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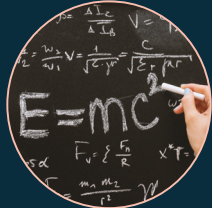
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2018

ST. NORBERT COLLEGE

UNDERGRADUATE RESEARCH FORUM

The Undergraduate Research Forum highlights the valued tradition at St. Norbert College of collaboration taking place in laboratories, studios, and other scholarly or creative settings between our students and our faculty and staff, resulting in a rich array of scholarly research and creative work. This celebration features collaborative projects that evolved out of independent studies, class assignments, and casual interactions as well as formal collaborations supported by internal grant funding.



THE FORUM AT A GLANCE

ORAL PRESENTATIONS

2:00 - 2:15

Mulva 101

1

Rachel Hendzel

Political Distrust in Colombia

2:30 - 2:45

Mulva 101

2

Boris Semnic

Characterization of a Parasitic Fluke from Channel catfish (*Ictalurus punctatus*) and Stonecats (*Noturus flavus*) using Morphological and Molecular Data

3:15 - 3:30

Mulva 101

3

Ben Gjerde

The Last Abbot of Prémontré: Science and Faith During the Revolution

3:30 - 4:00

Mulva studio

Creative Writing / Short Stories Presentations

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Natasha Igl

Paper Warnings

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Letty Mundt

Skylark Drive

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Benjamin K. Paplham

The Woman of Hathwood Manor

POSTER PRESENTATIONS

All Poster Presentations are located on the First Floor of Mulva

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Briana Scott

Predictors of Risk-Taking Behavior and Addiction Vulnerability in Young Adults

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Claire Rosenbeger

Does Level of Education Make a Difference? An examination in Emotion-based Decision-making

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Hannah Sherfinski, Elizabeth Carlson

Identification of Factors that Alter Stem Cell Proliferation and Survival

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Alexis Puyleart

Parametric Four-Wave Mixing in an Optical Cavity

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Dan Heimerl

High transparency Lakes of Northern Minnesota reveal greater Zooplankton Species Richness and Biomass

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Mariah Doughman

Carotenoid Formation in Senescent Tree Leaves

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Ashley Nelson, Stephen Lin, Elle Maricque

FISHing with worms: The Search for Genes Involved in the Excretory System of Planarians and Zebrafish

2:00 - 2:30

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Frank Cushman

Le Guide Michelin: The Story of Gastronomy's First and Most Important Ranking System

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Catherine O'Brien

Non-Suicidal Self Injury as a Maladaptive Shame Reduction Strategy

2:00 - 2:30

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Tyler J. Butts, Matthew Young

Possible detrimental Effects of Sediment Dredging on Zooplankton in the Lower Fox River, WI, USA from 2014-2016

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William Gallagher, Juyeon Park, Vincent Cefalu

The Legends that Raised a Nation: Japan

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Cole Joubert, Andrew LeMay, Kelsey Motto, Bison Woods, Mitch Winter

Muscle Recovery in Collegiate Athletes

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Michelle Lobermeier, Sierra Peters

Behavioral and ERP Measures of Response Initiation and Response Inhibition Among High and Low Sensation Seekers

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Mehakupinder Chahal, Coneria Nansubuga, Trenton Nicioli

Glucocorticoid-mediated Vesicular Glutamate Transporter Expression in Male and Female Zebra Finch Hippocampus

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Nicholas Koehn

Keto-phenolate Ligands and their Group 13 Complexes

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Grace Schwantes, Laura Rolfs, Mike Pinnow, Julia Novotny, Olivia Johnson, Dan Heimerl

Catecholaminergic and Steroid Hormone effects on Growth Rates of Bacteria Isolated from the Zebra Finch Gut

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Joshua Leach

Feasts, Feats, and Fats: Racialized Media Coverage of Green Bay Packers Running Back Eddie Lacy

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The Effect of Aging on Risky Decision Making

3:00 - 3:30

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Excretory System Regeneration Following Chemical Ablation

20 **Emma Meetz, Kaci Keleher, Collin Ellenbecker, Radek Buss, Emily Minton, Kelly Kuehl**
Effects of GSH Depletion and Thioredoxin Reductase Inhibitors on the Viability of MDA-MB-231 and MCF-7 cells

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Using a Vitality Index to Assess Neighborhood Change in Brown County

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Constructing a Digital Archive for George MacDonald's Phantastes (1858)

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Overcoming Negativity: The Relationship Between Sensation Seeking and Conflict Resolution in Younger and Older Adults

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St. Norbert Abbey and Chambers Island: Comparing Inland and Island Small Mammal Species Dynamics

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Planarians, Protonephridia and PKD: Effect of Cilia Disruption on Development of Protonephridia

3:30 - 4:00

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Giovanni Bisi

Classification of Early Eocene (53 MY) Rodents from the southern Bighorn Basin, Willwood Formation, Wyoming

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Sean T. Bennett

Designing a Diffraction Setup with Multiple Wavelengths

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The Effects of Internal Hydrogen Bond Formation on the Predicted Thermochemistry of Hydroxylated Criegee Intermediates

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Carson Torhorst

Parasites of the Burbot, *Lota lota*, from Green Bay of Lake Michigan, with an Evaluation of *Eubothrium rugosum* based on Molecular Data.

