

ST. NORBERT COLLEGE  
UNDERGRADUATE  
**RESEARCH  
FORUM**

MULVA LIBRARY

**FRI** APR 22, **1-4**  
**DAY** 2016 **PM**

**AWARDS RECEPTION TO FOLLOW**

MICHELS BALLROOM

4-5:30PM

**RASHAD J. COBB**

DIRECTOR OF EDUCATION AND CAREER DEVELOPMENT INITIATIVES

OF THE BOYS & GIRLS CLUB OF GREEN BAY

**GUEST SPEAKER**

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.

## FORUM AT A GLANCE

ALL EVENTS ARE IN THE MULVA STUDIO AND ON SECOND FLOOR

### ORAL PRESENTATION

Mulva 2nd Floor

- |  |   |
|--|---|
| <b>1:00-1:30</b><br><i>MULVA : 211</i> | <b>1:</b> Breanna Everetts<br>Respecting the Autonomy of an Absent Person   |
| <b>1:00-2:00</b><br><i>MULVA : 213</i> | <b>2:</b> Jonathan Carroll : In Defense of Being<br>Chryssy Joski : Motherhood  |
| <b>2:00-3:00</b><br><i>MULVA : 212</i> | <b>3:</b> Caroline Cooper : Violence Against the Poor in Charles Dickens's Oliver Twist<br>Sarah Lambert : The Toad Jar   |
| <b>2:00-3:00</b><br><i>MULVA : 217</i> | <b>4:</b> Benjamin Socha : Northeast WI Stock Market Index<br>Tyler Platz : Linking Variations in Wisconsin's Cancer Incidence Rates and Environmental Carcinogens  |
| <b>3:00-4:00</b><br><i>MULVA : 211</i> | <b>5:</b> Caroline Cooper : Murderous Women in 1940s and 1950s Film<br>Erich Wegenke : Nuclear Family   |
| <b>3:00-4:00</b><br><i>MULVA : 213</i> | <b>6:</b> Michaela Skalitzky : Identifying Receptors on Escherichia coli that Bacteriophages Attach To<br>Olivia Koehn : Does the gene, MzrA, contribute to the growth of Escherichia coli in the presence of bile salts? |
| <b>3:00-4:00</b><br><i>MULVA : 212</i> | <b>7:</b> Donnie LaBarre : Rejection of Grace: Satan's Use of Cost-Benefit Analysis in Paradise Lost<br>Erika Rettler : Leading Indicator Analysis  |

# POSTER PRESENTATION

POSTERS 1-23 ARE IN THE MULVA STUDIO. POSTERS 24-41 ARE ON SECOND FLOOR OF THE LIBRARY.

- 1:00-2:00**  
MULVA STUDIO
- 1:** Grace Schwantes and Quinn Van Oudenhoven:  
Increasing laser efficiency through exploration of optical pumping and cell size
- 2:00-3:00**  
MULVA STUDIO
- 2:** Nicole Kozlovsky:  
Economic Impact Studies
- 3:00-4:00**  
MULVA STUDIO
- 3:** Tyler Butts:  
Unintended consequences of dredging activity in the lower Fox River on zooplankton density and biomass
- 1:00-2:00**  
MULVA STUDIO
- 4:** Jacob Klug and Giovanni Bisi:  
The Mineralogy and Petrology of the Mellen Pegmatite
- 3:00-4:00**  
MULVA STUDIO
- 5:** Connor Gullstrand:  
Virulence of *Flavobacterium columnare* in Zebrafish
- 1:00-2:00**  
MULVA STUDIO
- 6:** Colin Dassow:  
Cannibalism in Large Mouth Bass: A 28-year Record From a Small North Temperate Lake
- 2:00-3:00**  
MULVA STUDIO
- 7:** Nicole Vanderlin:  
The Relationship Between Income and Depression
- 3:00-4:00**  
MULVA STUDIO
- 8:** Kaitlin Rhode:  
Moth Diversity
- 1:00-2:00**  
MULVA STUDIO
- 9:** Molly Gallahue and Angelina Pankow:  
Petrology of intrusive granites from the Mellen Complex in northwest WI
- 3:00-4:00**  
MULVA STUDIO
- 10:** Lenka Craigova and Johnny Shepherd:  
Growth and Virulence of an Environmental *Flavobacterium* Isolated from a Copepod in Lake Michigan
- 2:00-3:00**  
MULVA STUDIO
- 11:** Halee Martin:  
Using Chemical Disruption to Study Organ Regeneration
- 3:00-4:00**  
MULVA STUDIO
- 12:** Sophie Mueller:  
Analyzing density of Porites and *Cervicornis* coral near Bocas del Toro, Panama
- 2:00-3:00**  
MULVA STUDIO
- 13:** Sarah Jensen and Shelby VanRossum:  
Differences in Sensation Seeking by Age Group and Sex
- 1:00-2:00**  
MULVA STUDIO
- 14:** Cole Brennan:  
Macroinvertebrate Response to Winterkill Event in Dream Lake
- 2:00-3:00**  
MULVA STUDIO
- 15:** Chandler Brennan and Olivia Johnson:  
Mapping the Molecular and Cellular Complexity of Planarian Protonephridia
- 3:00-4:00**  
MULVA STUDIO
- 16:** Dominic Schaut: (DIGITAL SCREEN)  
Investigation of the Downstream Effects of Hippocampal Aromatase Inhibition via RNA Isolation from Zebra Finch Telencephalon
- 2:00-3:00**  
MULVA STUDIO
- 17:** Angel Hon: (DIGITAL SCREEN)  
Hippocampal Insulin Receptor Labeling in Zebra Finch Brain as Revealed by Confocal Microscopy
- 1:00-2:00**  
MULVA STUDIO
- 18:** John Becker:  
Analysis of Zooplankton Distribution and Community Composition between Tributary Source Locations and Canal Locations in Gatun Lake, Panama
- 3:00-4:00**  
MULVA STUDIO
- 19:** Katie Flesch and Erica Groelle:  
A Reexamination of Middle Eocene Rodents From the Bridger Formation of Green River Basin, Wyoming

## POSTER PRESENTATION

POSTERS 1-23 ARE IN THE MULVA STUDIO. POSTERS 24-41 ARE ON SECOND FLOOR OF THE LIBRARY.

