m.	Kirkhof Center GRR 002
Moore, Jennifer	Mentor	11:00 a.m.	Kirkhof Center GRR 068
Moore, Rachelle	Student	12:00 p.m.	Kirkhof Center 2270
Morales, Saray	Student	9:00 a.m.	Kirkhof Center GRR 018
Moreno, Teresa	Student	10:00 a.m.	Henry Hall Atrium 002
Moret, Zulema	Mentor	9:00 a.m.	LIB Multipurpose Room
Moret, Zulema	Mentor	9:30 a.m.	Kirkhof Center 2263
Morgan, Roderick	Mentor	9:00 a.m.	Henry Hall Atrium 094
Morison, Melissa	Mentor	1:00 p.m.	Kirkhof Center 2266
Morison, Melissa	Mentor	2:00 p.m.	Kirkhof Center 2259
Morison, William	Mentor	10:30 a.m.	Kirkhof Center 2201
Morrison, Ellie	Student	9:00 a.m.	Kirkhof Center GRR 059
Morrow, Andrea	Student	9:00 a.m.	Henry Hall Atrium 040
Morse, Paul	Student	10:00 a.m.	Kirkhof Center GRR 047
Mortimer, Nicholas	Student	11:00 a.m.	Kirkhof Center GRR 052
Mortimer, Nicholas	Student	4:00 p.m.	Kirkhof Center GRR 080
Morton, Elle	Student	9:30 a.m.	Kirkhof Center 1104
Moss, Daniel	Student	9:00 a.m.	Henry Hall Atrium 098
Mulder, Shae	Student	1:00 p.m.	Kirkhof Center 1104
Munday, Alice	Student	2:00 p.m.	Kirkhof Center 2266
Munk, Dana	Mentor	3:00 p.m.	Kirkhof Center 2263
Munster, Susan	Student	1:00 p.m.	Kirkhof Center 2201
Murawski, Jamie	Student	2:00 p.m.	Kirkhof Center GRR 044
Murphy, Garrett	Student	2:00 p.m.	Kirkhof Center GRR 044
Muscaro, Moriah	Student	10:00 a.m.	Henry Hall Atrium 056
Musser, Karen	Student	10:00 a.m.	Henry Hall Atrium 062
Myers, Jessica	Student	10:00 a.m.	Kirkhof Center GRR 079
Myers, Kara	Student	3:00 p.m.	Henry Hall Atrium 068

N



Naftaly, Jessica	Student	10:00 a.m.	Henry Hall Atrium 015
Naraghi, Navid	Student	10:00 a.m.	Kirkhof Center GRR 065
Navarre, Shelby	Student	4:00 p.m.	Kirkhof Center GRR 097
Ngassa, Felix	Mentor	9:00 a.m.	Henry Hall Atrium 095
Ngassa, Felix	Mentor	11:00 a.m.	Henry Hall Atrium 093
Ngassa, Felix	Mentor	2:00 p.m.	Kirkhof Center GRR 053
Nguyen, Lisa	Student	3:00 p.m.	Kirkhof Center 2263
Nguyen, Michael	Student	9:00 a.m.	Kirkhof Center GRR 098
Nicholson, Benjamin	Student	4:00 p.m.	Kirkhof Center GRR 049
Nichoson, Shane	Student	12:00 p.m.	Kirkhof Center 2259
Niederluecke, Drew	Student	1:30 p.m.	Kirkhof Center 1142
Noll, Lesley	Student	12:00 p.m.	Kirkhof Center 1104
Nordman, Erik	Mentor	9:00 a.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	9:00 a.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	9:30 a.m.	Kirkhof Center 2266
Nordman, Erik	Mentor	9:30 a.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	9:30 a.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	10:00 a.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	10:00 a.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	10:30 a.m.	Kirkhof Center 2259
Nordman, Erik	Mentor	10:30 a.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	10:30 a.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	11:00 a.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	11:00 a.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	11:30 a.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	11:30 a.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	12:00 p.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	12:00 p.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	12:30 p.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	12:30 p.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	1:00 p.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	1:00 p.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	1:30 p.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	2:00 p.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	2:00 p.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	2:30 p.m.	Kirkhof Center 2216
Nordman, Erik	Mentor	2:30 p.m.	Kirkhof Center 2215
Nordman, Erik	Mentor	3:00 p.m.	Kirkhof Center 2216
Norkus, Peter	Student	12:00 p.m.	Kirkhof Center GRR 025
Nowicki, Jakob	Student	1:00 p.m.	Henry Hall Atrium 028
Nowlan, Sam	Student	9:00 a.m.	Henry Hall Atrium 098
○			
O'Brien, Alexandra	Student	1:00 p.m.	Kirkhof Center GRR 003
O'Donohue, Shane	Student	3:00 p.m.	Kirkhof Center GRR 037
O'Donohue, Shane	Student	3:00 p.m.	Kirkhof Center GRR 024