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Annika Wallander

Nuclear DNA Diversity Among the Elephants of Guinea-Conakry

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Mutation in Genes required for Motility and Secretion in *Flavobacterium johnsoniae* reduce Biofilm formation

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Reducing Algal Blooms in Dream Lake

RESEARCH FORUM GUEST SPEAKER



Carol J. Bruess, Ph.D.

Professor Emerita of Communication and Journalism, and formerly Director of Family Studies, at the University of St. Thomas, MN

Carol J. Bruess, Ph.D., is Professor Emerita of Communication and Journalism, and formerly Director of Family Studies, at the University of St. Thomas, MN. For more than 25 years as a professor, researcher, author, and speaker she has been passionate about the study of family, couples, and relationships—fully committed to understanding, and help others learn and practice, the communication patterns of healthy relationships. Carol earned her B.A. in Art from St. Norbert College, DePere, WI, and her M.A. and Ph.D. from Ohio University's School of Interpersonal Communication.

She is the author or editor of five books, most recently *Family Communication in the Age of Digital and Social Media* (2015,

editor, Peter Lang International). Her forthcoming book, *The Happy Happy Couple: How to Become One (Again)*, is an inspirational, research-inspired tale of couples navigating the sometimes-bumpy marital road. She is co-author of the book *Contemporary Issues in Interpersonal Communication* (with Mark P. Orbe, Roxbury Publishing, 2005), and has published three contemporary self-help/inspirational books based on her research of couples, families, and friends: *What Happy Couples Do* (2008), *What Happy Parents Do* (2009), and *What Happy Women Do* (2010) (with co-author Anna Kudak, Ph.D.; Fairview Press/Rowman & Littlefield).

An active researcher in the area of family, interpersonal, and relationship communication, Carol has presented her work at dozens of national, regional, and international conferences, and has published in national and international journals and professional books. She is a trained Gottman Seven Principles Educator and is dedicated to making a difference with her research in others' lives and relationships. She has been quoted and interviewed in a variety of national media outlets, including PBS, The Chronicle of Higher Education, Men's Health, American Health, Natural Health, and Cosmopolitan Magazine and has provided expert commentary on local, regional, national and international CBS, NBC, and ABC stations about relationships, family, health and communication. Now with over 150 episodes, she is a weekly expert on CBS/WCCO-TV segment "Relationship Reboot"—sharing credible relationship advice to over 35,000 viewers across Minnesota each week. She is a regular contributor to the nationally-recognized lifestyle blog "Wit & Delight," has been heard on over four-dozen radio programs including Oprah Radio, and is an active provider of community-based, healthy-couple/healthy-family seminars and workshops.

Carol is currently living between two states -- St. Paul, MN and DePere, WI -- with her husband of 26 years Brian who is the new President of St. Norbert College where they met and both graduated more than three decades ago. (#FullCircle) They have two children – Tony (21, a senior at Stanford University studying computer science) and Gracie (18, a high school senior who will attend Loyola Marymount University, Los Angeles, CA next fall to study Spanish and explore pre-med), and a 5.5lb dog Fred. In her free time Carol enjoys sewing with vintage fabrics, doing hot yoga, and drinking hoppy beer (not all at the same time).

ABSTRACTS

ORAL PRESENTATIONS

2:00 - 2:15

Political Distrust in Colombia

Rachel Hendzel, Political Science

Angel Saavedra Cisneros, Assistant Professor of Political Science

1

Colombia is a country often associated with the drugs and violence of the 1990s. Fast forward twenty years and Colombia is becoming a popular tourist destination. In January, I traveled to Colombia and conducted interviews with a wide range of people regarding their political beliefs. The vast majority were anti-government, often mentioning corruption. Despite their President, Juan Miguel Santos winning the Nobel Peace Prize in 2014 for signing a peace agreement with paramilitary group “FARC”, the average citizen remains untrusting of the government. What makes corruption so prominent in Colombia? Is there hope of a more democratic future?