- |  |   |
|--|---|
| <b>2:00-3:00</b><br><i>MULVA STUDIO</i>    | <b>20:</b> Preston Konop, Keith Nielsen and Riley Hacker:<br>Rock Identification and Crystallization History of Gabbroic Rocks from the Mellen Intrusive Complex in Mellen, WI  |
| <b>3:00-4:00</b><br><i>MULVA STUDIO</i>    | <b>21:</b> Morgan Lanahan:<br>Measuring the Effectiveness of Rural Wisconsin Upward Bound Programs  |
| <b>1:00-2:00</b><br><i>MULVA STUDIO</i>    | <b>22:</b> Erin Lang:<br>Tunable Fluorescence from Novel Boron Difluoride Derivatives   |
| <b>1:00-4:00</b><br><i>MULVA STUDIO</i>    | <b>23:</b> Holly Hammann, Dani Perszyk, Sara Titus, and Rachel Mueller:<br>Digital Commons @ St. Norbert College (DIGITAL TABLE)  |
| <b>1:00-2:00</b><br><i>MULVA 2nd Floor</i> | <b>24:</b> Danielle Gardner and Brittany Rupp:<br>Spatial Memory Behavior and Vesicular Glutamate Transporter 2 mRNA in the Hippocampus of Adult Male and Female Zebra Finches Following Acute Corticosterone Treatment |
| <b>3:00-4:00</b><br><i>MULVA 2nd Floor</i> | <b>25:</b> Nicole Minton, Anna Nowaczyk, and Hannah Johnshoy:<br>Escherichia Coli Requires OmpX for Growth in the Presence of Bile Salts  |
| <b>1:00-3:00</b><br><i>MULVA 2nd Floor</i> | <b>26:</b> Angel Hon and Yekaterina Makeyeva:<br>G Protein-Coupled Estrogen Receptors in the Zebra Finch Hippocampus are Necessary for Learning and Memory of a Spatial Task  |
| <b>1:00-2:00</b><br><i>MULVA 2nd Floor</i> | <b>27:</b> Carly Barry:<br>The Effect of Mindset on Decision-Making   |
| <b>3:00-4:00</b><br><i>MULVA 2nd Floor</i> | <b>28:</b> Kristian Clausell-Mobley:<br>A Revision on the Impact of the Bubonic Plague  |
| <b>1:00-2:00</b><br><i>MULVA 2nd Floor</i> | <b>29:</b> Katie Flesch:<br>Indole Based Structural Analogs of Modafinil Inhibit the Dopamine Transporter   |
| <b>2:00-3:00</b><br><i>MULVA 2nd Floor</i> | <b>30:</b> Nelson Milbach:<br>Centrifugation Minimizes Microbial Growth in Craft Beer   |
| <b>1:00-2:00</b><br><i>MULVA 2nd Floor</i> | <b>31:</b> Rikki Gingras:<br>Cerebral Palsy Wage Study  |
| <b>3:00-4:00</b><br><i>MULVA 2nd Floor</i> | <b>32:</b> Elizabeth Paitel:<br>Stability of Older Adult Reaction Time in an Impulse Control Task   |
| <b>2:00-3:00</b><br><i>MULVA 2nd Floor</i> | <b>33:</b> Kate Peerenboom, Anna Forcey, and Jordana Butler:<br>Classification of Early Eocene (53 MY) Rodents from the Southern Bighorn Basin, Willwood Formation, Wyoming   |
| <b>3:00-4:00</b><br><i>MULVA 2nd Floor</i> | <b>34:</b> Emma Meetz, John Grady, Davey Holzer, Mitch Ledwith, Austin Livingston, and Kaci Keleher:<br>Characterization of the Cytotoxic Effects of Pteridium (fern) Extracts on Human Cell Lines                      |
| <b>1:00-2:00</b><br><i>MULVA 2nd Floor</i> | <b>35:</b> Bradley Lichtfuss:<br>Called to Serve: A Choice to Teach in a High-Need School   |
| <b>3:00-4:00</b><br><i>MULVA 2nd Floor</i> | <b>36:</b> Sam Potier:<br>Increasing Circulating Laser Intensity by Designing and Utilizing a Ring Optical Cavity   |

## POSTER PRESENTATION

POSTERS 1-23 ARE IN THE MULVA STUDIO. POSTERS 24-41 ARE ON SECOND FLOOR OF THE LIBRARY.

**3:00-4:00**

*MULVA 2nd Floor*

**37:**

Angel Hon, Emily Steffanus, Lauren Roethlisberger,  
and Kelly Brofka:

A Comparison of Varying Electrolyte Replacement on Fluid Balance  
in College Football Players

**1:00-2:00**

*MULVA 2nd Floor*

**38:**

Jack Roets:

Virulence of *Flavobacterium columnare* mutants in Zebrafish

**3:00-4:00**

*MULVA 2nd Floor*

**39:**

Andrew Gisi:

On Hans Kelsen's "Zur Theorie der Juristischen Fiktionen"

A Translation and Critical Reflection

**1:00-2:00**

*MULVA 2nd Floor*

**40:**

Anna Thompson:

From Ariel to Tiana: How do Princesses Influence our Adult Lives?

**3:00-4:00**

*MULVA 2nd Floor*

**41:**

Paige Navis:

The Relationship Between Individualism-Collectivism and Bullying  
Prevalence Across 45 Countries

# UNDERGRADUATE RESEARCH FORUM AWARDS

The Undergraduate Research Forum Awards, sponsored by the Mulva Library, recognizes the outstanding oral and poster presentations at the Forum. Each oral and poster presentation is rated by at least two judges, who represent faculty, staff, and administration members of St. Norbert College, and business and community leaders supportive of undergraduate research.

# RESEARCH FORUM SPEAKER



## RASHAD J. COBB

Director of Education &  
Career Development Initiatives  
of the Boys & Girls Club of Green Bay

Rashad Cobb was born and raised in Milwaukee and is a graduate of Marquette University, where he earned a degree in Business Management. Most important to Rashad is the fact that he is a husband, son, and brother to his wife, parents, and siblings. Rashad and his wife moved to the Green Bay community ten years ago to pursue job opportunities that would eventually lead them to the jobs of their dreams.

When not serving the youth at the Boys & Girls Club of Green Bay in his role as Director of Education & Career Initiatives, Rashad gives back to our community by serving as a Board of Directors member at NeighborWorks Green Bay, The Brown County United Way, and Literacy Green Bay. In addition to these commitments, Rashad also serves on the Brown County United Way's Emerging Leaders Advisory Council, as a committee member for Downtown Green Bay and Olde Main Streets Business Development committee, as a committee member for Downtown Green Bay and Olde Main Streets Physical Improvements committee, as a mentor to three area teens, and he is heavily involved in a handful of other community projects that find him trying to create opportunities for underserved and underprivileged members of the local community.

When he is not working for the people of this community, Rashad enjoys the following free time activities: attempting to bike 1,000 miles during summer months, running in as many 5Ks as possible even though he can NEVER catch his wife in these races, enjoying the local farmer's markets, and traveling the United States to catch up with friends from high school and college.

The Greater Green Bay Chamber of Commerce selected Rashad as a 2014 Future 15 recipient. The Current Young Professionals Network also named Rashad a Young Professional of the Year for 2015.