Olson, Amber	Student	9:00 a.m.	Henry Hall Atrium 027
Opdycke, Sarah	Student	9:00 a.m.	Henry Hall Atrium 070
Ortiz, Saulo	Student	3:00 p.m.	Kirkhof Center GRR 024
Orttenburger, Marie	Student	9:00 a.m.	Kirkhof Center 2270
Ossim, Steven	Student	10:00 a.m.	Henry Hall Atrium 080
Ostrom, Zachary	Student	10:00 a.m.	Henry Hall Atrium 081
Overway, Casey	Student	9:00 a.m.	Kirkhof Center 2201
Overway, Casey	Student	3:30 p.m.	Kirkhof Center 2201
Overweg, Melissa	Student	9:00 a.m.	Kirkhof Center GRR 104
Owen-DeSchryver, Jamie	Mentor	3:30 p.m.	Kirkhof Center 2263
Ozark, Erin	Student	12:00 p.m.	Kirkhof Center 1104

## P

Parker, Jodie	Student	12:00 p.m.	Kirkhof Center 1104
Patel, Osman	Mentor	9:00 a.m.	Kirkhof Center GRR 043
Patel, Osman	Mentor	9:00 a.m.	Kirkhof Center GRR 040
Patel, Osman	Mentor	10:00 a.m.	Henry Hall Atrium 091
Patel, Osman	Mentor	12:00 p.m.	Kirkhof Center GRR 041
Patel, Osman	Mentor	2:00 p.m.	Kirkhof Center GRR 044
Pawlak, Daniel	Student	12:00 p.m.	Henry Hall Atrium 008
Pawson, Benjamin	Student	2:00 p.m.	Kirkhof Center GRR 029
Pearson, Spencer	Student	1:00 p.m.	Henry Hall Atrium 022
Pedrolini, Kayla	Student	9:30 a.m.	Kirkhof Center 2263
Pedrolini, Kayla	Student	11:00 a.m.	Kirkhof Center 1104
Pentecost, Thomas	Mentor	1:00 p.m.	Henry Hall Atrium 060
Peters, Emily	Student	2:00 p.m.	Kirkhof Center GRR 035
Phillips, Kathleen	Student	12:30 p.m.	Kirkhof Center 1104
Phillips, Kristy	Student	3:00 p.m.	Kirkhof Center GRR 055
Phillips, Natalie	Student	3:30 p.m.	LIB Multipurpose Room
Pierson, Kenneth	Student	3:30 p.m.	Kirkhof Center 2263
Pierson, Kenneth	Student	4:30 p.m.	Kirkhof Center 2266
Piszczech, Cameron	Student	4:00 p.m.	Kirkhof Center GRR 080
Piszczech, Cameron	Student	11:00 a.m.	Kirkhof Center GRR 052
Plooster, Marc	Student	9:00 a.m.	Kirkhof Center GRR 026
Polakowski, Caitlin	Student	9:00 a.m.	Henry Hall Atrium 082
Pontow, Jessica	Student	9:00 a.m.	Henry Hall Atrium 027
Pontow, Jessica	Student	11:00 a.m.	Kirkhof Center 2201
Powell, Ali	Student	9:00 a.m.	Kirkhof Center 2266
Powers, Rachel	Mentor	9:00 a.m.	Kirkhof Center GRR 064
Powers, Rachel	Mentor	10:00 a.m.	Kirkhof Center GRR 014
Powers, Rachel	Mentor	12:00 p.m.	Henry Hall Atrium 077
Powers, Rachel	Mentor	3:00 p.m.	Kirkhof Center GRR 006
Praet, Amanda	Student	11:30 a.m.	Kirkhof Center 1104
Preble, Kristina	Student	2:00 p.m.	Kirkhof Center 2216
Price, Kaylin	Student	10:00 a.m.	Henry Hall Atrium 078
Propst Cuevas, Amanda	Mentor	9:00 a.m.	Henry Hall Atrium 087

