



7 RIVERS

UNDERGRADUATE
RESEARCH SYMPOSIUM

QUICK REFERENCE

Friday, November 9, 2018



VITERBOUNIVERSITY



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UNDERGRADUATE
RESEARCH SYMPOSIUM

Seven Rivers Undergraduate Research Symposium

*Welcome to the 2018
Seven Rivers Undergraduate Research Symposium!*

This Quick Reference is designed to help you navigate and make the most of today's Symposium. In addition to the materials found here, you can find the complete Seven Rivers Abstract Book, Award Evaluation Criteria, Lists of Student Presenters and much more on our website: www.viterbo.edu/sevenrivers.

If you have questions at any point throughout the day, please come to the Help Table in the Fine Arts Center Lobby or approach a volunteer for assistance (with the green nametags).

Thank you and we hope you enjoy today's celebration of academic achievement!



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Symposium Schedule

- 9:00-10:10am** **Registration** (*Fine Arts Center Atrium*)
- Light refreshments and breakfast will be provided.
 - Research and creative works posters may be set up at this time.
- 10:10am-11:20am** **Welcome and Keynote Address** (*Fine Arts Center Main Theater*)
- *Welcome*, Vice President of Academic Affairs Tracy Stewart
 - *Keynote Introduction*, Caitlin Fallon, Biopsychology '20
 - *Keynote address: Dr. Amit Sood*
 - **“Helping Twenty-First Century Brains: A Back-Stage View”**
 - *Closing and Event Reminders*, Colin Burns-Gilbert, Integrated Learning and Programs Coordinator
- 11:20am-12noon** **Break & Distribution of Lunches in the Fine Arts Center (FAC)**
**** Lunch is provided for registered participants only ****
- Seating is available in the Fine Arts Center Main Theater Lobby, the Reinhart Center Boardroom, and the Nursing Center 195.
 - Research posters available for viewing in the Reinhart Center Boardroom, Main Theatre Lobby, & Nursing Center 195.
- 12noon-2:00pm** **Oral Presentations** (*Reinhart Center and School of Nursing Building*)
- Presentations consist of a 10-12 minute talk followed by 3-5 minutes for questions. There will be a 5-minute break between presentations.
 - Quick References are available at the Help Table; the Alphabetical Listing of Presenters, Abstract Book, and Assessment Criteria are available online at www.viterbo.edu/sevenrivers.
- 2:00-4:00pm** **Poster Sessions** (*Reinhart Center Boardroom, Fine Arts Center Main Theater Lobby, School of Nursing Room 195*)
- Research and creative works posters will be staffed by student researcher(s).
 - Odd-numbered posters will be staffed for the first hour and even-numbered posters will be staffed for the second hour.
- 4:00-4:30pm** **Awards Reception and Closing** (*Fine Arts Center Main Theater Lobby*)
- Join us for cake, punch, awards, and some relaxed time for socializing.



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Seven Rivers Undergraduate Research Symposium

Lunch Locations

*While you are free to eat your lunch wherever you like,
the following spaces have been set aside for you
(see the campus map on the back page):*

Fine Arts Center Main Theater Lobby

Reinhart Center Board Room

Nursing Center Room 195 and Lobby

*You are also encouraged to peruse the research posters set up in the
Reinhart Center Boardroom, the Fine Arts Center Lobby, and the
School of Nursing Room 195.*

*Please approach the Help Table or a Seven Rivers volunteer (with the
green nametags) if you have any questions.*



Presenters: Alphabetical by Last Name



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KEY: RCB=Reinhart Center Boardroom, MTL=Fine Arts Center Main Theatre Lobby, NRC = Nursing Center Room