# ABSTRACT

## ORAL PRESENTATION Mulva 2nd Floor

1

ORAL

1:00-1:30

MULVA : 211

### **Respecting the Autonomy of an Absent Person**

*Breanna Everetts, Philosophy*

*Ben Chan, Assistant Professor of Philosophy*

Is it possible to respect the autonomy of an absent person? To place this conceptual question in a concrete setting, I will frame my analysis of autonomy in the context of surrogate decision-making. New standards for surrogate decision-making appear to be promising justifications for such a conceptual expansion. I hope that analyzing autonomy in the context of surrogate decision-making will allow me to demonstrate the possibility of expanding the rigid standard we currently have for autonomy. I will show that people need not make completely internalized, highly rational and selfish decisions to be respected as autonomous agents.

2

ORAL

1:00-1:30

MULVA : 213

### **Creative Works Presented at the Sigma Tau Delta National English Honor Society Conference in Minneapolis, MN, March 2-6, 2016**

*Jonathan Carroll, English*

*Chryssy Joski, English*

*Laurie MacDiarmid, Professor of English and  
Writer-in-Residence*

Jonathan Carroll, "In Defense of Being"

This is a creative short story which explores an individual's psyche of guilt and forgiveness through an inner dialogue, constructed in a multi-layer narrative with influences both Biblical and philosophical.

Chryssy Joski, "Motherhood"

Motherhood is often a glorified status, with only happy stories of glowing mothers and precious babies. However, the truth about parenthood is that there are just as many downs as there are ups. This presentation consists of a collection of flash fiction pieces (very short stories) about the realities of motherhood.

3

ORAL

1:00-1:30

MULVA : 212

**Critical and Creative Works Presented at the Sigma Tau Delta National English Honor Society Conference in Minneapolis, MN, March 2-6, 2016**

*Caroline Cooper, English and Sarah Lambert, English*

*John Pennington, Professor of English*

*Drew Scheler, Assistant Professor of English and Director of the Writing Program*

Caroline Cooper, "Violence Against the Poor in Charles Dickens's *Oliver Twist*"

This essay examines Dickens's attack on the social injustices against the poor in nineteenth century Britain in his 1837 novel *Oliver Twist*.

Sarah Lambert, "The Toad Jar"

This story was written for a creative writing at Chichester University in England. It is the story of Oliver, a seven-year old boy, and his time playing at a stream, told by his older sister.

**Research Projects from Business Administration and Economics**

*Benjamin Socha, Business Administration (Finance)*

*Tyler Platz, Economics*

*Marc Schaffer, Assistant Professor of Economics*

Benjamin Socha, "Northeast WI Stock Market Index"

The Northeast WI Stock Market Index attempts to measure the overall health of the economic development region in Northeast Wisconsin. This region, comprised of 18 counties, is home to various businesses and organizations that contribute to the overall health of the region. Headquartered in the region are a number of publicly-traded companies whose performances significantly influence regional economic well-being. The Northeast WI Stock Market Index tracks the performance of the publicly-traded companies using an aggregate index value that is compared to a national index value. In addition, the report analyzes individual company component returns based on sector analysis.

Tyler Platz, "Linking Variations in Wisconsin's Cancer Incidence Rates and Environmental Carcinogens"

The Fox River Valley region contains an abundance of carcinogenic substances in its ecosystem. This study sought to explain that cancer rates experienced in the Fox River Valley region are higher compared to all other Wisconsin counties. Ordinary Least Squares regression was utilized to explain variation in the dependent variable using measurable factors which oncological research has shown to impact cancer incidence in both individuals and populations. Cancer incidence rates were found to be statistically significantly higher for the affected counties, a result which can be explained using geological and environmental science studies on carcinogenic substance interaction with the environment.

4

ORAL

1:00-1:30

MULVA : 217

5  
ORAL

3:00-4:00  
MULVA : 211

**Media Studies Project and Performance of an Original Play**

*Caroline Cooper, English*

*Erich Wegenke, English (Creative Writing)*

*April Beiswenger, Assistant Professor of Theatre Studies*

*Mark Glantz, Assistant Professor of Communications and Media Studies*

Caroline Cooper, “Murderous Women in 1940s and 1950s Film”

This independent project analyzes three films from the 1940s and 1950s including *The Postman Always Rings Twice*, *The Bad Seed*, and *The Letter*. The project analyzes how the leading female characters are portrayed in the films and discusses not what happens to a woman if she commits murder, but instead what happens to her if she does not uphold the societal standards of femininity.

Erich Wegenke, Nuclear Family

Nuclear Family is an original full-length play about the Cuban Missile Crisis in 1962, written with the help and guidance of Professor Beiswenger as a playwriting independent study. Actors will present a 10-minute “staged-reading” style performance of a scene from the play.

**Research in Biology and Biomedical Science**

*Michaela Skalitzky, Biology*

*Olivia Koehn, Biology (Biomedical Science)*

*Zach Pratt, Assistant Professor of Biology*

Michaela Skalitzky, “Identifying Receptors on Escherichia coli that Bacteriophages Attach To”

Bacteriophages are viruses that infect bacteria by binding to a receptor on their surface. This research focused on identifying the necessary receptors for six individual bacteriophages to infect Escherichia coli. Plaque assays were performed on wild-type and single-gene mutants of E. coli to identify the receptors the bacteriophages bound to. Results indicated that bacteriophage K10-1 binds multiple receptors, suggesting there are several proteins that are required for infection. All other bacteriophages were capable of binding one receptor. Future work will indicate if K10-1 is a single strain or numerous strains of bacteriophages, and how it may be useful phage in therapy.

Olivia Koehn, “Does the gene, MzrA, contribute to the growth of Escherichia coli in the presence of bile salts?”

OmpX is required for the growth of Escherichia coli in bile salts, but how it contributes to the growth has yet to be elucidated. We hypothesized that MzrA is activated by OmpX and contributes to growth in bile salts. This hypothesis was tested by measuring the growth of wildtype and MzrA-deleted strains of E. coli in the presence of bile salts. The MzrA-deleted strain grew less well than the wildtype strain in bile salt conditions, which supported our hypothesis. In future experiments, we will measure gene expression of MzrA to further clarify its relationship with OmpX.

6  
ORAL

3:00-4:00  
MULVA : 213

ORAL 7

3:00-4:00

MULVA : 217

**Economic Analyses of Leading Indicators and of *Paradise Lost***

*Donnie LaBarre, Economics and English*

*Erika Rettler, Business Administration and Economics*

*Ed Ridsen, Professor of English*

*Marc Schaffer, Assistant Professor of Economics*

Donnie LaBarre, "Rejection of Grace: Satan's Use of Cost-Benefit Analysis in *Paradise Lost*"

This essay presents an economics-based reading of *Paradise Lost*, specifically arguing that Satan makes use of cost-benefit analysis in his critical decision to initially rebel against God, his determination to ruin humanity in Book 2, and his steely refusal to repent in Book 4. Satan's decision-making issues arise due to his fixation on a subjective and worldly understanding of costs and benefits. To Milton, some costs and benefits are objective and constitute "Right Reason": God's love has an infinite benefit, whereas obedience to God costs nothing. In Milton's poetic world, cost-benefit analysis is not useful unless one uses Right Reason.

