4-21-2017

Undergraduate Research Forum 2017

St. Norbert College

St. Norbert College

UNDERGRADUATE RESEARCH FORUM

April 21

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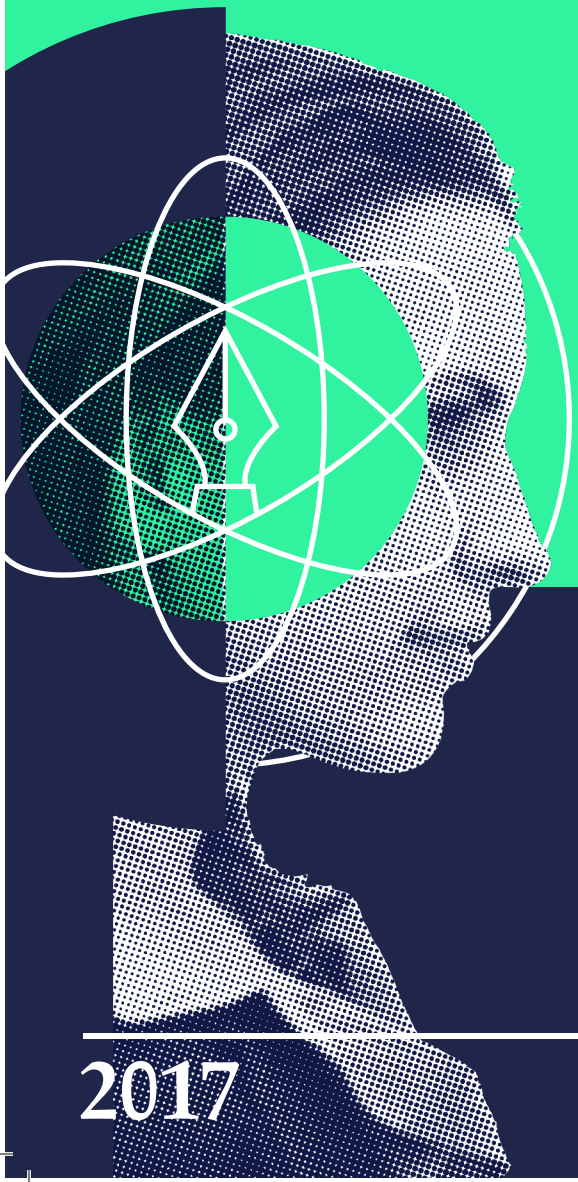

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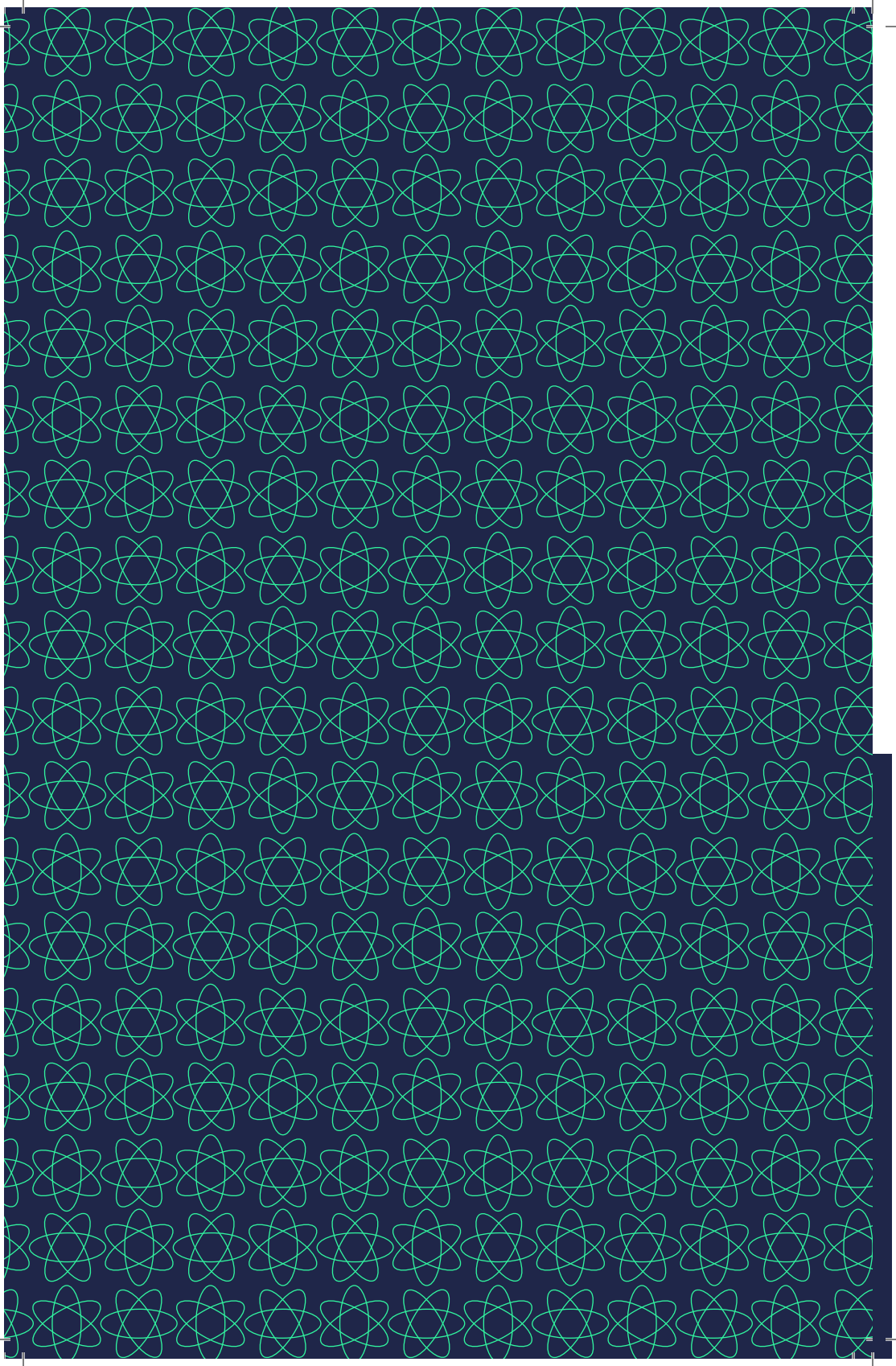