<u>First Name</u>	<u>Last Name</u>	<u>Institution</u>	<u>Location</u>	<u>Type</u>	<u>Discipline</u>
Alethea	Bakogeorge	Viterbo University	MTL #22	Poster	Music Theatre
Josh	Balsgier	Saint Mary's University of Minnesota	RCB #10	Poster	Biology
Deijane	Banks	University of Wisconsin-Platteville	1pm in RC 130	Oral	Biology
Deijane	Banks	University of Wisconsin-Platteville	RCB #1	Poster	Biology
Hunter	Barry	Viterbo University	NRC 195 #38	Poster	Nursing
Janet	Bebo	University of Wisconsin-Eau Claire	12:40pm in NRC 104	Oral	Sociology
Jessie	Benson	Viterbo University	RCB #11	Poster	Biology
Bailey	Benson	Viterbo University	RCB #12	Poster	Biology
Lexi	Bird	Viterbo University	MTL #25	Poster	Psychology
Patrick	Bogard	Viterbo University	12:20pm in NRC 101	Oral	History
Ashley	Bohn	Viterbo University	NRC 195 #38	Poster	Nursing
Ben	Borash	Saint Mary's University of Minnesota	12:20pm in RC 130	Oral	Environmental Biology
Claire	Bowar	Viterbo University	NRC 195 #42	Poster	Nutrition
Nicole	Broz	Viterbo University	MTL #20	Poster	Ethics
Nicole	Broz	Viterbo University	12:40pm in RC 127	Oral	Biology
Jennifer	Cash	Viterbo University	NRC 195 #40	Poster	Nursing
Ryan	Cook	Luther College	MTL #26	Poster	Psychology
Hannah	Cowan	University of Wisconsin-La Crosse	1:40pm in NRC 101	Oral	Humanities
Amber	Drewek	Viterbo University	RCB #13	Poster	Mathematics
Allison	Dunne	Viterbo University	12noon in NRC 104	Oral	Psychology
Melissa	Edgar	Viterbo University	NRC 195 #39	Poster	Biology
Hannah	Erickson	Viterbo University	MTL #33	Poster	Criminal Justice

Hannah	Exner	University of Wisconsin-Platteville	RCB #3	Poster	Biomedical Engineering
Curtis	Felton	Winona State University	RCB #4	Poster	Biochemistry
Derek	Fuchsberger	Viterbo University	RCB #14	Poster	Biology
Benjamin	Gibson	Viterbo University	NRC 195 #37	Poster	Biology
Ben	Gibson	Viterbo University	12noon in NRC 101	Oral	History
Tyler	Gonzales	University of Wisconsin-Eau Claire	RCB #15	Poster	Mathematics
Tyler	Gonzales	University of Wisconsin-Eau Claire	1:40pm in RC 130	Oral	Mathematics
Julian	Grosskopf	University of Wisconsin-La Crosse	RCB #2	Poster	Biochemistry
Andres	Guerrero	University of Wisconsin-La Crosse	RCB #18	Poster	Biochemistry
Cali	Gurnicki	Viterbo University	MTL #28	Poster	Religious Studies
Amanda	Hemmersbach	Viterbo University	MTL #19	Poster	Education
Erin	Hettinger	Saint Mary's University of Minnesota	12noon in RC 130	Oral	Biology
Rebecca	Houge	Viterbo University	MTL #23	Poster	Humanities
Aubrie	Jacobson	Viterbo University	1pm in NRC 101	Oral	Music
Micaela	Julian	University of Wisconsin-La Crosse	1:40pm in NRC 104	Oral	Psychology
Ashley	Kast	Viterbo University	12:20pm in NRC 104	Oral	Social Psychology
Grant	Keane	University of Wisconsin-Eau Claire	RCB #15	Poster	Mathematics
Grant	Keane	University of Wisconsin-Eau Claire	1:40pm in RC 130	Oral	Mathematics
Sophia	Kero	University of Wisconsin-La Crosse	NRC 195 #45	Poster	Organic Chemistry
Haley	Kirchhoff	Viterbo University	12:20pm in RC 127	Oral	Environmental Biology
Austin	Kleman	Saint Mary's University of Minnesota	12:40pm in NRC 101	Oral	Psychology
Jolene	Lansin	Viterbo University	MTL #30	Poster	Social Work
Dawn	Lawry	University of Wisconsin-La Crosse	NRC 195 #35	Poster	Nuclear Medicine
Jack	Lazowski	University of Wisconsin-Eau Claire	RCB #15	Poster	Mathematics
Jack	Lazowski	University of Wisconsin-Eau Claire	1:40pm in RC 130	Oral	Mathematics
Mark	Leonard	Saint Mary's University of Minnesota	RCB #16	Poster	Biology
Jessica	Liebau	University of Wisconsin-Eau Claire	RCB #8	Poster	Biochemistry