Erika Rettler, "Leading Indicator Analysis"

Leading Indicators can help companies forecast where they expect to be in the future. This project looked at revenue streams and many indicators that seek to explain the growth of those revenues. Based on correlation analysis indicators can be chosen if they are strongly correlated. The top 6 indicators have been graphed to show where the revenue can be expected to be in the next year.

# ABSTRACT

## POSTER PRESENTATION

POSTERS 1-23 ARE IN THE MULVA STUDIO. POSTERS 24-41 ARE  
ON SECOND FLOOR OF THE LIBRARY.

**1**  
**POSTER**  
**1:00-2:00**  
MULVA STUDIO

### **Increasing Laser Efficiency Through Exploration Of Optical Pumping and Cell size**

*Grace Schwantes, Physics*

*Quinn Van Oudenhoven, Physics*

*Joseph Zielinski, Physics*

*Erik Brekke, Assistant Professor of Physics*

The hyper-fine structures of rubidium can be used to emit 420nm blue light using a parametric four-wave mixing method. This was done using a 778nm laser propagating through a tapered amplifier and the rubidium  $5s_{1/2} \rightarrow 5d_{5/2}$  transition. We explored several possible methods for increasing the efficiency of this process. These involve manipulating the atomic level populations so more atoms can undergo the four-wave mixing process and changing the size of the cell containing rubidium to prevent re-absorption of light. Efficiency of these processes can be evaluated through the comparison of light intensities before and after the utilization of these methods.

**2**  
**POSTER**  
**2:00-3:00**  
MULVA STUDIO

### **Economic Impact Studies**

*Nicole Kozlovsky, Accounting and Economics*

*Marc Schaffer, Assistant Professor of Economics*

Economic Impact Studies for the Green Bay Botanical Garden and Cerebral Palsy Center find they have a \$5.97 million impact on Northeast Wisconsin and a \$8.53 million impact on Brown County, respectively.

**3**  
**POSTER**  
**3:00-4:00**  
MULVA STUDIO

### **Unintended Consequences Of Dredging Activity In The Lower Fox River On Zooplankton Density And Biomass**

*Tyler Butts, Biology (organismal) and Environmental Science*

*Carrie Kissman, Assistant Professor of Biology and Environmental Science*

Water bodies adjacent to paper and other industries are often contaminated by polychlorinated biphenyl (PCBs). Remediation via dredging to remove contaminated sediments may have unintended consequences for local water clarity and zooplankton density and biomass. Zooplankton samples and water quality data was collected at dredged sites as well as upstream and downstream of dredging for two years, 2013 and 2015. Total zooplankton density and biomass was significantly decreased at the dredged site and downstream of it, driven by *Bosmina longirostris* and *Diacyclops navus*. Results suggest that remediation via dredging can be harmful to food web dynamics in water bodies.

4  
POSTER  
1:00-2:00  
MULVA STUDIO

## The Mineralogy and Petrology of the Mellen Pegmatite

Jacob Klug, *Geology*

Giovanni Bisi, *Geology*

Tim Flood, *Professor of Geology*

Nine samples of pegmatite were collected from an outcrop one mile north of Mellen, WI on Highway 13. The pegmatite is associated with the Mellen gabbro (1.1 GA) and includes gabbro xenoliths, indicating that the pegmatite intruded the gabbro. Of the nine samples collected, five were selected for hand sample analysis, point count analysis, petrographic analysis, and scanning electron microscope analysis. The dominant minerals in the samples were found to be quartz, feldspar, and plagioclase. Smaller amounts of biotite, muscovite, chlorite, epidote, and zircon were also found within the samples. The samples collected were determined to be granitic pegmatites.

5  
POSTER  
3:00-4:00  
MULVA STUDIO

## Virulence of *Flavobacterium Columnare* in Zebrafish

Connor Gullstrand, *Biology (Biomedical Concentration)*

David Hunnicutt, *Associate Professor of Biology*

*Flavobacterium columnare* is a gram negative bacterium that causes columnaris disease, which leads to the mortality of many fish species. Zebrafish exposed to *F. columnare* strain (C#2) experience high mortality, and fish exposed to a *gldN*- mutant, defective for motility and secretion, experience no mortality. Similar results are also seen in fish exposed to acellular spent media, where the media is centrifuged and filtered. This suggests that the virulence of *F. columnare* may be due to secreted proteins. Characterization of these secreted proteins may aid in the treatment of columnaris disease in fish populations.

6  
POSTER  
1:00-2:00  
MULVA STUDIO

## Cannibalism In Largemouth Bass: A 28-year Record From A Small North Temperate Lake

Colin Dassow, *Organismal Biology*

James Hodgson, *Emeritus Professor of Biology*

Cannibalism is well studied in fishes and much has been published on the foraging behavior of largemouth bass (*Micropterus salmoides*). Here we report on cannibalism by largemouth bass on their young-of-the-year (YOY) over a 28-year period from a small (1.5 ha), unexploited, north temperate lake (86°32'W, 46°13'N). Largemouth bass dominate the fish community comprising > 95% of the fish biomass. The majority of cannibalism occurs between mid-June and early August (DOY 170-230). Individuals 175-225 mm TL are the principal cannibals where 86% of YOYs consumed were < 27 mm. Habitat segregation between adults and juveniles results in foraging opportunities for juveniles on pelagic, zooplanktivorous YOYs.

7  
POSTER

2:00-3:00

MULVA STUDIO

## The Relationship Between Income and Depression

*Nicole Vanderlin, Economics*

*Marc Schaffer, Assistant Professor of Economics*

A common cliché is that money cannot buy an individual happiness. Taking a closer look at such a simple but powerful saying one might examine the relationship between the two. One could capture this quantity by looking at an individual's level of depression. Going by the cliché would indicate that there would not be a consistent positive or negative linear relationship between ones level of depression and income. But one also can make the argument that the more depressed an individual is the less motivated one is, which could result in a lower income. This would indicate a negative relationship between depression and income. So the question then becomes how does depression affect one's income?

8  
POSTER

3:00-4:00

MULVA STUDIO

## Moth Diversity

*Kaitlin Rhode, Biology*

*Carrie Kissman, Assistant Professor of Biology  
and Environmental Science*

There are a multitude of characteristics that constitute species diversity and diversity that is observable at any given time. In particular, this study focuses on the effects of the lunar phases on species diversity, richness and abundance observed in the order Lepidoptera. Within the order, only moths were of interest in this study. Diversity was analyzed by determining species richness and abundance within the different moon phases in two different years. We expect to see that there will be greater richness and diversity of Lepidoptera during the new moon phase when moon illumination is almost non-existent, and less richness observed in phases, such as waxing gibbous, when the moon is bright.