St. Norbert College

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

1:00- 1:15
Mulva 101

1 **Alexa Brill**
Understanding Food Insecurity

1:15- 1:30
Mulva 101

2 **Bailey Bushman**
Social Comparison of Manipulated and Unmanipulated Media Images

2:30- 2:45
Mulva 101

3 **Benjamin Douglas Gjerde**
Laïcité, The Combes Laws, and the Abbey of Mondaye

3:00- 3:15
Mulva 101

4 **Marissa Elliott**
You Lead Like a Girl: Gender and Children's Leadership Development

3:00- 4:00
Mulva Studio

CREATIVE WRITING/ SHORT STORIES PRESENTATION

5 **Benjamin K. Paplham**
Rite of Flight

6 **Lizzie Tesch**
The Eye of a Hurricane

7 **Mary Paplham**
A Thin Place

	8	**Natasha Igl** Seeing Through Touch
3:15- 3:30 *Mulva 101*	9	**Megan Hovell** Leading Indicators Analysis
3:30- 3:45 *Mulva 101*	10	**Hannah Johnshoy** How does OmpX protect *Escherichia coli* in the Presence of Bile Salts?
3:45- 4:00 *Mulva 101*	11	**Alexa Brill, Mike Gehm** Employee Engagement in Education: Creating a Pulse Survey

POSTER PRESENTATIONS

All Poster Presentations are located on the First Floor of Mulva

1:00- 1:30	1	**Kevin Schlichter** Effects of Encoding and Delay on Recall
	2	**Tyler J. Butts** Zooplanktivory in Post-Juvenile Largemouth Bass: A 28-Year Record From a Small North Temperate Lake
	3	**Benjamin Douglas Gjerde** Laïcité, The Combes Laws, and the Abbey of Mondaye
	4	**Johnny Shepherd** Pathogenicity of an Environmental *Flavobacterium* Isolated from a Copepod in Lake Michigan
	5	**Kathryn Sauter, Kacey Spoerl** The Effect of Educational Major Area on the Ethical Perceptions of Students

1:00- 1:30	6	**Marissa Elliott, Sierra Peters, Tina Pizzo** The Cognitive Reflection Test: Judgment In Collision And Non-Collision Athletes
	7	**Michaela Machurick, Mikaela Nowak** Planarians: Light or Death?
	8	**Preston Konop** Inland Sand Dunes of the Lower Oconto River Valley: Geomorphology, Age, and Paleoclimate
	9	**Riley Hacker** A New Partial Skeleton of *Xiphactinus audax* With a Well-Preserved Neurocranium from rhe Late Cretaceous Tropic Shale of Southern Utah
	10	**Hannah Ramminger, Christian M. Cattan** E-Loft Accelerator Development
1:30- 2:00	11	**Jonathan Carroll, Kristin Schmitt, Mackenzie Ciske, Hannah Mandlman** The Extents of Human Perceptive Capabilities in a Physical Reality
	12	**Amanda J. Schmidt, Isabel R. Detienne** Reducing Non-Suicidal Self-Injury and Emotion Dysregulation: Effectiveness of DBT in a Community-Based Clinic
	13	**Brittany Rupp, Mehakupinder Chahal** Sexually Dimorphic Effects of Acute Corticosterone Treatment on Spatial Memory Behavior and Vesicular Glutamate Transporter 2 mRNA in the Zebra Finch Hippocampus

1:30- 2:00	14	**Kayla Lewin** Cancerous Worms
	15	**Malgorzata Waz** Comparison of zooplankton communities between Chagres River and Gatun Lake tributary sites in Panama
	16	**Serena Hatahet** New Specimens of *Taxymys* and *Tillomys* Highlight Evolutionary Relationships Among Early-Middle Eocene Sciuravids
	17	**Elizabeth Manlick** New Specimens of *Sciuravus undans* (Mammalia, Rodentia) Recovered from the Bridger Formation, Green River Basin, Wyoming
	18	**Tina Pizzo** Attitudes and Judgments on Food Consumption: Descriptive Analyses
2:00- 2:30	19	**Jessica Tooley** Examining How Directions Alter Visual Search Behavior
	20	**Megan Johnson** Relationship Between *Porites porites* and *Acropora cervicornis* Coral Densities and Various Environmental Factors
	21	**Madeleine Sprout** Terrorism in France
2:30- 3:00	22	**Ashley Nelson, Stephen Lin** Fishing with Worms: The Search for Homologs Involved in the Excretory System of Planarians and Zebrafish

2:30- 3:00

23 **Ashley Nelson, Taylor Oswald, Zachary Krueger**
Planaria Hysteria: The Search for Differentially Expressed Genes During Planarian Regeneration

24 **Boris Semnic**
Characterization of a Widely Distributed Fish Parasite *Crepidostomum cooperi* (Trematoda: Allocreadiidae) Using Morphology and Molecular Data

25 **Claire Visconti**
French Nobel Prize Winners

26 **John Grady, Davey Holzer, Kaci Keleher, Emma Meetz, Collin Ellenbecker**
The Combined Effects of Polyamine and GSH Inhibition on the Viability of Human Cancer Cell Lines

27 **Grace Schwantes, Joseph Zielinski**
Investigation of Laser Efficiency Using Lock-in Amplification

28 **Sam Potier**
Optical Cavity for Enhanced Parametric Four-Wave Mixing in Rubidium

29 **Hannah Sherfinski, Paige Bonner, Lauren Hoyer**
Excretory System Regeneration Following Chemical Ablation

3:00- 3:30

30 **Connor Gullstrand,Megan Kroll**
Characterizing and Combating Columnaris Disease in Zebrafish

3:00- 3:30

31 **Brittany Sheahan**
2nd Order Linear Differential Equations and AIry's Function

32 **Claire Mahon**
Determining Laser Frequency Using a Grating Spectrometer

33 **Maggie McConnaha**
Empathy Formation in Middle School

34 **Tyler J. Butts**
Reducing Algal Blooms In Dream Lake, WI: Algal and Zooplankton Seasonal Dynamics Indicate Response to Food Web Manipulation

35 **Lauren Hoyer, Paige Bonner**
Excretory System Regeneration Following Chemical Ablation

36 **Julia Novotny**
Planarian Protonephridia and Polycystic Kidneys

RESEARCH FORUM GUEST SPEAKER

Thomas Kunkel

SEVENTH PRESIDENT OF ST. NORBERT COLLEGE

An author, journalist and educator, Thomas Kunkel is the seventh president of St. Norbert College. He joined the college in 2008.