2:30 - 2:45

Characterization of a Parasitic Fluke from Channel catfish (*Ictalurus punctatus*) and Stonecats (*Noturus flavus*) using Morphological and Molecular Data

Boris Semnic, Biology

Anindo Choudhury, Professor of Biology and Environmental Science

2

Crepidostomum ictaluri is typically an intestinal parasite of Channel Catfish (*Ictalurus punctatus*) but is also found in Stonecats (*Noturus flavus*). Since most *Crepidostomum* species show narrow host specificity, and given the observed difference in the shape of testes between worms from different hosts, I hypothesized that these differences are not host-induced but indicative of a new species in Stonecats. Although analysis of 21 stonecat and 22 channel catfish parasites showed significant morphological differences, phylogenetic analysis of 28S rRNA gene showed no genetic difference between the parasites, indicating that the differences between the parasites are host-induced.

3:15 - 3:30

3

The Last Abbot of Prémontré: Science and Faith During the Revolution

Ben Gjerde, History

Fr. Andrew Ciferni O. Praem., Center for Norbertine Studies

Jean-Baptiste L'Écuy (1740-1834) lived a life of contemplation, scholarship, and service. He joined the Norbertine Order at the age of 19. He later became the Abbot of Prémontré, the birthplace of the Order. But sadly, he oversaw a time of revolution and turmoil during which religious orders were persecuted by the French government. Despite the loss of his order in France L'Écuy continued to work as a scholar, eventually becoming a canon at Notre Dame de Paris. Recently one of his notebooks, which was not known to exist, was uncovered at SNC.

3:00 - 4:00

Creative Writing / Short Stories Presentations

Natasha Igl, Alaina (Letty) Mundt, Benjamin K. Paplham,

Leah Hennick; John Pennington, Professor of English

This session features members of the St. Norbert College chapter of Sigma Tau Delta who presented their creative writings at the international meeting of the society in March. They get together here to read their creative works as a celebration of their achievements at the convention.

4

Paper Warnings

Natasha Igl, English

John Pennington, Professor of English

“Paper Warnings” is a creative piece with creepy happenings and some foreshadowing that might make your spine tingle. This piece was presented at the 2018 Sigma Tau Delta Convention from March 21-24. Technically a thriller, sort of a horror, the short story focuses on Melody, a student just trying to write a paper. As she writes, she is constantly interrupted by paper airplanes that warn of danger. Melody tries to escape the fear that builds up, but eventually is consumed by it. You’ve been warned.

5

Skylark Drive

Letty Mundi, English - Creative Writing
John Pennington, Professor of English

My creative piece “Skylark Drive” is a reflective memoir I wrote a year ago in order to sort through the relationship between my novel-writing journey and the real, physical journeys I take that inspire my writing and its growth. The work is written in a braided style that jumps between the two journeys. “Skylark Drive” was originally presented at the 2018 Sigma Tau Delta convention in Cincinnati.

6

The Woman of Hathwood Manor

Benjamin K. Paplham
John Pennington, Professor of English

A short creative writing piece about a young girl who is scared to meet a new resident of their small town.

POSTER PRESENTATIONS

1:00 - 1:30

1

Predictors of Risk-Taking Behavior and Addiction Vulnerability in Young Adults

*Briana Scott, Psychology and Sociology (Human Services)
Raquel Cowell, Assistant Professor of Psychology*

This study examines a potential relationship between childhood adversity, patterns of risk-taking behavior, family history, coping strategies, and current risk-taking behavior, which is measured using a computerized task, the Balloon Analog Risk Task. We hypothesize that there will be greater risk-taking performance on the BART in the experimental condition amongst individuals who have experienced childhood adversity, including traumatic experiences. We expect this is due to the activation of the amygdala, the portion of the brain responsible for emotion such as fear and anger, as well as the remembrance and recollection of traumatic or unpleasant experiences that this condition may trigger.

1:00 - 1:30

2

Does Level of Education Make a Difference? An Examination in Emotion-based Decision-making

*Claire Rosenbeger, Psychology
Raquel Cowell, Assistant Professor of Psychology*

Over the years, the Iowa Gambling Task (IGT) has become an well-used instrument for the study of emotion-based decision-making. Emphasis has been placed on the complexity of the task (i.e., four decks of varying contingency patterns) with the idea that the participant must use emotion-based learning to deal with a complex decision-making process. Previous research has suggested one's level of education moderates the role of emotion-based learning in decision-making (Bowman, & Turnbull, 2004). This research exams the effects level of education has on participants scores for the IGT.