Ellie	Lochner	University of Wisconsin-Eau Claire	RCB #15	Poster	Mathematics
Ellie	Lochner	University of Wisconsin-Eau Claire	1:40pm in RC 130	Oral	Mathematics
Levi	Orr	Viterbo University	MTL #24	Poster	Psychology
Carolyn	Payne	University of Wisconsin-Eau Claire	RCB #15	Poster	Mathematics
Carolyn	Payne	University of Wisconsin-Eau Claire	1:40pm in RC 130	Oral	Mathematics
Chi	Pham	Luther College	MTL #26	Poster	Psychology
Haley	Polin	Viterbo University	NRC 195 #38	Poster	Nursing
Sarah	Prill	Viterbo University	NRC 195 #46	Poster	Biology
Abigail	Propsom	Saint Mary's University of Minnesota	1:20pm in RC 127	Oral	Biology
Michele	Remer	Saint Mary's University of Minnesota	RCB #10	Poster	Biology
Maya	Richardson	Viterbo University	1:20pm in NRC 104	Oral	Activism
Angela	Riederer	Viterbo University	NRC 195 #43	Poster	Nutrition
Megan	Ripp	Viterbo University	MTL #24	Poster	Psychology
			MTL #27	Poster	
Damon	Schmalzriedt	Viterbo University	1:20pm in RC 130	Oral	Biology
Dani	Schmaus	Winona State University	RCB #5	Poster	Biochemistry
Kendal	Schmitz	Viterbo University	NRC 195 #41	Poster	Nutrition
Sydney	Schmutzer	Viterbo University	MTL #19	Poster	Education
Kristin	Schneider	Viterbo University	RCB #17	Poster	Biology
Erika	Schultz	Viterbo University	1pm in RC 127	Oral	Chemistry
James	Scoles	Viterbo University	NRC 195 #36	Poster	Biology
Emily	Seib	University of Wisconsin-La Crosse	NRC 195 #35	Poster	Nuclear Medicine
Emily	Seib	University of Wisconsin-La Crosse	12:40pm in RC 130	Oral	Nuclear Medicine
Brooklyn	Seiler	Viterbo University	NRC 195 #44	Poster	Nutrition
Kellie	Shaw	University of Wisconsin-La Crosse	NRC 195 #35	Poster	Nuclear Medicine
Aaron	Streed	University of Wisconsin-Stout	RCB #6	Poster	Biochemistry
Gage	Stuttgen	University of Wisconsin-LaCrosse	RCB #7	Poster	Biochemistry
Brian	Szto	Winona State University	12noon in RC 127	Oral	Agro-Ecology

Abby	Thurk	Viterbo University	MTL #29	Poster	Social Work
Abby	Thurk	Viterbo University	1pm in NRC 104	Oral	Social Work
Sam	Totsky	Viterbo University	NRC 195 #44	Poster	Nutrition
Claire	Trussoni	Viterbo University	1:20pm in NRC 101	Oral	English
Cole	Van Houten	Saint Mary's University of Minnesota	12noon in RC 130	Oral	Biology
Alexis	Vertein	Viterbo University	MTL #19	Poster	Education
Jory	Wagner	University of Wisconsin-Eau Claire	RCB #15	Poster	Mathematics
Jory	Wagner	University of Wisconsin-Eau Claire	1:40pm in RC 130	Oral	Mathematics
Sydney	Wallace	Viterbo University	MTL #34	Poster	Psychology
Katelyn	Weeks	University of Wisconsin-Eau Claire	RCB #8	Poster	Biochemistry
Andrew	Wegner	Viterbo University	RCB #9	Poster	Biochemistry
Abigail	Weighner	Viterbo University	NRC 195 #40	Poster	Nursing
Kyle	Wolmutt	University of Wisconsin-La Crosse	RCB #18	Poster	Biochemistry
Haotian	Wu	University of Wisconsin-Eau Claire	RCB #15	Poster	Mathematics
Haotian	Wu	University of Wisconsin-Eau Claire	1:40pm in RC 130	Oral	Mathematics
Houa	Yang	Viterbo University	MTL #31	Poster	Social Work