During his tenure Kunkel has overseen the construction and renovation of $100 million in campus facilities and infrastructure, including the Gehl-Mulva Science Center, Michels Commons, Schneider Stadium, the Mulva Library, Gries Hall, the Ariens Family Welcome Center, Todd Wehr Hall, the Cassandra Voss Center, and the Mulva Family Fitness and Sports Center.

He has also presided over the introduction of the Master of Business Administration and Master of Liberal Studies graduate programs; a groundbreaking partnership with the Medical College of Wisconsin; the adoption of a new General Education curriculum; a successful "Full Ahead" fundraising campaign; and the inception of "Sport and Society in America," a major biennial academic conference sponsored jointly by the college and the Green Bay Packers. Under Kunkel's leadership, the college has experienced record enrollment and continues to move upward in national rankings of liberal arts colleges.

Before coming to St. Norbert College, Kunkel served for eight years as dean of the Philip Merrill College of Journalism at the University of Maryland, where he also served as president of the American Journalism Review and as editor and director of the Project on the State of the American Newspaper.

Kunkel spent much of his early career in newspaper management, working for such organizations as the San Jose Mercury News, the Miami Herald, The New York Times and The Cincinnati Post.

He is the author of six books, most recently "Man in Profile: Joseph Mitchell of The New Yorker," published by Random House. His other works include "Genius in Disguise" (1995), the critically acclaimed biography of The New Yorker's founding editor, Harold Ross; "Enormous Prayers: A Journey into the Priesthood" (1998), an ethnographic portrait of 28 Catholic priests; and "Letters from the Editor" (2000), a compilation and analysis of Ross' letters.

Kunkel was born and raised in Evansville, Ind. He earned his B.A. in political science at the University of Evansville in 1977 and his master's degree in humanities from UE in 1979. He and his wife, Debra, have four grown daughters.

Abstracts

ORAL PRESENTATIONS

1:00- 1:15
Mulva 101

1. Understanding Food Insecurity

Alexa Brill, Sociology and Economics
Marc Schaffer, Assistant Professor of Economics

Food insecurity is an economic and social condition that revolves around adequate quality and nutritious food. Food insecurity is in public conversation with low income and social welfare but many still do not know exactly what it is or where to find it. This research takes a look at food insecurity and food deserts at a national, regional and local level. Understanding the definitions and causes of this issue helps raise awareness for the Brown County community and the community partners working against the issue.

1:15- 1:30
Mulva 101

2. Social Comparison of Manipulated and Unmanipulated Media Images

Bailey Bushman Communication & Media Studies
Anna Herrman, Assistant Professor of Communications and Media Studies

Male and female participants viewed either a manipulated or unmanipulated female image. Results indicate participants understood that the manipulated image was unnatural and that the unmanipulated image was natural. Participants, however, demonstrated the belief that both the manipulated and the unmanipulated body were attainable. In addition, only women with affective body image dissatisfaction engaged in upward comparisons with the manipulated image. The findings emphasize the importance of educating college students on media literacy.

2:30- 2:45
Mulva 101

3. Laïcité, The Combes Laws, and the Abbey of Mondaye

Benjamin Douglas Gjerde
The Rev. Andrew D. Ciferni O. Praem, Director of Center for Norbertine Studies and Adjunct Professor of Religious Studies

Laïcité, one of the core concepts of the French Constitution, is French secularism. Laïcité has been molded by the events of modern France from the French Revolution to the Third Republic. Our project investigates what laïcité means, how it came to be and how it has affected the Abbey of Mondaye, Normandy though three expulsions.

3:00-3:15
Mulva 101

4. You Lead Like a Girl: Gender and Children's Leadership Development

Marissa Elliott, Sociology
Alexa Trumpy, Assistant Professor of Sociology

We discuss how leadership and empowerment are taught to children and how those who administer and participate in empowerment programs attempt to impart messages of leadership. Several months of participation observation of two gender segregated leadership camps for elementary and middle school students revealed that these camps often unintentionally reinforce gender stereotypes just as strongly as they intentionally attempt to break them down. We argue that the sex-segregated environment leads to a problematic "separate but equal" approach to gender and leadership that advances the abilities of boys and girls but does little to decrease gender disparities in emotional development, physical competition, or leadership styles.

3:00-4:00
Mulva Studio

Creative Writing / Short Stories Presentations

Panel: Benjamin K. Paplham, Lizzie Tesch, Mary Paplham, Natasha Igl
John Pennington, Professor of English

5. Rite of Flight

Benjamin K. Paplham, English, Theatre

This is a reading of a short story in the fantasy genre titled "Rite of Flight." In the piece, Rayne is an aerohuman about to undergo an initiation ritual at Cirrastra Academy. The work explores the challenges of disability and the struggle to compare oneself to other's achievements.

6. The Eye of a Hurricane

Lizzie Tesch, Music Performance, English

Originally based on my experiences with Hurricane Matthew in Orlando last fall, this piece of original fiction is a collection of six short vignettes, all focusing on a different character and a different perspective. I submitted this work for consideration for the International Sigma Tau Delta English Convention, and it was accepted for presentation last month.

7. A Thin Place

Mary Paplham, English

This is a reading of a short work of creative fiction originally composed for the course ENGL 307 (Fiction Workshop). An abridgment of the original work, this particular version explores how family members respond to and grieve the sudden loss of a loved one. This work was recently presented at the Sigma Tau Delta International Convention.