Purdy, Christa	Student	10:00 a.m.	Kirkhof Center GRR 017
Q			
Qi, Min	Mentor	11:00 a.m.	Kirkhof Center GRR 052
Quamme, Joel	Mentor	1:30 p.m.	Kirkhof Center 2263
R			
Raap, Julia	Student	9:30 a.m.	Kirkhof Center 2259
Ramirez, Amanda	Student	12:30 p.m.	Kirkhof Center 2215
Ramo, Aula	Student	1:00 p.m.	Henry Hall Atrium 036
Ramsson, Eric	Mentor	10:00 a.m.	Henry Hall Atrium 031
Rasch, Emily	Student	9:00 a.m.	LIB Multipurpose Room
Rauch, Gerrit	Student	11:00 a.m.	Henry Hall Atrium 047
Ray, Tyler	Student	2:00 p.m.	Kirkhof Center GRR 036
Reams, Nicole	Student	11:00 a.m.	Kirkhof Center 1104
Rediske, Richard	Mentor	4:00 p.m.	Kirkhof Center GRR 073
Reed, James	Mentor	9:00 a.m.	Kirkhof Center GRR 099
Reed, James	Mentor	9:00 a.m.	Kirkhof Center GRR 098
Reed, Philip	Student	3:00 p.m.	Henry Hall Atrium 042
Reichkitzer, Nathan	Student	1:00 p.m.	Kirkhof Center GRR 078
Remick, Tanner	Student	9:00 a.m.	Kirkhof Center GRR 092
Remtema, Zackery	Student	10:00 a.m.	Henry Hall Atrium 081
Renkema, Racquel	Student	10:00 a.m.	Henry Hall Atrium 078
Rescigno, Timothy	Student	9:00 a.m.	Henry Hall Atrium 082
Reynolds, Ross	Mentor	11:00 a.m.	Henry Hall Atrium 037
Rhodes, Keith	Mentor	10:00 a.m.	Kirkhof Center 2270
Rice, Seth	Student	10:30 a.m.	Kirkhof Center 2270
Richardson, Logan	Student	11:30 a.m.	Kirkhof Center 2263
Richiert, Dawn	Mentor	9:00 a.m.	Kirkhof Center GRR 099
Richiert, Dawn	Mentor	9:00 a.m.	Kirkhof Center GRR 098
Riemersma, Peter	Mentor	9:00 a.m.	Henry Hall Atrium 092
Riemersma, Peter	Mentor	10:00 a.m.	Henry Hall Atrium 062
Riemersma, Peter	Mentor	10:00 a.m.	Henry Hall Atrium 081
Riemersma, Peter	Mentor	10:00 a.m.	Kirkhof Center GRR 072
Riemersma, Peter	Mentor	10:00 a.m.	Henry Hall Atrium 080
Riemersma, Peter	Mentor	10:00 a.m.	Henry Hall Atrium 078
Rigterink, Taryn	Student	2:30 p.m.	Kirkhof Center 1142
Riley, Sean	Student	2:00 p.m.	Kirkhof Center GRR 053
Robertson, Amanda	Student	12:00 p.m.	Henry Hall Atrium 064
Robinson, Ursula	Student	9:00 a.m.	Kirkhof Center GRR 043
Robke, Rhiannon	Student	10:00 a.m.	Henry Hall Atrium 031
Rolfe, Daniel	Student	10:00 a.m.	LIB Exhibition Space 01
Rosenhauer, Jack	Student	9:00 a.m.	Kirkhof Center GRR 089
Roth, Mitchell	Student	12:00 p.m.	Henry Hall Atrium 011
Russell, Amy	Mentor	10:00 a.m.	Henry Hall Atrium 101
Russell, Amy	Mentor	1:00 p.m.	Kirkhof Center 2201
Russo, Craig	Student	9:00 a.m.	Kirkhof Center GRR 043