**Poster Session
By Room and Poster
Number**



KEY: RCB=Reinhart Center Boardroom, MTL=Fine Arts Center Main Theatre Lobby

NRC 195 = Nursing Center Room 195

<u>Room</u>	<u>Poster #</u>	<u>First Name</u>	<u>Last Name</u>	<u>Institution</u>	<u>Discipline</u>
RCB	1	Deijane	Banks	UW-Platteville	Biology
RCB	2	Julian	Grosskopf	UW-La Crosse	Biochemistry
RCB	3	Hannah	Exner	UW-Platteville	Biomedical Engineering
RCB	4	Curtis	Felton	Winona State University	Biochemistry
RCB	5	Dani	Schmaus	Winona State University	Biochemistry
RCB	6	Aaron	Streed	UW-Stout	Biochemistry
RCB	7	Gage	Stuttgen	UW-La Crosse	biochemistry
RCB	8	Katelyn	Weeks	UW-Eau Claire	Biochemistry
RCB	8	Jessica	Liebau	UW-Eau Claire	Biochemistry
RCB	9	Michele	Remer	Saint Mary's University	Biology
RCB	9	Josh	Balsgier	Saint Mary's University	Biology
RCB	10	Andrew	Wegner	Viterbo University	Biochemistry
RCB	11	Jessie	Benson	Viterbo University	Biology
RCB	12	Bailey	Benson	Viterbo University	Biology
RCB	13	Amber	Drewek	Viterbo University	Mathematics
RCB	14	Derek	Fuchsberger	Viterbo University	Biology
RCB	15	Haotian	Wu	UW-Eau Claire	Mathematics
RCB	15	Carolyn	Payne	UW-Eau Claire	Mathematics
RCB	15	Tyler	Gonzales	UW-Eau Claire	Mathematics

RCB	15	Jory	Wagner	UW-Eau Claire	Mathematics
RCB	15	Grant	Keane	UW-Eau Claire	Mathematics
RCB	15	Ellie	Lochner	UW-Eau Claire	Mathematics
RCB	15	Jack	Lazowski	UW-Eau Claire	Mathematics
RCB	16	Mark	Leonard	Saint Mary's University	Biology
RCB	17	Kristin	Schneider	Viterbo Univeristy	Biology
RCB	18	Andres	Guerrero	UW-La Crosse	Biochemistry
RCB	18	Kyle	Wolmutt	UW-La Crosse	Biochemistry
MTL	**				
MTL	19	Amanda	Hemmersbac	Viterbo University	Education
MTL	19	Alexis	Vertein	Viterbo University	Education
MTL	19	Sydney	Schmutzer	Viterbo University	Education
MTL	20	Nicole	Broz	Viterbo University	Ethics
MTL	22	Alethea	Bakogeorge	Viterbo University	Music Theatre
MTL	23	Rebecca	Houge	Viterbo University	Humanities
MTL	24	Levi	Orr	Viterbo University	Psychology
MTL	24	Megan	Ripp	Viterbo University	Psychology
MTL	25	Lexi	Bird	Viterbo University	Psychology
MTL	26	Chi	Pham	Luther College	Psychology
MTL	26	Ryan	Cook	Luther College	Psychology
MTL	27				
MTL	28	Cali	Gurnicki	Viterbo University	Religious Studies
MTL	29	Abby	Thurk	Viterbo University	Social Work
MTL	30	Jolene	Lansin	Viterbo University	Social Work
MTL	31	Houa	Yang	Viterbo University	Social Work

MTL	32				
MTL	33	Hannah	Erickson	Viterbo University	Criminal Justice
MTL	34	Sydney	Wallace	Viterbo University	Psychology
NRC	**				
NRC 195	35	Emily	Seib	UW-La Crosse	Nuclear Medicine
NRC 195	35	Kellie	Shaw	UW-La Crosse	Nuclear Medicine
NRC 195	35	Dawn	Lawry	UW-La Crosse	Nuclear Medicine
NRC 195	36	James	Scoles	Viterbo University	Biology
NRC 195	37	Benjamin	Gibson	Viterbo University	Biology
NRC 195	38	Hunter	Barry	Viterbo University	Nursing
NRC 195	38	Ashley	Bohn	Viterbo University	Nursing
NRC 195	38	Haley	Polin	Viterbo University	Nursing
NRC 195	39	Melissa	Edgar	Viterbo University	Biology
NRC 195	40	Jennifer	Cash	Viterbo University	Nursing
NRC 195	40	Abigail	Weighner	Viterbo University	Nursing
NRC 195	41	Kendal	Schmitz	Viterbo University	Nutrition
NRC 195	42	Claire	Bowar	Viterbo University	Nutrition
NRC 195	43	Angela	Riederer	Viterbo University	Nutrition
NRC 195	44	Brooklyn	Seiler	Viterbo University	Nutrition
NRC 195	44	Sam	Totsky	Viterbo University	Nutrition
NRC 195	45	Sophia	Kero	UW-La Crosse	Organic Chemistry
NRC 195	46	Sarah	Prill	Viterbo University	Biology