1:00 - 1:30

Identification of Factors that Alter Stem Cell Proliferation and Survival

*Hannah Sherfinski, Biology; Elizabeth Carlson, Biology
Ryan King, Assistant Professor of Biology*

3

Planarians have an immense capacity to regenerate new tissues. Despite the ability of stem cells to undergo a massive level of proliferation following injury, it is rare for planarians to develop signs of cancer. To better understand how planarian stem cell proliferation is regulated, we have been developing chemical and genetic methods to inhibit or stimulate stem cell division and monitoring the rate of division and size of the stem cell population. We are beginning to apply these tools to analyze the function of genes that are significantly up- or down-regulated during regeneration.

1:00 - 1:30

Parametric Four-Wave Mixing in an Optical Cavity

*Alexis Puyleart, Physics
Erik Brekke, Assistant Professor of Physics*

4

We demonstrate the implementation of a ring cavity to enhance the efficiency of parametric four-wave mixing in rubidium, an atomic process that produces 420 nm blue light. This results in a maximum power output of 1.9 ± 0.3 mW at 420 nm, 50 times what was previously generated in the lab. The dependence on input power indicates the process may be approaching saturation. The use of a Fabry-Perot cavity reveals the presence of multiple generated wavelengths, indicating the presence of a competing four-wave mixing path through different hyperfine states.

1:00 - 1:30

High transparency Lakes of Northern Minnesota reveal greater Zooplankton Species Richness and Biomass

Dan Heimerl, Biology

Carrie Kissman, Assistant Professor of Biology

5

Prior research suggests that water transparency plays a key role in zooplankton predation. Anatomical features of certain groups, such as the transparent body of cladocerans, are thought to conceal them from visual predators in lakes with low transparency. We hypothesized that high transparency lakes have significantly lower zooplankton biomass and species richness than low transparency lakes. 12-14 Lakes of northern Minnesota were sampled June of 2016-2017. Our initial hypothesis was refuted as results showed a greater biomass and species richness in high transparency lakes, except *Holopedium gibberum* showing greater biomass and species richness in low transparency lakes.

1:00 - 1:30

Carotenoid Formation in Senescent Tree Leaves

Mariah Doughman, Chemistry

David Poister, Professor of Chemistry and Environmental Science

6

During senescence in autumn, pigments in the leaves of deciduous trees progressively degrade, causing leaves to change color. During this time, nutrients and compounds are drawn out of the leaves and placed into different tissues in the tree. Leaves from seven trees in De Pere were collected each week during the autumn of 2017. In leaves of the Norway Maple, a pigment was detected that increases in concentration during senescence in contrast to other pigments. High-performance liquid chromatography (HPLC) analysis indicates that this pigment is likely a carotenoid synthesized by the tree in autumn. In addition, it was determined that the unknown carotenoid is likely unique to the Norway Maple but may be formed in trace quantities in Birch trees.

1:00 - 1:30

FISHing with worms: The Search for Genes Involved in the Excretory System of Planarians and Zebrafish

*Ashley Nelson, Biology; Stephen Lin, Biology; Elle Maricque, Biology
Ryan King, Assistant Professor of Biology*

7

Planarians have become a powerful model organism for studying regeneration. Previously, we performed a screen identifying 80 genes with increased expression in the planarian excretory system. Many of these genes are conserved in humans, but their function and expression in vertebrate excretory systems have not been examined. To explore whether these newly identified genes have conserved expression in vertebrates we have cloned homologs of these genes in zebrafish and are examining whether their expression is conserved in the zebrafish excretory system using in situ hybridization.

2:00 - 2:30

Le Guide Michelin: The Story of Gastronomy's First and Most Important Ranking System

*Frank Cushman, French, Philosophy
Tom Conner, Professor of Modern Languages and Literatures
(French)*

8

In the year 1900, two French brothers, Edouard and Andre Michelin, owners of the tire company Michelin, in an attempt to increase demand for their tires published a guide to the best restaurants of France. In addition they published road maps and a guide to cultural sights along the way. Awarding rankings of 1, 2 and 3 stars to excellent culinary establishments around the country was meant to get people out on the road in search of good food. That first year they gave away 35,000 copies of their guide. Today the Michelin guide is published in a number of languages and rates restaurants all over Europe, Asia and the Americas. I will tell the story of the rise of "le guide" and its influence on the culinary arts in contemporary France and the world.

2:00 - 2:30

Non-Suicidal Self Injury as a Maladaptive Shame Reduction Strategy

Catherine O'Brien, Psychology, Art

Michelle Schoenleber, Assistant Professor of Psychology

9

Previous research has found that non-suicidal self-injury (NSSI) functions to down-regulate shame (Schoenleber, Berenbaum, and Motl, 2014). The current study tested women with and without a history of NSSI to further examine NSSI as a maladaptive shame reduction strategy. Women with a history of NSSI reported higher trait shame, shame aversion, and shame proneness than women without a history of NSSI. After a shame-inducing social rejection task, both women with and without a history of NSSI reported reductions in shame after enduring a pressure pain task.