Russo, Craig	Student	1:00 p.m.	Kirkhof Center GRR 045
Rutaremarra, Diana	Student	12:00 p.m.	Kirkhof Center GRR 031
Rydecki, Krysta	Student	9:00 a.m.	Kirkhof Center GRR 101
S			
Sackett, Amanda	Student	2:00 p.m.	Kirkhof Center GRR 044
Salich, Melissa	Student	11:00 a.m.	Henry Hall Atrium 076
Sall, Chelsey	Student	9:00 a.m.	Henry Hall Atrium 020
Sandvig, Carolyn	Student	9:00 a.m.	Kirkhof Center 2201
Sant, Jeffrey	Student	12:00 p.m.	Kirkhof Center 1104
Sass, Georgette	Mentor	10:00 a.m.	Kirkhof Center GRR 065
Saunders, Alison	Student	9:00 a.m.	Kirkhof Center GRR 043
Sawyer, Steven	Student	4:00 p.m.	Henry Hall Atrium 038
Sawyer, Steven	Student	2:30 p.m.	Kirkhof Center 2216
Schaertel, Stephanie	Mentor	1:00 p.m.	Henry Hall Atrium 028
Schalk, Catlin	Student	1:00 p.m.	Henry Hall Atrium 028
Schimmel, Nicholas	Student	1:30 p.m.	Kirkhof Center 2216
Schmedding-Bartley, Janine	Mentor	4:00 p.m.	Kirkhof Center GRR 082
Schneider, Patrick	Student	10:00 a.m.	Kirkhof Center GRR 038
Schneider, Patrick	Student	10:00 a.m.	Kirkhof Center GRR 087
Schneider, Patrick	Student	12:00 p.m.	Kirkhof Center GRR 007
Schnobel, Anthony	Student	12:00 p.m.	Kirkhof Center GRR 086
Schnyders, Harold	Mentor	11:00 a.m.	Henry Hall Atrium 065
Schreur, Victoria	Student	9:30 a.m.	Kirkhof Center 1104
Schroeder, Bill	Mentor	12:00 p.m.	Henry Hall Atrium 054
Schroeder, Kyle	Student	9:00 a.m.	Henry Hall Atrium 020
Schroedter, Lindsey	Student	10:00 a.m.	Kirkhof Center GRR 079
Schroskey, Kelsey	Student	9:00 a.m.	Kirkhof Center GRR 056
Scott, John	Student	9:00 a.m.	Kirkhof Center GRR 094
Scull, Brian	Student	9:30 a.m.	Kirkhof Center 2215
Seaver, Eric	Student	12:00 p.m.	Kirkhof Center GRR 027
Serrata, Medar	Mentor	4:30 p.m.	LIB Multipurpose Room
Shady, Justin	Student	10:00 a.m.	Henry Hall Atrium 049
Shann, Caitlyn	Student	11:30 a.m.	Kirkhof Center 1104
Sheikh, Elaine	Student	9:00 a.m.	Henry Hall Atrium 027
Silbar, Jean	Mentor	12:00 p.m.	Kirkhof Center GRR 050
Siluk, Caitlin	Student	10:00 a.m.	Kirkhof Center 2270
Simon, Isaac	Student	12:00 p.m.	Kirkhof Center GRR 032
Simon, Isaac	Student	10:00 a.m.	Henry Hall Atrium 071
Sinagoga, Anna	Student	10:00 a.m.	Kirkhof Center GRR 063
Sinderson, Megan	Student	3:00 p.m.	LIB Exhibition Space 02
Singh, Shambhavi	Student	9:00 a.m.	Henry Hall Atrium 089
Skutnik, John	Student	10:00 a.m.	Kirkhof Center GRR 088
Slachter, Mitchell	Student	9:00 a.m.	Henry Hall Atrium 092
Slep, Jakob	Student	9:00 a.m.	Henry Hall Atrium 087
Sloan, Abigail	Mentor	1:30 p.m.	Kirkhof Center 2266