9  
POSTER

1:00-2:00

MULVA STUDIO

## Petrology Of Intrusive Granites From The Mellen Complex in Northwest Wisconsin

*Molly Gallahue, Geology*

*Angelina Pankow, Geology*

*Tim Flood, Professor of Geology*

The Mellen Complex (MC) in northwest Wisconsin formed 1.1 Ga during the Keweenawan rifting event. Granites are the youngest part of the MC making them the youngest igneous rocks in the state of Wisconsin. The purpose of this project was to determine the origin and crystallization history of the granites. Research methodology included outcrop and hand sample examination, microscope point count and textural analysis, and scanning electron microscope analysis to establish mineral chemistry. The samples for this study were found to be different types of granites. The crystallization sequence for most samples was also determined.

10  
POSTER  
3:00-4:00  
MULVA STUDIO

**Growth and Virulence of an Environmental *Flavobacterium* Isolated from a Copepod in Lake Michigan**

*Lenka Craigova, Biology (Biomedical Concentration)*  
*Johnny Shepherd, Biology (Biomedical Concentration)*  
*David Hunnicutt, Associate Professor of Biology*

*Flavobacterium columnare* is the cause of Columnaris disease in a variety of fish species. Ecologists at UW-Madison studying the microbiota of copepods in Lake Michigan recently isolated a potential strain of *F. columnare* from *Eurytemora affinis*. We are testing growth rates and pathogenicity of this organism. Growth curves were conducted in common *flavobacterium* media Modified Shieh and MAT. Infection trials were conducted on zebrafish (*Danio rerio*) via scale removal and immersion bath. Our goal is to compare our results to those of other well-studied strains in order to expand our understanding of potential reservoirs of *F. columnare*.

11  
POSTER  
2:00-3:00  
MULVA STUDIO

**Using Chemical Disruption to Study Organ Regeneration**

*Halee Martin, Chemistry*  
*Ryan King, Assistant Professor of Biology*

Planarians have amazing capacity for regeneration. Current strategies of studying this system involve amputation of large sections of the body. This does not encompass replication of traumatic organ injury such as kidney failure. Planarians possess a primitive kidney-like system with cellular and molecular similarities to the human kidney. The goal of this project is to develop a strategy to destroy this system without damaging other parts of the organism in order to study regeneration.

12  
POSTER  
3:00-4:00  
MULVA STUDIO

**Analyzing Density of *Porites* and *Cervicornis* Coral Near Bocas del Toro, Panama**

*Sophie Mueller, Environmental Science*  
*Carrie Kissman, Assistant Professor of Biology and Environmental Science*

This project will be looking at the densities of two different species of coral collected from four different locations near Bocas del Toro, Panama. My hypothesis states that coral reef density will increase as distance from the mainland increases.

**13  
POSTER**  
**2:00-3:00**  
MULVA STUDIO

### **Differences in Sensation Seeking by Age Group and Sex**

*Sarah Jensen, Psychology and Shelby VanRossum, Psychology  
Raquel Cowell, Assistant Professor of Psychology*

Sensation seeking is a trait used to assess an individual's pursuit of novel and exciting experiences, and is expressed behaviorally as risk-taking. Previous research suggests that sensation seeking may change throughout life but has focused on young adults without including older adults (Steinberg et al., 2008). Our study addresses this deficit by administering a modified version of Zuckerman's Sensation Seeking Scale to 54 younger (18-22) and older (65+) adult participants. A one-way ANOVA revealed significant between-group effects for three of the sensation seeking subscales. These findings suggest differences in sex and age regarding sensation seeking. These differences may affect the decision-making processes used in everyday life.

**14  
POSTER**  
**1:00-2:00**  
MULVA STUDIO

### **Macroinvertebrate Response to Winterkill Event in Dream Lake**

*Cole Brennan, Biology  
Carrie Kissman, Assistant Professor of Biology and  
Environmental Science*

Most research conducted on lakes that have experienced winterkills looks at fish dynamics rather than macroinvertebrates due to both the rarity and unpredictability of winterkills. In spring of 2014, Dream Lake, a small water body in Brown Co, WI, experienced a significant winterkill that dramatically reduced fish populations. We hypothesized that the macroinvertebrate populations would shift in response to this event. Macroinvertebrate populations from three locations were sampled pre- and post-winterkill. Preliminary data analyses indicate a decrease in macroinvertebrate species diversity, a change in relative abundance for some species, and no change in richness post winterkill.

**15  
POSTER**  
**2:00-3:00**  
MULVA STUDIO

### **Mapping the Molecular And Cellular Complexity Of Planarian Protonephridia**

*Chandler Brennan, Biology  
Olivia Johnson, Biology  
Ryan King, Assistant Professor of Biology*

Planarian protonephridia are an exciting model for dissecting the mechanisms underlying cystic kidney diseases as well as for identifying novel drug targets for treating parasitic flatworm infections. An important step in taking advantage of this model is uncovering the molecular composition and complexity of this excretory system. We have identified eighty genes with enriched expression in protonephridia and have mapped the expression of these genes uncovering an impressive level of cell-type complexity. While a number of these genes have vertebrate homologs, many appear specific to flatworms and may represent exciting drug targets for treating flatworm infections.

**16  
POSTER**  
**3:00-4:00**  
MULVA STUDIO  
DIGITAL SCREEN

**Investigation of the Downstream Effects of HippoCampal Aromatase Inhibition Via RNA Isolation From Zebra Finch Telencephalon**

*Dominic Schaut, Biology (Biomedical Concentration)*  
*David Bailey, Associate Professor of Biology*

Estradiol is produced in the brain by the enzyme aromatase and is critical to hippocampal memory formation. Work in the lab has shown that aromatase inhibition in the zebra finch hippocampus inhibits performance in a hippocampal-dependent memory task. Given that the hippocampus is the primary site of estradiol production, what the effects of this aromatase inhibition are on hippocampal efferents have yet to be elucidated. RNA was extracted from zebra finch telencephalon (minus the hippocampus) following inhibition of estradiol production or action at its receptor, and qPCR will be performed to analyze the signal transduction pathways modified by hippocampal estradiol.

**17  
POSTER**  
**2:00-3:00**  
MULVA STUDIO  
DIGITAL SCREEN

**Hippocampal Insulin Receptor Labeling in Zebra Finch Brain as Revealed by Confocal Microscopy**

*Angel Hon, Biology*  
*David Bailey, Associate Professor of Biology*

Insulin is a hormone best known for blood glucose regulation, but it also plays a role in memory. Insulin receptors were labeled immunohistochemically in male and female zebra finch brain. As a number of sex differences exist in songbird brains, it is hypothesized that there will be a male-biased sexual dimorphism. Three-dimensional images of insulin receptor expression were produced via confocal microscopy. Labeling of neuronal somata and dendrites will be examined in select areas of the brain, but especially the hippocampus, a structure central to memory. This analysis will inform us of how songbird memory function is regulated by insulin receptors.