2:00 - 2:30

Possible detrimental Effects of Sediment Dredging on Zooplankton in the Lower Fox River, WI, USA from 2014-2016

Tyler J. Butts, Biology and Environmental Science;

Matthew Young, Biology

Carrie Kissman, Assistant Professor of Biology and Environmental Science

10

The Fox River in Green Bay, WI is an Area of Concern (AOC) due to PCB contaminants within the sediments. We hypothesized that remediation via dredging has detrimental consequences on water clarity, quality and on aquatic invertebrates. Monthly sampling was conducted within two dredged, upstream, and downstream sites, respectively. We found that total zooplankton density and *Diatylops navus* density were significantly lower at the dredged site compared to the upstream and downstream sites. Total zooplankton biomass was significantly lower at the dredged and upstream site compared to the downstream sites. These data suggest that dredging has a potential negative impact.

2:00 - 2:30

The Legends that Raised a Nation: Japan

*William Gallagher, Computer Science; Juyeon Park, Vincent Cefalu
Ikuko Torimoto, Assistant Professor of Modern Languages and
Literatures (Japanese)*

11

Otogibanashi, Japanese fairy tales, are a mix of history and legend. Some Otogibanashi are purely legend, while others are history that has become legend. Japanese legends give insight into how Japan's modern beliefs were formed. This presentation goes all the way back to the creation of Japan and the story of the central deities, Izanagi and Izanami, and aims to show how the creation story reflects Japan's morals and beliefs in legends, particularly certain Japanese fairy tales. We will examine classic children's fairy tales to see how legends teach valuable life lessons to children.

2:30 - 3:00

Muscle Recovery in Collegiate Athletes

*Cole Joubert, Biology; Andrew LeMay, Biology; Kelsey Motto,
Biology; Bison Woods, Biology; Mitch Winter, Biology
David Bailey, Professor of Biology*

12

Post-workout supplements are a staple of intense training regimens due to their proposed benefits on muscle recovery. This experiment measured recovery in male and female college athletes supplemented with whey- or milk-based protein. Markers of protein metabolism and vertical jump performance were measured prior to the study and following two days of supplementation. Following the treatment period, there was no significant difference in creatinine levels and vertical jump performance within sports. Urobilinogen levels remained closer to baseline in those who supplemented with milk compared to whey protein treatment, which may indicate an improved maintenance of aerobic capacity with casein-based supplements.

2:30 - 3:00

Behavioral and ERP Measures of Response Initiation and Response Inhibition Among High and Low Sensation Seekers

Michelle Lobermeier, Psychology, Music Liberal Arts;

Sierra Peters, Psychology

Raquel Cowell, Assistant Professor of Psychology

13

Sensation seeking involves the inclination to search for novel experiences though these experiences may require a high level of risk. Many researchers have focused on isolating individual differences between aspects of sensation seeking, such as response initiation and inhibition. The present study will examine this question using behavioral and ERP (event related potential) analyses of participants completing a Go-No Go task, as well as their responses on a sensation seeking scale. It also investigates how response inhibition and initiation may change based on age group.

2:30 - 3:00

Glucocorticoid-mediated Vesicular Glutamate Transporter Expression in Male and Female Zebra Finch Hippocampus

Mehakupinder Chahal, Biology; Coneria Nansubuga, Biology;

Trenton Nicioli, Biology

David Bailey, Professor of Biology

14

The stress hormone corticosterone alters glutamate neurotransmission and consequently modulates learning and memory processes. Vesicular glutamate transporter proteins (VGLUTs) are important in glutamate release as they move glutamate from the cytosol into vesicles. Previous work in male and female zebra finches acutely (48 hrs) implanted with corticosterone pellets or blanks suggested a sexual dimorphism in VGLUT2 mRNA levels, indicating glutamatergic neurotransmission may be more affected in females than males. We continue to confirm and expand on these results by utilizing methods involving RNA extraction and qPCR to determine glucocorticoid-mediated effects on glutamate availability at the synapse.

2:30 - 3:00

Keto-phenolate Ligands and their Group 13 Complexes

Nicholas Koehn, Chemistry

Kari Cunningham, Assistant Professor of Chemistry

15

The photochemistry of the boron family is as varied as the chemical properties of metals and metalloids. Although very different, boron-carbon frameworks and aluminum coordination complexes are both photochemically stable and used as organic light-emitting diodes (OLEDs). Our current project is a direct comparison of the photochemistry of identical aluminum and boron complexes using keto-phenolate ligands. The new complexes created revealed both solid-state and solution phase emission. The intensity and wavelength of the fluorescence varied with ligand structure and type of atom used which suggests the important ability to tune the excited state of these complexes.