8. Seeing Through Touch

Natasha Igl, English

My creative piece is a short story I wrote about a woman, named Zoe, reflecting on an afternoon she spent with her great aunt Grenna. The piece focuses on Zoe changing her previous judgement about Grenna as she spends time with her. I will be reading the whole story out loud with a few of the other Sigma Tau Delta members. A discussion will follow after everyone shares their works. I presented this short story at the 2017 Sigma Tau Delta Convention.

3:15-3:30
Mulva 211

9. Leading Indicators Analysis

Megan Hovell, Accounting
Marc Schaffer, Assistant Professor of Economics

A leading economic indicators analysis is a tool used to help predict the future behavior of key variables in the economy. A database of over 600 variables was narrowed down to six that had a strong correlation and leading impact on the revenue behavior of a local business. The purpose of this project was to use these variables to identify the quarter in which the next turning point of their business cycle would occur.

3:30- 3:45
Mulva 101

10. How Does OmpX Protect *Escherichia coli* in the Presence of Bile Salts?

Hannah Johnshoy, Biology
David Hunnicutt, Associate Professor of Biology
Zachary Pratt, Associate Professor of Biological Sciences, Edgewood College

Outer membrane proteins, Omps, help protect Gram-negative bacteria against environmental stress. Identifying how OmpX affords *Escherichia coli* resistance to physiological concentrations of bile salts may help to determine how *E. coli* persists in the human gastrointestinal tract. OmpF was repressed when *E. coli* was cultured in the presence of bile salts, and ompX was required for the repression. The activation of RpoE, CpxAR, or BaeSR were not required for the phenotypes we observed. These data indicate that the repression of OmpF via OmpX does not occur at the level of transcription as we previously thought, but may occur post-transcriptionally.

3:45- 4:00
Mulva 211

11. Employee Engagement in Education: Creating a Pulse Survey

Alexa Brill, Sociology and Economics; Mike Gehm, Economics
Jamie O'Brien, Assistant Professor of Business Administration

We were contacted by an educational organization to conduct an employee engagement survey during the fall of 2016. We were able to come up with a survey that addressed the areas that the organization wanted to learn more about specifically. Our methodology included collaboration with the organization and researching the expectations of similar surveys and findings in the education industry. Our findings were consistent with previous research, indicating that a strong vocational call kept employees at this organization. However, as with many educational positions, compensation and benefits were consistently an issue with employees of varying tenures at this organization.

POSTER PRESENTATIONS

1:00- 1:30
Mulva 101

1. Effects of Encoding and Delay on Recall

Kevin Schlichter, Psychology and Sociology
Kameko Halfmann, Visiting Assistant Professor of Psychology

Encoding is the process by which humans intake information and convert it for use in short-term or long-term memory. The levels of processing theory argues that the deeper information or stimuli are encoded, the more accurately they are recalled. By running a 2x2 factorial design measuring verbal/visual encoding and long/short delay, we show that encoding has a larger effect on recall, and that delay produced almost no effect. Furthermore, there was no significant interaction between encoding and delay. Our results shed light on some of the mechanisms by which human memory works, and demonstrate the processes by which people learn and retain information.

1:00- 1:30
Mulva 101

2. Zooplanktivory in Post-Juvenile Largemouth Bass: A 28-Year Record from a Small North Temperate Lake

Tyler J. Butts, Biology and Environmental Science
James Hodgson, Professor Emeritus, Biology and Environmental Science

Largemouth bass are optimal/opportunistic foragers that prey on a wide array of diet items. Here, we report on zooplanktivory – feeding on *Daphnia* spp. - in post-juvenile bass over a 28-year period from a north temperate lake in Michigan's Upper Peninsula. Zooplankton are a high cost/low benefit food item for post-juveniles, yet 32.9% of post-juveniles were found to have *Daphnia* in their diet (n=1709, mean = 57.6). Smaller fish (TL 150-250mm) consumed the most *Daphnia*, with low correlation between abundance of *Daphnia* and their mean number in the diet, and between the frequency of dietary occurrence of *Daphnia* and mean number of *Daphnia* per bass stomach.

1:00- 1:30
Mulva 101

3. Laïcité, The Combes Laws, and the Abbey of Mondaye

Benjamin Douglas Gjerde
The Rev. Andrew D. Ciferni O. Praem, Director of Center for Norbertine Studies and Adjunct Professor of Religious Studies

Laïcité, one of the core concepts of the French Constitution, is French secularism. Laïcité has been molded by the events of modern France from the French Revolution to the Third Republic. Our project investigates what laïcité means, how it came to be and how it has affected the Abbey of Mondaye, Normandy though three expulsions.

1:00- 1:30
Mulva 101

4. Pathogenicity of an Environmental *Flavobacterium* Isolated from a Copepod in Lake Michigan

Johnny Shepherd, Biology
David Hunnicutt, Associate Professor of Biology

Members of the genus *Flavobacterium* are gram-negative rods common in aquatic environments. Several species, like *F. columnare*, cause disease in fish. Ecologists at UW-Madison studying the microbiota of copepods in Lake Michigan isolated a bacterium (FcC1) genetically similar to *F. columnare* from Eurytemora affinis. We are testing the pathogenicity of this isolate. Both bath and injection infection trials were conducted on *Danio rerio* (Zebrafish) to test pathogenicity. Preliminary data have been inconsistent but seem to indicate different rates of lethality depending on FcC1's growth stage. Overall FcC1 appears to be pathogenic, but less so than *F. columnare*.

1:00- 1:30
Mulva 101

5. The Effect of Educational Major Area on the Ethical Perceptions of Students

Kathryn Sauter, Biology; Kacey Spoerl, Accounting
Amy Vandenberg, Assistant Professor of Business Administration
Jason Haen, Assistant Professor of Accounting

By controlling for educational major area, this study adds to the literature (which reports inconsistent research results) regarding perceptions of students about the ethical nature of actions. Survey data was collected from undergraduate students within two educational major areas: business and natural science. A factor analysis identified two factors which were labeled academic dishonest acts and business dishonest acts. A significant difference between the ethical perceptions of natural science students versus business students was found for males, but only for academic dishonest acts.