**18  
POSTER**  
**1:00-2:00**  
MULVA STUDIO

**Analysis of Zooplankton Distribution and Community Composition between Tributary Source Locations and Canal Locations in Gatun Lake, Panama**

*John Becker, Environmental Science*  
*Carrie Kissman, Assistant Professor of Biology and Environmental Science*

We explored zooplankton distribution and community composition at various distances from tributaries entering into Gatun Lake, Panama. Zooplankton samples were taken at 3 different tributaries entering in Gatun Lake, each with a sampling site close to a tributary source and a site towards the canal, further away from the source. Relative density of *Diaphanosoma brachyurum* increases moving away from the tributary source and average density of *Bosmina longirostris*, *Bosminopsis deitersi*, and *D. brachyurum* also increases when moving away from the source. Density increase could be caused by an increase in phytoplankton, the primary food source of zooplankton.

19  
POSTER  
3:00-4:00  
MULVA STUDIO

## **A Reexamination of Middle Eocene Rodents from the Bridger Formation of Green River Basin, Wyoming**

*Katie Flesch, Biology*

*Erica Groelle, Biology*

*Deborah Anderson, Associate Professor of Biology*

Sciuravids are a diverse group of primitive rodents from the early to middle Eocene of North America. Taxonomy of the Sciuravidae has been misleading because the genotype, *Sciuravus nitidus*, with its high level of intraspecific variation, has been used as a wastebasket taxon. By comparing the size and morphology of each tooth, we determined that the specimens originally assigned to *S. nitidus* could be divided into four different species. Distinguishing characteristics used to identify species included presence of ectostylids, tooth outline, and other crown pattern features. We recognized *S. nitidus* in biochron Br-1 (early middle Eocene) and Br-2 (middle middle Eocene) and *S. powayensis*, *S. eucristadens*, and *S. undans* in biochron Br-2. By revising the alpha taxonomy, we generated the base data which can now be used for future studies investigating sciuravid evolution.

20  
POSTER  
2:00-3:00  
MULVA STUDIO

## **Rock Identification and Crystallization History of Gabbroic Rocks from the Mellen Intrusive Complex in Mellen, WI**

*Preston Konop, Geology,*

*Keith Nielsen, Geology*

*Riley Hacker, Geology*

*Tim Flood, Professor of Geology*

The Mellen Gabbro Complex is part of a larger suite of igneous rocks related to the Keweenawan Rifting Event which occurred, 1.1 Ga. The purpose of this research project is to quantitatively analyze rock samples and determine crystallization history. Rock type was determined through the use of point count analysis and mineral chemistry was determined using a SEM-EDS. Nine hand samples were collected from a quarry in Mellen, Wisconsin. Five of the nine were identified to be either gabbro, leucotroctolite, and anorthosite. Crystallization history for each sample was also determined; the crystallization sequence was Plagioclase followed by Pyroxene.

**21**  
**POSTER**  
**3:00-4:00**  
MULVA STUDIO

**Measuring the Effectiveness of Rural Wisconsin Upward Bound Programs**

*Morgan Lanahan, Psychology and Sociology*  
*Jamie Lynch, Assistant Professor of Sociology*

This research evaluates the effectiveness of several of the rural TRIO Upward Bound programs of Wisconsin. This evaluation focuses on how effectively the programs assist low-income and first-generation potential college students in completing their high school education and enrolling in postsecondary education. The results indicate that the Upward Bound programs produced higher graduation rates and greater college attendance rates than their target high schools; thus branding them effective. The data collected regarding low-income status of the high school seniors provided evidence showing that if the funding was available, a greater number of eligible students would be able to be served.

**22**  
**POSTER**  
**1:00-2:00**  
MULVA STUDIO

**Tunable Fluorescence From Novel Boron Difluoride Derivatives**

*Erin Lang, Chemistry*  
*Kurstan Cunningham, Assistant Professor of Chemistry*

Luminescent boron complexes have utilized either a dipyrromethene (BODIPY) or a diketonate functionality to create emission from a short-lived, singlet  $\pi-\pi^*$  excited state, making these complexes excellent as molecular probes, biological tags or light-emitting diodes. Our current project combines the chemical characteristics of these two different ligand frameworks into one, a keto-phenolate core. The new complexes revealed emission that was blue-shifted in both solution and solid state compared to the known compounds. The intensity and wavelength of the fluorescence was based on the ligand structure which suggests an ability to tune the excited state of these complexes.

**23**  
**POSTER**  
**1:00-4:00**  
MULVA STUDIO  
DIGITAL TABLE

**Digital Commons @ St. Norbert College**

*Holly Hammann, English*  
*Dani Perszyk, Mathematics and Computer Science*  
*Sarah Titus, Project Librarian for Intellectual Engagement Initiatives*

*Rachel Mueller, Library Communications Specialist*  
*John Pennington, Professor of English*

Come learn about a brand new, cross-college initiative which seeks to highlight, preserve, and cultivate all aspects of academic life at St. Norbert College. Through this institutional repository, the campus community will be able to efficiently preserve and share faculty and student work, including various research presentations on display in today's forum. Featured during the demonstration will be the *North Wind: A Journal of George MacDonald Studies* and *Orts: The Newsletter of the George MacDonald Society* digital archives. Stop by the digital table in the Mulva Studio for an opportunity to interact with content examples in the repository and discuss other campus projects that reflect the values and academic standards of SNC.

**24  
POSTER**

**1:00-2:00**  
MULVA 2nd Floor

**Spatial Memory Behavior and Vesicular Glutamate Transporter 2 mRNA in the Hippocampus of Adult Male and Female Zebra Finches Following Acute Corticosterone Treatment**

*Danielle Gardner, Biology and Brittany Rupp, Biology  
David Bailey, Associate Professor of Biology*

Hippocampal-dependent memory is modified by the stress hormone corticosterone, which can alter glutamate neurotransmission. Glutamate is loaded into synaptic vesicles by vesicular glutamate transporter proteins (VGLUTs). In previous work, corticosterone treatment of female zebra finches increased hippocampal VGLUT mRNA by 140% relative to controls. We hypothesized that corticosterone treatment of males would significantly increase VGLUT2 mRNA compared to females. These data will provide an explanation for the sexually dimorphic nature of stress-induced, hippocampal-dependent memory performance, and a further indication that potentiation of memory during acute stress results from an increased glutamate shuttling following upregulation of VGLUT2.