Smart, Robert	Mentor	12:00 p.m.	Henry Hall Atrium 054
Smart, Robert	Mentor	12:00 p.m.	Henry Hall Atrium 003
Smart, Robert	Mentor	12:00 p.m.	Henry Hall Atrium 018
Smith, Andrew	Student	11:30 a.m.	Kirkhof Center 2215
Smith, Andrew	Student	2:00 p.m.	Kirkhof Center 2201
Smith, Callie	Student	4:30 p.m.	Kirkhof Center 2263
Smith, Shelly	Mentor	10:00 a.m.	Henry Hall Atrium 073
Smith, Stafford	Mentor	9:00 a.m.	LIB Exhibition Space 01
Snyder, Alyssa	Student	10:00 a.m.	Kirkhof Center GRR 057
Snyder, Eric	Mentor	9:00 a.m.	Kirkhof Center GRR 104
Snyder, Eric	Mentor	3:00 p.m.	Kirkhof Center GRR 055
Soja, Tyler	Student	12:00 p.m.	Kirkhof Center GRR 042
Sparber, Morgan	Student	4:30 p.m.	Kirkhof Center 2263
Spencer, Max	Student	10:30 a.m.	Kirkhof Center 2266
Spenski, Aubriana	Student	9:00 a.m.	Henry Hall Atrium 024
Spenski, Aubriana	Student	11:00 a.m.	Kirkhof Center 2216
Spruit, Stephanie	Student	3:30 p.m.	Kirkhof Center 2263
Sridhar, Suganthi	Mentor	9:00 a.m.	Henry Hall Atrium 089
Sridhar, Suganthi	Mentor	12:00 p.m.	Henry Hall Atrium 054
St. Louis, Scott	Student	1:00 p.m.	Kirkhof Center 2263
Stabler, Scott	Mentor	2:00 p.m.	Kirkhof Center 2266
Stacey, Bethany	Student	9:00 a.m.	Kirkhof Center 1104
Stahl, Wyatt	Student	1:30 p.m.	Kirkhof Center 2201
Stamps, Samantha	Student	1:00 p.m.	Kirkhof Center GRR 034
Stark, David	Mentor	4:30 p.m.	LIB Multipurpose Room
Starks, Leah	Student	2:00 p.m.	Henry Hall Atrium 058
Stedman, Jordan	Student	12:00 p.m.	Kirkhof Center GRR 086
Stillerman, Joel	Mentor	12:30 p.m.	Kirkhof Center 2266
Stockard, Daniel	Student	9:00 a.m.	Kirkhof Center GRR 043
Stoller, Nathaniel	Student	9:00 a.m.	Kirkhof Center GRR 092
Stoscup, Julie	Student	4:00 p.m.	Kirkhof Center GRR 080
Stoscup, Julie	Student	10:00 a.m.	Henry Hall Atrium 066
Straight, Jordan	Student	10:00 a.m.	Henry Hall Atrium 045
Strickler, Timothy	Mentor	9:00 a.m.	Kirkhof Center GRR 099
Strickler, Timothy	Mentor	9:00 a.m.	Kirkhof Center GRR 098
Stultz, Heidi	Student	10:00 a.m.	Kirkhof Center GRR 079
Sullivan, Kayla	Student	9:00 a.m.	LIB Exhibition Space 05
Sun, Wanxiao	Mentor	4:00 p.m.	Kirkhof Center GRR 001
Swanson, Hollister	Student	10:00 a.m.	Kirkhof Center GRR 014
Swanson, Hollister	Student	12:00 p.m.	Kirkhof Center GRR 041
Swartz, Marissa	Student	4:00 p.m.	Kirkhof Center GRR 016
Swastek, Theresa	Student	9:00 a.m.	Henry Hall Atrium 069
Swets, Benjamin	Mentor	3:00 p.m.	Henry Hall Atrium 100
Swets, Benjamin	Mentor	4:00 p.m.	Kirkhof Center GRR 097
Swett, Tanner	Student	4:00 p.m.	Kirkhof Center 1104

Sylvester, Francis	Mentor	12:00 p.m.	Henry Hall Atrium 099
Sylvester, Francis	Mentor	1:00 p.m.	Henry Hall Atrium 041
Sylvester, Francis	Mentor	1:00 p.m.	Kirkhof Center GRR 067
Sylvester, Francis	Mentor	2:00 p.m.	Henry Hall Atrium 058
Szarecka, Agnieszka	Mentor	12:00 p.m.	Henry Hall Atrium 067
Szarecka, Agnieszka	Mentor	12:00 p.m.	Henry Hall Atrium 054