1:00- 1:30
Mulva 101

6. The Cognitive Reflection Test: Judgment in Collision and Non-Collision Athletes

Marissa Elliott, Sociology; Sierra Peters, Psychology;
Tina Pizzo, Sociology
Kameko Halfmann, Visiting Assistant Professor of Psychology

Although young collision sport athletes are unlikely to have sustained CTE or experience the long-term impacts of repeated head injuries, it is important to understand how participation in sports, particularly collision, affects judgment and decision-making. Judgment and decision-making may be particularly susceptible to the effects of concussion or head injury because they often involve both cognitive functions and emotional functions, which have been found to be impaired with concussions. We hypothesize that collision athletes will make more errors in a judgment task than non-collision athletes.

1:00- 1:30
Mulva 101

7. Planarians: Light or Death?

Michaela Machurick, Biology; Mikaela Nowak, Biology
Ryan King, Assistant Professor of Biology

Planarians have an incredible stem cell system in which one pluripotent adult stem cell has the ability to generate an extensive range of cell types and organs within the planarian body. Understanding how stem cells recognize and respond to tissue damage is a fundamental question in regeneration research. Our project focused on using light to specifically damage pigment cells within the planarians and to examine how the level of tissue damage affects the rate of repigmentation. This project sets the foundation for future studies involving regulation of stem cell proliferation and fate decisions.

1:00- 1:30
Mulva 101

8. Inland Sand Dunes of the Lower Oconto River Valley: Geomorphology, Age, and Paleoclimate

Preston Konop, Geology
Nelson Ham, Professor of Geology
Rebecca McKean, Associate Professor of Geology
Jeff DuMez, Adjunct Instructor of Geology

Windblown sand dunes occur in the lower Oconto River Valley of Oconto County, Wisconsin. Dune crests were mapped using a Digital Elevation Model (DEM) created from a recent Light Detection and Ranging (LiDAR) survey. These parabolic dunes are now stabilized by vegetation and formed from predominantly northwest to southeast blowing winds. Eight samples collected for Optically Stimulated Luminescence (OSL) dating indicate the dunes are between 8,630 and 11,500 years old. Dune ages are similar to those collected from other localities in northeastern Wisconsin. The presence of widespread sand dunes suggests a dryer climate during the late Pleistocene and early Holocene.

1:00- 1:30
Mulva 101

9. A New Partial Skeleton of *Xiphactinus audax* With A Well-Preserved Neurocranium from the Late Cretaceous Tropic Shale of Southern Utah

Riley Hacker, Geology
Rebecca McKean, Associate Professor of Geology

MNA V10796 (Museum of Northern Arizona, Flagstaff) is a partial skeleton of *Xiphactinus audax* discovered in the Tropic Shale in Glen Canyon National Recreation Area. MNA V10796 was partially articulated, moderately compressed and heavily fractured. It includes a well-preserved neurocranium, two fragmentary teeth, five abdominal vertebrae, a couple of ribs, and a partial pectoral fin. This fossil is morphologically similar to previously described specimens of *X. audax*. The neurocranium is the first to be described from *X. audax* of the Tropic Shale. This specimen adds to the limited information about *X. audax* along the western side of the Western Interior Seaway.

1:00- 1:30
Mulva 101

10. E-Loft Accelerator Development

Hannah Ramminger, Accounting;
Christian M. Cattan, Economics and Political Science
Marc Schaffer, Assistant Professor of Economics

The purpose of this project is to research and advise upon the important characteristics of startup accelerator programs from around the nation in order to help local incubator, E-Hub, develop an accelerator, E-Loft, of their own. This research was conducted through both the analysis of academic writing on the topic of accelerators and through the analysis of real world accelerators. The key findings from this analysis include three key factors to consider when creating a successful accelerator program which are the use of mentorship, a dedication to a specific field or industry, and maintaining a strong network of outside partners and entrepreneurs.

1:30-2:00
Mulva 101

11. The Extents of Human Perceptive Capabilities in a Physical Reality

Jonathan Carroll, English, Psychology, and Philosophy; Kristin Schmitt, Psychology; Mackenzie Ciske, Music and Psychology; Hannah Mandlman, Psychology and Sociology
Kameko Halfmann, Visiting Assistant Professor of Psychology

The present study combines student research from multiple psychology courses to investigate the capacity of human attentiveness and test the limits of sensory perception. Participants estimated physical frequencies of auditory, tactile, and visual stimuli. In one study, participants estimated multi-sensory stimuli firing at the same frequency, and in the following study, participants estimated multi-sensory stimuli firing at different frequencies. The combined data suggest that consistently firing stimuli will increase accuracy regardless of senses, as there is no strain on the attention to differentiate the frequencies; however, inconsistently firing stimuli may increase or decrease accuracy, depending on which senses are paired.

1:30-2:00
Mulva 101

12. Reducing Non-Suicidal Self-Injury and Emotion Dysregulation: Effectiveness of DBT in a Community-Based Clinic

Amanda J. Schmidt, Psychology; Isabel R. Detienne, Psychology
Michelle Schoenleber, Assistant Professor of Pyschology

Non-suicidal self-injury (NSSI) and emotion dysregulation are major targets in dialectical behavior therapy (DBT). Well-controlled DBT studies show it reduces these outcomes and concomitant psychopathology. Yet, we know little about DBT's effectiveness in real-world settings. We considered DBT effectiveness in a community mental health clinic, not operating with close affiliation/contact with active DBT clinical researchers. Using archival data from 75 adults/adolescents who received DBT at a local clinic we examined: (1) DBT's effectiveness reducing emotion dysregulation and NSSI, (2) whether decreased emotion dysregulation contributed to decreased NSSI, and (3) whether emotion dysregulation changes moderated associations between NSSI and psychopathology.