2:30 - 3:00

Catecholaminergic and Steroid Hormone effects on Growth Rates of Bacteria Isolated from the Zebra Finch Gut

Grace Schwantes, Physics; Laura Rolfs, Biology; Mike Pinnow, Biology; Julia Novotny, Biology; Olivia Johnson, Biology;

Dan Heimerl, Biology

David Bailey, Professor of Biology; David Hunnicutt, Associate Professor of Biology

16

Host hormones affect the growth rates of gut microbiota. Previous experiments in this course suggested that some bacteria isolated from the zebra finch gut display variations in their growth rates in the presence of the stress hormones epinephrine and corticosterone. We intend to replicate and extend these findings by examining whether these bacteria metabolize and/or transport catecholamines, or whether growth is affected by the steroid hormone precursor cholesterol or a variety of progestins and estrogens. The results may provide insights into systemic health effects caused by the exposure of gut microbiota to varying levels of exogenous and endogenous hormones.

2:30 - 3:00

Feasts, Feats, and Fats: Racialized Media Coverage of Green Bay Packers Running Back Eddie Lacy

Joshua Leach, Communication & Media Studies

Mark Glantz, Associate Professor of Communication and Media Studies

17

Racialized coverage of professional athletes has been prevalent since the integration of the major sports leagues. While significant strides have been made in the right direction, print coverage of former Packers running back Eddie Lacy shows that more steps must be taken to overcome racial bias in sports writing.

2:30 - 3:00

The Effect of Aging on Risky Decision Making

Annika Neerdaels, Biology

Raquel Cowell, Assistant Professor of Psychology

18

Event-related potentials were recorded during Iowa Gambling Task in younger in older adults. Evidence suggests that risky decision-making declines over the course of a human lifespan (Di Rosa et al., 2017). P3 results were significant and further analyses revealed that an age-related decline of P3 was present. This pattern is consistent with recent studies (West et al., 2014). The attenuation of P3 amplitude after negative feedback in older adults suggests that an age-related change in processing negative feedback may be present.

3:00 - 3:30

Excretory System Regeneration Following Chemical Ablation

Paige Bonner, Biology; Lauren Hoyer, Biology

Ryan King, Assistant Professor of Biology

19

Acute Kidney Injury is a frequent complication in hospitalized patients with numerous causes, typically leading to damaged kidney tissue. Understanding fundamental mechanisms of excretory system regeneration could provide useful avenues for treating kidney injury. Planarians have incredible regenerative capacity and contain an excretory system with significant cellular and molecular similarities to human kidneys. We have developed molecular tools for analyzing excretory system regeneration and a simple screening methodology to identify chemicals that specifically damage excretory cells.

3:00 - 3:30

Effects of GSH Depletion and Thioredoxin Reductase Inhibitors on the Viability of MDA-MB-231 and MCF-7 cells

Emma Meetz, Biology; Kaci Keleber, Biology; Collin Ellenbecker, Biology; Radek Buss, Biology; Emily Minton, Biology; Kelly Kuehl, Biology.
Russ Feirer, Associate Professor of Biology

20

The purpose of this study was to investigate the effect of altering the reducing environment in cancer cells by targeting both glutathione (GSH) and thioredoxin (Trx), using treatments with auranofin, methylglyoxal (MG), and buthionine sulfoximine (BSO). By inhibiting redox enzymes of the thioredoxin system, auranofin induces oxidative stress in cells via increased levels of reactive oxygen species (ROS). Such high levels of ROS cause damage to cellular DNA and proteins. MG stimulates further oxidative damage. The experiments were conducted using the breast cancer lines, MDA-MB-231 and MCF-7, which are known to exhibit differences in metabolism and responses to chemotherapeutic drugs.

3:00 - 3:30

Using a Vitality Index to Assess Neighborhood Change in Brown County

Taylor Rudie, Mathematics, Economics
Marc Schaffer, Associate Professor of Economics

21

This project creates a neighborhood vitality index to assess how neighborhoods in Brown County have changed over time. The study required the analysis of census data from 1970 to 2010 and the construction of an index based on median home values, median rents, and per capita income, allowing for neighborhoods to be ranked. With this ranking, we were able to determine which neighborhoods have been ascending, have been stable, or have been descending. We explored these results to assess what trends have occurred in the region that may explain how these neighborhoods have evolved to where they are today.