## T

Tafel, Heather	Mentor	2:30 p.m.	Kirkhof Center 2201
Tallman, Melissa	Mentor	9:00 a.m.	Henry Hall Atrium 040
Tallman, Melissa	Mentor	9:00 a.m.	Kirkhof Center GRR 099
Tallman, Melissa	Mentor	9:00 a.m.	Kirkhof Center GRR 098
Tallman, Melissa	Mentor	10:00 a.m.	Henry Hall Atrium 056
Tallman, Melissa	Mentor	10:00 a.m.	Henry Hall Atrium 050
Tanis, Kyle	Student	2:00 p.m.	Kirkhof Center GRR 095
Taylor, Heather	Student	10:00 a.m.	Kirkhof Center GRR 054
Taylor, Merritt	Mentor	9:00 a.m.	Kirkhof Center GRR 103
Taylor, Merritt	Mentor	10:00 a.m.	Henry Hall Atrium 045
Taylor, Merritt	Mentor	1:00 p.m.	Kirkhof Center GRR 045
Taylor, Merritt	Mentor	10:00 a.m.	Kirkhof Center 2263
Terbrack, Erin	Student	1:30 p.m.	Kirkhof Center 2270
Terwilliger, Adam	Student	10:00 a.m.	Kirkhof Center GRR 012
Thomas, Derek	Mentor	3:00 p.m.	Henry Hall Atrium 048
Thomas, Kari	Student	9:00 a.m.	Henry Hall Atrium 027
Thomas, Kari	Student	11:00 a.m.	Kirkhof Center 2270
Thompson, Anthony	Mentor	9:00 a.m.	LIB Exhibition Space 05
Thompson, Anthony	Mentor	9:00 a.m.	LIB Exhibition Space 01
Thompson, Anthony	Mentor	9:00 a.m.	LIB Exhibition Space 02
Thompson, Megan	Student	12:00 p.m.	Henry Hall Atrium 064
Thorpe, Patrick	Mentor	11:00 a.m.	Kirkhof Center 2201
Thorpe, Patrick	Mentor	11:00 a.m.	Kirkhof Center 2270
Tillotson, Sarah	Student	1:00 p.m.	Henry Hall Atrium 022
Tole, Olvi	Student	9:00 a.m.	Henry Hall Atrium 029
Toogood, Jared	Student	9:00 a.m.	Kirkhof Center 2259
Torres, Aaron	Student	10:00 a.m.	Kirkhof Center 1142
Totaj, Edita	Student	12:30 p.m.	Kirkhof Center 1104
Trank, Zachary	Student	12:30 p.m.	Kirkhof Center 2266
Traylor, Zachary	Student	10:30 a.m.	Kirkhof Center 2215
Trier, Terry	Mentor	1:30 p.m.	Kirkhof Center 2259
Trombley, Jarrod	Student	11:00 a.m.	Henry Hall Atrium 004
Tropiano, Hannah	Student	4:00 p.m.	Kirkhof Center GRR 060
Tusch, Guenter	Mentor	9:00 a.m.	Henry Hall Atrium 029
Tutt, Kevin	Mentor	1:00 p.m.	Kirkhof Center 2270

## U

Uhl, Katie	Student	12:00 p.m.	Henry Hall Atrium 003
Underwood, Kathleen	Mentor	9:00 a.m.	Kirkhof Center GRR 009



Underwood, Kathleen	Mentor	9:00 a.m.	Henry Hall Atrium 046
Underwood, Kathleen	Mentor	9:30 a.m.	Kirkhof Center 2259
Underwood, Kathleen	Mentor	11:00 a.m.	Kirkhof Center GRR 074
Underwood, Kathleen	Mentor	11:00 a.m.	Kirkhof Center 2263
Underwood, Kathleen	Mentor	12:00 p.m.	Henry Hall Atrium 102
Underwood, Kathleen	Mentor	1:00 p.m.	Kirkhof Center GRR 100
Underwood, Kathleen	Mentor	1:00 p.m.	Kirkhof Center GRR 081
Underwood, Kathleen	Mentor	1:00 p.m.	Henry Hall Atrium 059
Underwood, Kathleen	Mentor	1:00 p.m.	Henry Hall Atrium 097
Underwood, Kathleen	Mentor	3:00 p.m.	Henry Hall Atrium 019
Utter, Samantha	Student	9:00 a.m.	Henry Hall Atrium 009