1:30-2:00
Mulva 101

13. Sexually Dimorphic Effects of Acute Corticosterone Treatment on Spatial Memory Behavior and Vesicular Glutamate Transporter 2 mRNA in the Zebra Finch Hippocampus

Brittany Rupp, Biology; Mehakupinder Chahal, Biology
David Bailey, Associate Professor of Biology

Hippocampal-dependent learning and memory is modified by the stress hormone corticosterone, which alters glutamate neurotransmission via a variety of mechanisms. Glutamate is loaded into synaptic vesicles by vesicular glutamate transporter proteins (VGLUTs), and previous work found that corticosterone treatment of female but not male zebra finches potentiated hippocampal-dependent learning and increased hippocampal VGLUT2 mRNA as measured by in situ hybridization. We are currently using qPCR to quantify mRNA levels following similar treatments, and anticipate confirmation of the in situ results. These data will further inform us as to the presynaptic and potentially sexually dimorphic glutamatergic mechanisms modified by acute stress.

1:30-2:00
Mulva 101

14. Cancerous Worms

Kayla Lewin, Biology
Ryan King, Assistant Professor of Biology

Planarians are packed with stem cells whose proliferation is under tight control. Our Developmental Biology independent research project was aimed at trying to induce cancer in planarians using mutagens such as ethyl methanesulfonate. Treatment with mutagens increased cell proliferation, but planarians did not develop noticeable tumors. To more precisely manipulate cell cycle control we are in the process of cloning and knocking-down tumor suppressor and caspase pathway components to generate tumorous outgrowths in planarians. We hope to better understand the mechanisms that allow proliferation of planarian stem cells to be tightly controlled yet rapidly responsive to stimuli like tissue injury.

1:30-2:00
Mulva 101

15. Comparison of Zooplankton Communities Between Chagres River and Gatun Lake Tributary Sites in Panama

Malgorzata Waz, Biology
Carrie Kissman, Assistant Professor of Biology, Assistant Professor of Environmental Science

Zooplankton were sampled from multiple nearshore sites along the Chagres River in 2017, and Gatun Lake in 2016, Panama. Samples were counted by students during the Research Experience in Panama Course, and both data sets are compared to determine zooplankton community similarities and differences between the river and lake locations. Little research has been done in the past comparing zooplankton communities of rivers to lakes. The close proximity of Gatun Lake and the Chagres River permits a direct comparison of these aquatic systems. Surprisingly, the river and lake sites that were closest to each other were not the most similar.

1:30-2:00
Mulva 101

16. New Specimens of *Taxymys* and *Tillomys* Highlight Evolutionary Relationships Among Early-Middle Eocene Sciuravids

Serena Hatahet, Biology
Deborah Anderson, Professor of Biology

Taxymys and *Tillomys* are hamster-sized rodents known from the early to middle Eocene (48-50 MYA). Since limited fossil material has been recovered for each, the taxonomic position of these two genera is uncertain. *Taxymys* is known only from maxillary material and *Tillomys* only from mandibles, making some suggest they are cogeneric. We propose morphological characters to distinguish between these two taxa. A study of new specimens from Utah and Wyoming led to the discovery of lower cheek teeth for *Taxymys* and upper cheek teeth for *Tillomys*. Results of this work clarify the phylogeny of these taxa among Eocene rodents.

1:30-2:00
Mulva 101

17. New Specimens of *Sciuravus undans* (Mammalia, Rodentia) Recovered From The Bridger Formation, Green River Basin, Wyoming

Elizabeth Manlick, Biology
Deborah Anderson, Professor of Biology

Sciuravus undans is a small, hamster-sized rodent known from the middle Eocene (50 MYA) of North America. There has been some debate about whether S. undans is a distinct species or synonymous with *S. nitidus*, the genotype. A study of new specimens of *S. undans* from the Bridger Formation in Wyoming has led to a re-evaluation of this classification. To test the hypotheses that *S. undans* is distinct, we studied specimens of *S. nitidus, S. wilsoni, S. powayensis,* and *S. eucristadens.* We found that *Sciuravus undans* is morphologically distinct from these other species, consistent with the original classification. These results can be used to clarify the evolutionary relationships among sciuravids.

1:30-2:00
Mulva 101

18. Attitudes and Judgments on Food Consumption: Descriptive Analyses

Tina Pizzo, Sociology
Kameko Halfmann, Visiting Assistant Professor of Psychology

Response inhibition allows individuals to overrule impulsive or habitual reactions in accordance with one's long term goal (Nederkoorn, Houben, Hofmann, Roefs, & Jansen, 2010). We hypothesize that response inhibition will correlate implicit attitudes about food healthiness. Participants completed a series of questionnaires and computer tasks designed to measure their explicit food preferences, their implicit food preferences, and their ability to inhibit impulsive responses. These results will aid individuals in forming a healthy lifestyle based on implicit attitudes that may differ from predisposed food preferences.

2:00-2:30
Mulva 101

19. Examining How Directions Alter Visual Search Behavior

Jessica Tooley, Psychology
Raquel Cowell, Assistant Professor of Psychology

The ability to search a visual scene and identify items quickly is an essential skill to many people. These skills are strongly tested when navigating a new environment. Clarke et al. (2016) found a strong connection between visual search abilities and sentence structure of directions in young adults. My study aims to replicate these findings in younger adults, and explore the visual search abilities in older adults. Data collection in older adults is ongoing. Preliminary data from young adults indicate that the ordering of relevant items in the sentence structure of directions does produce significantly different reaction times.

2:00-2:30
Mulva 101

20. Relationship Between *Porites porites* and *Acropora cervicornis* Coral Densities and Various Environmental Factors

Megan Johnson, Biology
Carrie Kissman, Assistant Professor of Biology, Assistant Professor of Environmental Science

Coral reefs are sensitive to environmental changes and naturally degrade over time through mechanical and biological erosion. Two species of coral, *Porites porites* and *Acropora cervicornis*, found in Bocas del Toro, Panama, are especially sensitive to even the smallest environmental changes. This study investigates the relationship between environmental variation and coral density changes. Coral samples were collected, measured, and deployed in winter 2016, then collected and measured again in winter 2017. The ultimate goal of this study is to determine the impact of environmental variation on coral bioerosion rates.