3:00 - 3:30

Shoreline Credit Union: Market Entry Study

Roman Buss, Economics, Political Science

Marc Schaffer, Associate Professor of Economics; John-Gabriel Licht, Assistant Professor of Business Administration

22

Shoreline Credit Union is a member-owned, non-profit financial cooperative that serves 11,000 members across nine counties in northeast Wisconsin, with locations in Manitowoc County. This well-established credit union provides a myriad of lending options including mortgage, vehicle, and personal loans to its members. Limited by its physical presence in only one county, Shoreline is considering branching out to new markets, most notably Green Bay and Sheboygan. The purpose of this study was to assess the market potential for these two locations and provide an alternative comparison pertaining to which location currently holds the most promise for market entry in the future.

3:00 - 3:30

Constructing a Digital Archive for George MacDonald's *Phantastes* (1858)

Erika Ditzman, English, Communication

John Pennington, Professor of English

23

Project entails creating a teaching supplement site on the college's Digital Commons of George MacDonald's (1824-1905) *Phantastes* (1858), a Victorian fantasy that "baptized" the imagination of C. S. Lewis and influenced, to a great degree, J. R. R. Tolkien. The supplemental archive provides contextual background to the 2017 annotated edition of *Phantastes* edited by John Pennington and Roderick McGillis for Winged Lion Press, which will link to the site. Supplemental material will include: German and English Transnational Influences on *Phantastes*; Fantasy and Realism in the Nineteenth Century; Illustrated Editions of *Phantastes*; and Victorian and Contemporary Reviews of MacDonald.

3:00 - 3:30

Overcoming Negativity: The Relationship Between Sensation Seeking and Conflict Resolution in Younger and Older Adults

Sarah Jensen, Psychology, French

Raquel Cowell, Assistant Professor of Psychology

24

This study examined sensation seeking and conflict resolution in younger and older adults. We predicted that sensation seeking and conflict resolution were positively correlated. The correlation between the sensation seeking score and conflict resolution score, measured by better performance on the Iowa Gambling Task (IGT), wasn't significant. We further analyzed conflict resolution by examining the N2/P3 waves in an event-related potential (ERP) analysis. Results indicated that lower sensation seekers are better at conflict resolution and that there's a positive component to consider in conflict resolution. Further research should be done to expand upon these findings.

3:30 - 4:00

St. Norbert Abbey and Chambers Island: Comparing Inland and Island Small Mammal Species Dynamics

MacKenzie Hennes, Biology; Mikaela Nowak, Biology

Adam Brandt, Assistant Professor of Biology

25

Understanding wildlife population demographics is useful for conservation efforts. Here we describe the first iteration of an annual mark-recapture study to assess population fluctuations at St. Norbert Abbey and Chambers Island. Population data were collected using standard mark-recapture methods. There were greater capture rates on Chambers Island, while the St. Norbert Abbey had greater species diversity. Data from this study will contribute to the long-term research goals: (1) to determine annual variation and long-term trends in species diversity and abundance and (2) provide advocates in and around the Green Bay area biological data to ensure sound conservation and management decisions.

3:30 - 4:00

Planarians, Protonephridia and PKD: Effect of Cilia Disruption on Development of Protonephridia

Julia Novotny, Biology

Ryan King, Assistant Professor of Biology

26

Chronic kidney diseases can result from dysfunction of cellular appendages called cilia that leads to over-proliferation of kidney tubule cells resulting in formation of cysts. The planarian excretory system has significant cellular and molecular similarities to the human kidney and could serve as a model system for analyzing cilia's function in excretory system biology. The goals of this project are to resolve the role of cilia in maintenance of protonephridia architecture, examine cilia's role in fluid flow and sensory function as it relates to excretory system structure and differentiation, and to examine the requirements for cilia during organ regeneration.

3:30 - 4:00

Classification of Early Eocene (53 MY) Rodents from the southern Bighorn Basin, Willwood Formation, Wyoming

Giovanni Bisi, Geology

Deborah Anderson, Professor of Biology

27

Ischyromyid rodents are common elements of the southern Bighorn Basin Early Eocene (53 MY) fauna. These rodents have a generalized molar crown pattern and lack distinguishing features, which has previously made it difficult to identify specimens to the species level. This study uses a new sample of specimens from the Bighorn Basin to revise the alpha taxonomy. Although the specimens were similar in basic features, we were able to recognize distinct characteristics for classification. We identified four different species of ischyromyids, enhancing previous descriptions. These findings will serve as a reference for future studies of Bighorn Basin rodent diversity.