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Valdez, Glenn	Mentor	4:00 p.m.	Kirkhof Center GRR 060
Vallery, Richard	Mentor	10:00 a.m.	Kirkhof Center GRR 046
Van Zalen, Shelby	Student	10:00 a.m.	Henry Hall Atrium 080
VanOeveren, Sarah	Student	2:00 p.m.	Henry Hall Atrium 026
Vanamberg, Kelsey	Student	11:00 a.m.	Henry Hall Atrium 030
VandenPlas, Jessica	Mentor	1:00 p.m.	Henry Hall Atrium 060
VanderVere, Rachel	Student	10:00 a.m.	Henry Hall Atrium 062
Vanderlip, Christopher	Student	10:00 a.m.	Henry Hall Atrium 062
Vaughn, Madeline	Student	9:00 a.m.	LIB Multipurpose Room
Vavrikova, Marlen	Mentor	9:30 a.m.	Kirkhof Center 2201
Veihl, Ashton	Student	10:30 a.m.	Kirkhof Center 1104
Venhuizen, Kathleen	Student	11:00 a.m.	Henry Hall Atrium 093
Vickers, Anthony	Student	10:00 a.m.	Henry Hall Atrium 081
Videtich, Patricia	Mentor	11:00 a.m.	Kirkhof Center GRR 008
Vogl, Jessica	Student	1:00 p.m.	Henry Hall Atrium 060

W

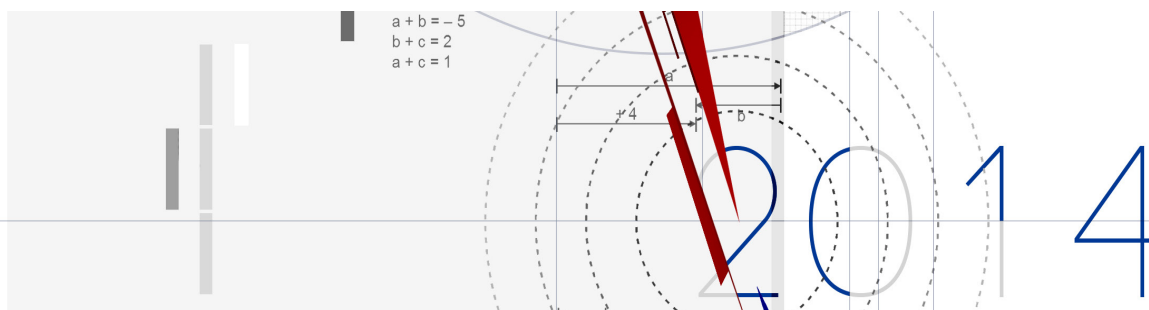
Waite, Cristine	Student	1:30 p.m.	Kirkhof Center 2266
Walhof, Darren	Mentor	9:00 a.m.	Kirkhof Center GRR 026
Walker, Kevin	Student	12:00 p.m.	Kirkhof Center GRR 086
Wallar, Bradley	Mentor	10:00 a.m.	Kirkhof Center GRR 014
Wampler, Peter	Mentor	9:00 a.m.	Henry Hall Atrium 063
Wampler, Peter	Mentor	4:00 p.m.	Kirkhof Center GRR 073
Warner, Ryan	Student	3:00 p.m.	Henry Hall Atrium 014
Weber, John	Mentor	9:00 a.m.	Kirkhof Center GRR 018
Wegner, Justin	Student	2:00 p.m.	Kirkhof Center 2215
Wehby, Jessica	Student	12:00 p.m.	Henry Hall Atrium 102
Weibel-Swanson, Deana	Mentor	12:00 p.m.	Kirkhof Center GRR 048
Welti, Skylar	Student	1:30 p.m.	Kirkhof Center 2259
Werner, Josephine	Student	3:00 p.m.	Kirkhof Center GRR 006
Wertheimer, Megan	Student	9:00 a.m.	Henry Hall Atrium 016
Westbrook, Laurel	Mentor	12:00 p.m.	Kirkhof Center 2259
Westrick, Logan	Student	1:00 p.m.	Kirkhof Center GRR 090
Whaley, Margaret	Student	1:00 p.m.	Kirkhof Center 1104