2:00-2:30
Mulva 101

21. Terrorism in France

Madeleine Sprout, Biology
Tom Conner, Professor of Modern Languages and Literatures

Terrorism attacks in France have become more frequent, causing death and destruction to French life. To understand the recent terror attacks in France, it is necessary to look back to the beginning of the "clash of civilizations". From the Crusades to present day, conflicts between Muslims and France has shaped today's current state of affairs. The attacks of Charlie Hebdo, November 2015, and Bastille Day, have been the deadliest and strongly impacted French pride and identity. It is important to look to the past to understand why and look to the future to solve the conflicts and heal the damage.

2:30-3:00
Mulva 101

22. Fishing with Worms: The Search for Homologs Involved in the Excretory System of Planarians and Zebrafish

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

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 has not been examined. To explore whether these newly identified genes have conserved expression in vertebrates we have begun cloning homologs of these genes in zebrafish and are beginning to examine whether their expression is conserved in the zebrafish excretory system using in situ hybridization.

2:30-3:00
Mulva 101

23. Planaria Hysteria: The Search for Differentially Expressed Genes During Planarian Regeneration

Ashley Nelson, Biology; Taylor Oswald, Biology;
Zachary Krueger, Biology
Ryan King, Assistant Professor of Biology

Planarians have awe inspiring regenerative abilities capable of regenerating lost body parts within a week. To better understand the genes involved in regeneration, we used RNAseq analysis to identify genes differentially expressed between regenerating and intact planarians. We cloned several genes with either increased or decreased expression during regeneration. Using these clones, we generated dsRNA to knockdown gene function to determine their necessity in regeneration. We also generated RNA probes to examine the expression of each of these genes through in situ hybridization.

2:30-3:00
Mulva 101

24. Characterization of a Widely Distributed Fish Parasite *Crepidostomum cooperi* (Trematoda: Allocreadiidae) Using Morphology and Molecular Data

Boris Semnic, Biology
Anindo Choudhury, Professor of Biology, Professor of Environmental Science
Adam Brandt, Assistant Professor of Biology

Crepidostomum cooperi (Trematoda: Allocreadidae) has been reported in distantly related hosts such as Yellow Perch (*Perca flavescens*), Bluegill (*Lepomis macrochirus*), Pumpkinseed (*Lepomis gibbosus*), Green Sunfish (*Lepomis cyanellus*), and Trout Perch (*Percopsis omiscomaycus*). Deviation from parasite-host specificity often indicates possible diversification events. Anatomical measurements from whole-mounted worms indicate that no morphological character was useful in differentiating worms from different hosts. Analysis of 28S rRNA gene indicates that worms from Trout Perch and Yellow Perch are separate from those found in other hosts. These findings falsify the host-specificity hypothesis, but suggest that Yellow Perch and Trout Perch '*C.cooperi*' represents a separate entity.

2:30-3:00
Mulva 101

25. French Nobel Prize Winners

Claire Visconti, Biology
Tom Conner, Professor of Modern Languages and Literatures

The French have received many Nobel Prizes for their contributions to the natural sciences. The Nobel Prize is awarded each year to people who have made major contributions in physics, chemistry, medicine, literature, peace, and economic sciences. In recent years, many French have won. Jean-Pierre Sauvage is the most recent winner for his work with molecular machines in chemistry. Another winner from France was Luc Antoine Montagnier who discovered human immunodeficiency virus (HIV). There are many other important winners from France who have made so many important contributions, which is why France is ranked fourth in the world for the most noble prizes won.

2:30-3:00
Mulva 101

26. The Combined Effects of Polyamine and GSH Inhibition on the Viability of Human Cancer Cell Lines

John Grady, Biology; Davey Holzer, Biology; Kaci Keleher, Biology; Emma Meetz, Biology; Collin Ellenbecker, Biology
Russ Feirer, Associate Professor of Biology

Polyamine metabolism is a target for cancer therapeutics. DenSpm induces catabolism of polyamines by SSAT, leading to the production of reactive oxygen species (ROS), resulting in cellular death. BSO depletes intracellular antioxidant GSH. We hypothesized that treating cancer cell lines with both DenSpm and BSO will have a synergistic cytotoxic effect, due to generation of ROS caused by DenSpm and absence of GSH. Treatment of cells with DenSpm resulted in reduced cell viability and induction of SSAT. Treatment of cells with BSO caused a decrease in intracellular GSH levels. Combined, BSO and DenSpm had effects greater than either compound alone.

2:30-3:00
Mulva 101

27. Investigation of Laser Efficiency Using Lock-in Amplification

Grace Schwantes, Physics; Joseph Zielinski, Physics
Erik Brekke, Assistant Professor of Physics

Laser output frequency can be controlled using optical methods such as atomic spectroscopy with lock-in amplification. In the parametric four-wave mixing process of creating blue laser light, resonance with atomic levels is crucial in order to obtain the highest output power. This process involves 778-nm incident red laser light, a system of mirrors and lenses, and a tapered amplifier to ultimately arrive at the production of 420-nm blue light. The lock-in amplifier was initially tested on the 778-nm laser light and we found that it successfully modulated the frequency in order to produce a laser lock lasting approximately 20 minutes.

2:30-3:00
Mulva 101

28. Optical Cavity for Enhanced Parametric Four-Wave Mixing in Rubidium

Sam Potier, Physics
Erik Brekke, Assistant Professor of Physics

We demonstrate the implementation of a ring cavity to enhance the efficiency of parametric fourwave mixing in rubidium, an atomic process that produces 420nm blue light. Through the use of an entry mirror with 95% reflectance, we increase the circulating intensity by a factor of 5.6±0.5, and up to 1.9±0.3 mW of power at 420 nm is generated, 50 times what was previously generated in the lab. The blue output of the cavity also shows greatly improved spatial quality, combining to make this a promising source of 420 nm light for future experiments.

2:30-3:00
Mulva 101

29. Excretory System Regeneration Following Chemical Ablation

Hannah Sherfinski, Biology; Paige Bonner, Biology,
Lauren Hoyer, Biology
Ryan King, Assistant Professor of Biology

Acute Kidney Injury is a frequent complication in hospitalized patients and has numerous causes that typically lead 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 excretory system conservation with humans. We are developing chemical treatments to specifically destroy excretory system cells to analyze how this system regenerates following injury. Our current work focuses on developing molecular tools for analyzing excretory system regeneration in planarians.