3:30 - 4:00

Designing a Diffraction Setup with Multiple Wavelengths

Sean T. Bennett, Physics

Erik Brekke, Physics

28

A setup to demonstrate diffraction for multiple wavelengths was designed and constructed. A red, green, and violet laser are combined into one beam using mirrors and beam splitters, and then pass through a diffraction grating. A parallel circuit was constructed to power each laser from a single power supply. By measuring the angles of the diffracted light, it is possible to calculate the wavelengths of each beam, and they were found to be $512 \pm 13 \text{ nm}$, $640 \pm 20 \text{ nm}$, $395 \pm 10 \text{ nm}$. This apparatus will be an excellent visual model for future students studying light waves and diffraction.

3:30 - 4:00

The Effects of Internal Hydrogen Bond Formation on the Predicted Thermochemistry of Hydroxylated Criegee Intermediates

Thomas Mellen, Chemistry

Matthew K. Sprague, Assistant Professor of Chemistry

29

The goal of the investigation is to determine whether the formation of an internal hydrogen bond in hydroxylated Criegee Intermediates contribute to a greater energetic stability. The thermochemistry of the ozonolysis of both vinyl and allyl alcohol was calculated using computational software. Molecule geometries were optimized in Gaussian 9, and energies were calculated in Molpro 2012.1. Entropy calculations assumed that molecules were rigid rotors and bonds were harmonic oscillators. The vinyl alcohol Criegee Intermediate isomerized to performic acid with no energetic barrier. The allyl alcohol Criegee Intermediate's internal hydrogen bond did create increased stability.

3:30 - 4:00

Parasites of the Burbot, *Lota lota*, from Green Bay of Lake Michigan, with an Evaluation of *Eubothrium rugosum* based on Molecular Data.

Carson Torhorst, *Biology*

Anindo Choudhury, *Professor of Biology and Environmental Science*

30

As part of an ongoing study on the parasites of Burbot, from Green Bay of Lake Michigan, 19 adult Burbot were examined and six species of helminth parasites were found: 2 cestodes (*Eubothrium rugosum*, and *Proteocephalus* sp.), 1 nematode, and three species of acanthocephalans. Partial sequences of the 18S (1933 bp) and 28S (716 bp) and ITS-2 (716 bp) regions of the rRNA gene array of *E. rugosum* from Burbot in this study showed differences with Eurasian *E. rugosum*. These molecular data will be added to morphological data to test whether North American *E. rugosum* may be a different species.

3:30 - 4:00

Nuclear DNA Diversity Among the Elephants of Guinea-Conakry

Annika Wallander, *Biology, Spanish*

Adam L Brandt, *Assistant Professor of Biology*

31

Poaching is a major cause of elephant population decline and molecular techniques are crucial elements for conservation. There are two species of elephants in Africa, African savannah elephant (*Loxodonta africana*) and African forest elephant (*Loxodonta cyclotis*). Knowing the taxonomy of the elephants in a population is imperative for effective conservation efforts. Elephants in Guinea-Conakry are located in a transitional habitat zone where the range of both species overlap. Using diagnostic single nucleotide polymorphisms we examined the taxonomy of this novel population. Understanding the extent of hybridization contributes to a database for triangulating the provenance of confiscated illegal ivory.

3:30 - 4:00

Mutation in Genes required for Motility and Secretion in *Flavobacterium johnsoniae* reduce Biofilm formation

*Camillus Greguske, Biology; Lauren Kenny, Biology
David Hunicutt, Associate Professor of Biology*

32

The Type IX secretion system (T9SS) is important for secretion and motility in *Flavobacterium johnsoniae*. *Flavobacterium johnsoniae* forms biofilms in low nutrient conditions. Several T9SS Mutants and motility mutants of *F. johnsoniae* were tested for their ability to produce biofilms using a crystal violet microplate assay. Strains with mutations in T9SS components GldNO, GldJ, and PorV were unable to form biofilms. Mutations in secreted adhesin SprB did not have decreased biofilm formation. Chitinase mutants also displayed decreased biofilm formation. Truncations to GldJ showed varied levels of decrease compared to GldJ deletions and wild type. These results indicate that both secretion and motility mutants reduce biofilm formation.

3:30 - 4:00

Reducing Algal Blooms in Dream Lake

*Matthew Young, Biology; Dan Heimerl, Biology
Carrie Kissman, Assistant Professor of Biology and Environmental Science*

33

Many freshwater ecosystems experience increased algal bloom formation due to cultural eutrophication. A top-down trophic cascade, with the addition of piscivores (i.e. largemouth bass), and bottom-up, with nutrient run-off reduction, from 2012-2017 was implemented in Dream Lake to reduce frequent algal blooms. We hypothesized that these manipulations would reduce algal bloom frequency and improve sport fishing. Analysis showed a significant increase in water transparency, lower chlorophyll α , and increased total zooplankton species biomass. Results indicate that Dream Lake may be positively responding to top-down and bottom-up manipulations, and a more balanced ecosystem may have been achieved.

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