White, Duncan	Student	9:00 a.m.	Kirkhof Center GRR 040
Wilcoxson, Alison	Student	12:00 p.m.	Kirkhof Center GRR 048
Williams, Jacqueline	Student	9:00 a.m.	Kirkhof Center GRR 021
Williams, Jacqueline	Student	10:00 a.m.	Kirkhof Center GRR 075
Williams, Todd	Mentor	12:00 p.m.	Kirkhof Center GRR 032
Williams, Todd	Mentor	10:00 a.m.	Henry Hall Atrium 071
Wilson, Cameron	Student	4:00 p.m.	Kirkhof Center GRR 005
Winchester, Randy	Mentor	9:00 a.m.	Henry Hall Atrium 032
Winchester, Randy	Mentor	10:00 a.m.	Kirkhof Center GRR 017
Winchester, Randy	Mentor	1:00 p.m.	Kirkhof Center GRR 033
Wind, Curtis	Student	10:00 a.m.	Kirkhof Center 2270
Winger, Elena	Student	4:30 p.m.	LIB Multipurpose Room
Winget, Jeremy	Student	9:00 a.m.	Kirkhof Center GRR 101
Winslow, Katelyn	Student	9:00 a.m.	Kirkhof Center 1104
Winther, Jennifer	Mentor	9:00 a.m.	Kirkhof Center 2259
Witherspoon, Trista	Student	10:00 a.m.	Henry Hall Atrium 085
Witte, Trisha	Student	9:00 a.m.	Kirkhof Center 1142
Wojtowicz, Connor	Student	3:00 p.m.	Henry Hall Atrium 057
Wolfe, Michael	Mentor	12:00 p.m.	Kirkhof Center GRR 032
Wolffe, Gregory	Mentor	1:00 p.m.	Kirkhof Center GRR 090
Woller-Skar, M	Mentor	10:00 a.m.	Henry Hall Atrium 101
Wolschendorf, Robin	Student	9:00 a.m.	Henry Hall Atrium 082
Wolters, Emily	Student	4:30 p.m.	LIB Multipurpose Room
Woodard, Kamya	Student	12:00 p.m.	Kirkhof Center 2216
Woods, Kristin	Student	10:00 a.m.	Henry Hall Atrium 085
Woodwyk, Alyssa	Student	3:00 p.m.	Kirkhof Center 2263
Wu, Shinian	Mentor	4:30 p.m.	Kirkhof Center 2216
Wyble, Lily	Student	9:00 a.m.	Kirkhof Center 2266
X - Y - Z			
Xu, Xiaojuan	Mentor	11:00 a.m.	Henry Hall Atrium 030
Yazbec, Angele	Student	9:00 a.m.	Kirkhof Center GRR 101
Yazbec, Angele	Student	1:00 p.m.	Kirkhof Center GRR 004
Yoas, Alexander	Student	11:00 a.m.	Henry Hall Atrium 096
Young, Kathryn	Student	1:00 p.m.	Henry Hall Atrium 041
Zaszlavik, Katalin	Mentor	9:00 a.m.	Henry Hall Atrium 020
Zaszlavik, Katalin	Mentor	11:30 a.m.	Kirkhof Center 2263
Zhou, Jordan	Student	10:00 a.m.	Kirkhof Center GRR 038
Zhou, Jordan	Student	10:00 a.m.	Kirkhof Center GRR 087
Zimmer, Kyle	Student	1:00 p.m.	Henry Hall Atrium 074
Zimmer, Kyle	Student	1:30 p.m.	Kirkhof Center 2263
Zivi, Karen	Mentor	9:00 a.m.	Kirkhof Center 2270
Zokvic, Caitlin	Student	4:30 p.m.	LIB Multipurpose Room
Zolen, Heather	Student	9:00 a.m.	Henry Hall Atrium 089
Zucker, Noah	Student	11:00 a.m.	Henry Hall Atrium 072
Zuhl, Alex	Student	12:00 p.m.	Kirkhof Center GRR 083

## NOTES



## NOTES





Grand Valley State University is an affirmative action, equal opportunity institution. It encourages diversity and provides equal opportunity in education, employment, all of its programs, and the use of its facilities. It is committed to protecting the constitutional and statutory civil rights of persons connected with the university. 3/13  
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