3:00- 3:30
Mulva 101

30. Characterizing and Combating Columnaris Disease in Zebrafish

Connor Gullstrand, Biology; Megan Kroll, Biology
David Hunnicutt, Associate Professor of Biology

Flavobacterium columnare is a gram negative bacterium which causes columnaris disease and mortality in many fish species. Zebrafish exposed to *F. columnare* C#2 experience high mortality, and fish exposed to a ΔgldN mutant, defective for motility and secretion, experience no mortality. Similar results are seen in fish exposed to acellular spent media of the respective strains. However, treating spent media with heat or trypsin eliminates its virulence, suggesting secreted proteins heavily influence fish mortality associated with Columnaris disease. Additionally, prior exposure of zebrafish to the Δ gldN mutant confers protection against subsequent exposure to C#2, revealing a potential vaccine.

3:00- 3:30
Mulva 101

31. 2nd Order Linear Differential Equations and Airy's Function

Brittany Sheahan, Mathematics
Terry Jo Leiterman, Associate Professor of Mathematics

We examine a class of homogenous, second order, linear ordinary differential equations that take the form y^''+f(x)y=0 where the coefficient on the y term is the power function f(x)=x^n. Using a power series approach, we derive solutions for all integers n ≥ 1. Interesting patterns emerged. The case where n=1 provides a well-known solution, named after George Biddell Airy (1801-1892). We showcase Airy's function, which we derive using the same power series approach. As part of the project, we investigated classic and contemporary applications of Airy's function.

3:00- 3:30
Mulva 101

32. Determining Laser Frequency Using a Grating Spectrometer

Claire Mahon, Chemistry
Erik Brekke, Assistant Professor of Physics

Lasers are used for a wide variety of purposes in many industries. A laser can be tuned to a specific frequency through the process of optical feedback. During optical feedback, the beam is split and a small portion of it into back into the cavity, enabling the operator to control the frequency of the larger portion of the beam. The purpose of this experiment was to build a spectrometer, a device used to measure wavelength. The spectrometer uses a diffraction grating to observe optical feedback and determine and control the wavelength of a laser.

3:00- 3:30
Mulva 101

33. Empathy Formation in Middle School

Maggie McConnaha, English, Secondary Education
Robert Pyne, Senior Director of Community Engagement, Norman Miller Center for Peace, Justice and Public Understanding.

Teachers are met with new ways to improve their teaching: professional development, new studies, pedagogical techniques, and sensitivity training. My research focuses on designing justice-based curriculum. I take into account research on books such as Harry Potter, and the effects the content can have on empathy cultivation, as well as equality-based teaching practices, word choice, and attitude. Taking each part of a calendar year unit-by-unit, as well as describing transformative teaching techniques in different classroom situations, I hope to shed light on systemic ways to create curriculum that benefits students academically while also preparing them with tools such as positive public discourse, empathy, cooperation, and understanding.

3:00- 3:30
Mulva 101

34. Reducing Algal Blooms in Dream Lake, WI: Algal and Aooplankton Seasonal Dynamics Indicate Response to Food Web Manipulation

Tyler J. Butts Biology and Environmental Science
Carrie Kissman, Assistant Professor of Biology, Assistant Professor of Environmental Science

Many freshwater ecosystems are experiencing algal bloom formation due to cultural eutrophication. Dream Lake, a small water body located in Brown Co. WI, has frequent algal blooms and decreased recreational and aesthetic value. From 2012-2016 we implemented a combined top-down trophic cascade by adding piscivores, i.e. largemouth bass (Micropterus salmoides), and a bottom-up approach by reducing fertilizer inputs to reduce algal blooms. Changes in water transparency, decreased algal biomass, increases in zooplankton biomass, and changes in zooplankton length post-manipulation indicate that Dream Lake may be responding to the combined top-down and bottom-up manipulations and a 2014 winter kill event.

3:00- 3:30
Mulva 101

35. Excretory System Regeneration Following Chemical Ablation

Lauren Hoyer, Biology; Paige Bonner, Biology
Ryan King, Assistant Professor of Biology

Acute Kidney Injury is a frequent complication in hospitalized patients and has numerous causes that typically lead to damaged kidney tissue. Understanding fundamental mechanisms of excretory system regeneration could provide useful avenues for treating kidney injury. Planarians have an incredible regenerative capacity and excretory system conservation with humans. We are developing chemical treatments to specifically destroy excretory system cells to analyze how this system regenerates following injury. Our current work focuses on developing molecular tools for analyzing excretory system regeneration in planarians.

3:00- 3:30
Mulva 101

36. Planarian Protonephridia and Polycystic Kidneys

Julia Novotny, Biology
Ryan King, Assistant Professor of Biology

Chronic kidney diseases like Polycystic Kidney Disease are caused by dysfunction of cellular appendages called cilia. Loss of cilia function leads to over-proliferation of tubule cells resulting in formation of cysts that disrupt fluid flow in the kidney. The planarian excretory system has significant cellular and molecular similarities to the human kidney and could serve as a model system for studying cystic kidneys. To gain better insights into the role of cilia in maintaining excretory system function, we are in the process of analyzing system defects following various types of cilia disruption.

ACKNOWLEDGEMENTS

The Collaborative Center for Undergraduate Research would like to thank the following people who have been instrumental in planning the Undergraduate Research Forum:

ART DIRECTION
Samual Kalies, Art and Graphic Design

MULVA LIBRARY
Kristin Vogel, Director of the Library
Candy Klos, Library Operations Assistant and Circulation Assistant

DIGITAL PRINT CENTER
Paul Mroczynski, Manager of Printing and Distribution
Mary Lee, Digital Print Associate
Stefanie Steward, Digital Arts Specialist

CONFERENCE AND EVENT SERVICES
Pam Joski, Event Coordinator

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A SPECIAL THANKS TO OUR SPONSORS

Drs. Mark & Mary Ellen Stinski

Joe Kline

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