**25  
POSTER**

**3:00-4:00**  
MULVA 2nd Floor

**Escherichia Coli Requires OmpX for Growth in the Presence of Bile Salts**

*Nicole Minton, Biology, Anna Nowaczyk, Biology  
and Hannah Johnshoy, Biology  
Zachary Pratt, Assistant Professor of Biology*

Outer membrane proteins (Omps) in Gram-negative bacterial membranes fight against environmental stress. Omps function during extracellular stress as efflux pumps or activators of RpoE, a stress-responsive sigma factor. Our work examines ompX's effect on the growth of Escherichia coli in bile salts, which are found in the gastrointestinal tract and disrupt bacterial lipid membranes. An ompX mutant was generated in E.coli using recombineering (Datsenko and Wanner, 2001). The ompX deletion mutant showed decreased growth compared to the parental strain in the presence of bile salts. These findings indicated that the deletion of ompX renders E. coli sensitive to bile salts.

**26  
POSTER**

**1:00-3:00**  
MULVA 2nd Floor

**G Protein-Coupled Estrogen Receptors in the Zebra Finch Hippocampus are Necessary for Learning and Memory of a Spatial Task**

*Angel Hon, Biology and Yekaterina Makeyeva, Biology  
David Bailey, Associate Professor of Biology*

Inhibition of estrogen production in the zebra finch hippocampus decreases performance in a spatial memory task, but studies involving the role of estrogen receptors in this effect are necessary to more directly examine estradiol's role. Birds were given an agonist or antagonist of the G protein-coupled estrogen receptor (GPER) and were tested for acquisition and retention of a food location. Then, brain tissue was collected and the hippocampus microdissected. While GPER agonism did not significantly affect acquisition, antagonism resulted in a failure of learning. Additional work is determining the synaptic mechanisms mediated by estrogen provision and necessary for hippocampal-dependent memory.

**27**  
**POSTER**  
**1:00-2:00**  
*MULVA 2nd Floor*

**The Effect of Mindset on Decision-Making**

*Carly Barry, Psychology*

*Kameko Halfmann, Visiting Assistant Professor of Psychology*

We explored how abstract versus concrete processing affected decision-making. We also examined if connection to future self modified the relationship between mindset and decision-making. We expected individuals in the concrete processing condition to make safer and more immediately gratifying decisions than the abstract processing condition. Preliminary analyses show that, on average, participants in the concrete condition do indeed make safer and more immediately satisfying choices, and that connectedness to one's future self predicts future oriented choices. However, data analysis is ongoing. The results of this research will help us understand what guides our decision-making process.

**28**  
**POSTER**  
**3:00-4:00**  
*MULVA 2nd Floor*

**A Revision on the Impact of the Bubonic Plague**

*Kristian Clausell-Mobley, Biology*

*Tom Conner, Professor of French*

Beginning in the mid-14th century, bubonic plague swept across the known world leaving death in its wake. This pandemic sized cataclysm which ravaged Europe was brought about by a multitude of factors including those which could be controlled and others which could not. Within this paper I make the case for a different view of the plague; one that maintains it was not all bad. Some effects of the plague, one might argue, could have led to an eventual rise of the middle class in medieval Europe, eventually leading to capitalism as we know it today. Evidence for these positive contributions of the plague will be analyzed to see just how the bubonic plague changed the Europe of the 1300's to the one more recognizable today.

**29**  
**POSTER**  
**1:00-2:00**  
*MULVA 2nd Floor*

**Indole Based Structural Analogs of Modafinil Inhibit the Dopamine Transporter**

*Katie Flesch, Biology*

*Cynthia Ochsner, Assistant Professor of Chemistry*

Modafinil (2-[(diphenylmethyl) sulfinyl] acetamide) is a wake promoting agent that acts at presynaptic dopaminergic neurons as a partial substrate for the dopamine transporter (DAT), increasing extraneuronal dopamine. Using rotating disc electrode voltammetry in a suspension of human embryonic kidney cells expressing the human dopamine transporter, our previous results indicated that modafinil binds to DAT at the same site as DA. We also reported that an in-house synthesized indole based structural analog of modafinil inhibits DAT in an uncompetitive manner, exhibiting cocaine-like inhibition. We have synthesized four additional indole based analogs to determine whether they are inhibitors (cocaine-like) or substrates (amphetamine-like) of DAT. The mechanisms of inhibition of these analogs are determined by fitting rates of dopamine inward transport to mathematical models.

**30**  
**POSTER**  
**2:00-3:00**  
MULVA 2nd Floor

**Centrifugation Minimizes Microbial Growth in Craft Beer**

*Nelson Milbach, Chemistry (Biochemistry emphasis)*  
*David Hunnicutt, Associate Professor of Biology*

Brewing involves the activity of microbes from the production of raw materials to packaging. Fermentation of sugars in grain extracts by brewing yeast, *Saccharomyces cerevisiae*, is of central importance to brewing. However, the presence of other microbes presents a threat to the quality of finished product, dictating the careful management of the brewing process. The current work assesses the microbial content of craft beers produced by Hinterland Brewery, Green Bay WI before and after the incorporation of centrifugation in the brewing process. Analysis of microbial growth on differential media suggests that centrifugation effectively eliminates excess microbial content.

**31**  
**POSTER**  
**1:00-2:00**  
MULVA 2nd Floor

**Cerebral Palsy Wage Study**

*Rikki Gingras, Business Administration*  
*Jamie O'Brien, Assistant Professor of Business Administration*  
*Marc Schaffer, Assistant Professor of Economics*

The goal of this wage study was to compare the salaries offered by the Cerebral Palsy Center to Green Bay market salaries. The Cerebral Palsy Center has thirty-eight positions that needed to be evaluated and compared with the going market wage in our region.

**32**  
**POSTER**  
**3:00-4:00**  
MULVA 2nd Floor

**Stability of Older Adult Reaction Time in an Impulse Control Task**

*Elizabeth Paitel, Psychology and Spanish*  
*Raquel Cowell, Assistant Professor of Psychology*

Both younger and older adults spend an increasing amount of time with their peers. While research suggests that younger adults significantly change their behaviors in the context of peers and take greater risks as a result (Steinberg & Gardner, 2008), it is not clear if older adults are similarly influenced. In the current study, reaction time on a decision-making task varied by age group and social context. Results from a one-way ANOVA showed that overall, a community sample of older adults exhibited slower reaction times on a decision-making task compared to the younger adults, regardless of social context. Additionally, younger adults appeared more sensitive to peers compared to their older adult counterparts and performed more quickly when they were being observed by two similarly aged, same sex peers ( $M = 6.09$ ). This may suggest that young adults do not contemplate decisions as thoroughly in the presence of peers as older adults. These results have the potential to inform the general public of the realities of cognitive aging, and to combat ageism within our communities by illustrating how a steady reaction time is more robust in older adults, regardless of changes in the environment.

33  
POSTER

2:00-3:00  
MULVA 2nd Floor

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

*Kate Peerenboom, Biology*

*Anna Forcey, Biology*

*Jordana Butler, Biology*

*Deborah Anderson, Associate Professor of Biology*

Ischryomyid 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. We found that although the specimens were similar in basic features, we were able to recognize distinct characteristics to classify each taxon. We identified eight different species of ischryomyids, enhancing previous descriptions. These findings will serve as a reference for future studies of Bighorn Basin rodent diversity.

34  
POSTER

3:00-4:00  
MULVA 2nd Floor

**Characterization of the Cytotoxic Effects of Pteridium (fern) Extracts on Human Cell Lines**

*Emma Meetz, Biology*

*John Grady, Biology*

*Davey Holzer, Biology*

*Mitch Ledwith, Biology*

*Austin Livingston, Biology*

*Kaci Keleher, Biology*

*Russ Feirer, Associate Professor of Biology*

Bracken fern (*Pteridium aquilinum*) frond extracts induce apoptosis and cell cycle arrest in certain cancer cell lines. This work extended the findings of Roudsari et al. and determined the cytotoxicity of *P. aquilinum* extracts on additional cancer cell lines. *P. aquilinum* extracts affected the cancerous MDA-231 cells (IC<sub>50</sub> ~75 µg/mL) more than the non-cancerous MCF-10a cells (IC<sub>50</sub> ~ 500 µg/mL). To isolate the cytotoxic compound(s) that induced cell death, the extract was separated using a silica column to yield several distinct bioactive fractions. Work continues to characterize the bioactive compounds in *P. aquilinum* extracts, which have been found to be labile.

35  
POSTER

1:00-2:00  
MULVA 2nd Floor

**Called to Serve: A Choice to Teach in a High-Need School**

*Bradley Lichtfuss, Economics and Political Science*

*Marc Schaffer, Assistant Professor of Economics*

This project examined the current intent of undergraduate students here at St. Norbert College, specifically looking at where they intend to teach. It also examined how they would respond to financial incentives to join an urban education program and go and teach in a high-need school for three years.

**36  
POSTER**

**2:00-3:00**

MULVA 2nd Floor

**Increasing Circulating Laser Intensity by Designing and Utilizing a Ring Optical Cavity**

*Sam Potier, Physics and Mathematics*

*Erik Brekke, Assistant Professor of Physics*

Within the field of optical research, build-up cavities are utilized in order to increase the intensity of a circulating laser beam. Construction of an optical ring cavity has been the focus of my research. This specific build-up cavity design of four mirrors was chosen due to its ability to generate a large amount of intensity increase through the constructive interference of multiple reiterations of the laser beam, its resultant 10 micron waist, and its length, which allows a Rubidium cell to be placed within the cavity. This increased intensity allows for further study of the excitation levels of Rubidium atoms.

**37  
POSTER**

**3:00-4:00**

MULVA 2nd Floor

**A Comparison of Varying Electrolyte Replacement on Fluid Balance in College Football Players**

*Angel Hon, Biology*

*Emily Steffanus, Biology*

*Lauren Roethlisberger, Biology*

*Kelly Brofka, Biology*

*David Bailey, Associate Professor of Biology*

Electrolyte replacements contain ingredients to maintain hydration and enhance performance. We determined the effectiveness of Pedialyte, Gatorade, and Medi-lyte electrolyte tablets in college football players, hypothesizing that Pedialyte would be most effective. Treatments were provided prior to practice over 4 weeks, and participants' vitals were measured and urinalysis was conducted before and after each practice. Among treatment conditions, there were no significant differences in variables like urine specific gravity, pH, and body temperature. However, of the cardiovascular variables, the tablets were more effective, limiting fluctuation of systolic blood pressure. Additional studies could examine these effects across sport and season.

**38  
POSTER**

**1:00-2:00**

MULVA 2nd Floor

**Virulence of *Flavobacterium Columnare* Mutants in Zebrafish**

*Jack Roets, Biology*

*David Hunnicutt, Associate Professor of Biology*

*Flavobacterium columnare* is a gram-negative rod that is the cause of Columnaris disease in a variety of fish, including ecologically and economically important species in Wisconsin. Infection assays using a zebrafish (*Danio rerio*) model system have been used to evaluate *F. columnare* virulence factors in knockout mutants. Wild type *F. columnare* strain C#2 resulted in fatal infection, while mutations in *gldN*, a gene required for gliding motility and secretion, showed reduced virulence. The *gldN*- mutant strain is being evaluated as a potential vaccine to provide resistance to Columnaris disease.

## 39 POSTER

3:00-4:00  
MULVA 2nd Floor

### **On Hans Kelsen's "Zur Theorie der Juristischen Fiktionen": A Translation and Critical Reflection**

*Andrew Gisi, Philosophy*

*Joel Mann, Associate Professor of Philosophy*

This project will examine and provide an in-depth analysis of a particular work by Hans Kelsen (1881-1973). In introducing his "Pure Theory of Law," Kelsen attempted to study the nature of law apart from cultural ideologies. This objective approach to the scientific study of law allowed Kelsen to write on a variety of topics such as the problems of sovereignty, sanctions, the interactions of international law and state law, and particular world organizations like the League of Nations and the United Nations. Kelsen's 400 works have wide-ranging implications for law and the philosophical study of law. Despite this impact, however, scholars have overlooked Kelsen's works until recently. This collaborative project seeks to join in the discussion of Kelsen's philosophy by first offering a translation of Kelsen's "Zur Theorie der juristischen Fiktionen" and then an interpretation of the work that attacks or defends one of Kelsen's provocative, contentious theses.

### **From Ariel to Tiana: How do Princesses Influence our Adult Lives?**

*Anna Thompson, Political Science*

*Karlynn Crowley, Professor of English and Director of the  
Cassandra Voss Center*

*Anna Czarnik-Neimeyer, Assistant Director of the  
Cassandra Voss Center*

Most people loved watching Disney movies as children. But what lasting effects have these movies generally and the princess characters specifically had on us? Research demonstrates that college-aged women, who still embrace the princess culture created by Disney, are more likely than their non-princess obsessed peers to stay in abusive relationships. This phenomenon should be examined, particularly on college campuses. This project will investigate how women can be empowered to break free from princess culture. The poster presentation was inspired by attending the National Women's Studies Association (NWSA) conference with 11 students from St. Norbert in November.

## 40 POSTER

1:00-2:00  
MULVA 2nd Floor

### **The Relationship Between Individualism-Collectivism and Bullying Prevalence Across 45 Countries**

*Paige Navis, Psychology and Sociology*

*Paul Ngo, Associate Professor of Psychology*

In recent years, bullying has been recognized as a worldwide epidemic that is harmful to all involved. The aim of the present study is to investigate this relationship between a country's individualism score and the prevalence of bullying in both girls and boys. Through the analysis of already existing data from 45 countries the results suggest that a country's individualism score does impact the prevalence of bullying in both boys and girls. This suggests that in both boys and girls the more individualistic the country is the less prevalent bullying becomes.

## 41 POSTER

3:00-4:00  
MULVA 2nd Floor

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# NOTES



Breakthrough Fuel is proud to support undergraduate research at St. Norbert College and congratulates all students for participating in such research