KEY: RC=Reinhart Center, NRC = Nursing Center

Time Slot	Room	First Name	Last Name	Institution
12noon	NRC 101	Patrick	Bogard	Viterbo University
12:20pm	NRC 101	Benjamin	Gibson	Viterbo University
12:40pm	NRC 101	Austin	Kleman	Saint Mary's University
1pm	NRC 101	Aubrie	Jacobson	Viterbo University
1:20pm	NRC 101	Claire	Trussoni	Viterbo University
1:40pm	NRC 101	Hannah	Cowan	UW-La Crosse
12noon	NRC104	Allison	Dunne	Viterbo University
12:20pm	NRC104	Ashley	Kast	Viterbo University
12:40pm	NRC104	Janet	Bebo	UW-Eau Claire
1pm	NRC104	Abby	Thurk	Viterbo University
1:20pm	NRC104	Maya	Richardson	Viterbo University
1:40pm	NRC104	Micaela	Julian	UW-La Crosse
12noon	RC 127	Brian	Szto	Winona State University
12:20pm	RC 127	Haley	Kirchoff	Viterbo University
12:40pm	RC 127	Nicole	Broz	Viterbo University
1pm	RC 127	Erika	Schultz	Viterbo University
1:20pm	RC 127	Abigail	Propsom	Saint Mary's University
1:40pm	RC 127	--	--	--
12noon	RC 130	Erin	Hettinger	Saint Mary's University
12noon	RC 130	Cole	Van Houter	Saint Mary's University
12:20pm	RC 130	Ben	Borash	Saint Mary's University
12:40pm	RC 130	Emily	Seib	UW-La Crosse
1pm	RC 130	Deijane	Banks	UW-Platteville
1:20pm	RC 130	Damon	Schmalzriedt	Viterbo University
1:40pm	RC 130	Haotian	Wu	UW-Eau Claire
1:40pm	RC 130	Carolyn	Payne	UW-Eau Claire
1:40pm	RC 130	Tyler	Gonzales	UW-Eau Claire
1:40pm	RC 130	Jory	Wagner	UW-Eau Claire
1:40pm	RC 130	Grant	Keane	UW-Eau Claire
1:40pm	RC 130	Ellie	Lochner	UW-Eau Claire
1:40pm	RC 130	Jack	Lazowski	UW-Eau Claire



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Effect of combination cesium-retinol-zinc gluconate on human cancer cells

Deijane Banks**, *Katheryn Holter*, *Carley Traverse*, *Bridget White*, & *Marilyn Tufte

*indicates presenting at Seven Rivers

Institution: **UW-Platteville**

Faculty Mentor: ***Dr. Miranda Bader-Goodman***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #1***

Abstract:

Previous research at UW-Platteville demonstrated that combination cesium (Cs), vitamin A, and zinc (Zn) gluconate treatment eliminated colorectal tumors in mice without noticeable adverse effects. The current project investigates the effect of this treatment on human colorectal carcinoma and normal cells in vitro. Initial dose-response experiments are being conducted to determine optimal in vitro-relevant concentrations for each compound alone and in combination. Flow cytometry will then be used to verify the effective dose(s). These results underlie a multidisciplinary project employing microfluidic technology and Raman spectroscopy to assess real-time biochemical output of cells in response to treatment.



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TPS domain governs virulence factor functionality and stability

Julian Grosskopf*

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: ***Drs. Todd Weaver and Daniel Grilley***

Discipline: ***Biochemistry***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #2***

Abstract:

The secretion of virulence factors often aids bacterial pathogenesis. The two-partner secretion (TPS) pathway, harboring both A (TpsA) and B-components (TpsB), is the most commonly used gram-negative virulence factor secretion system. In fact, whooping cough, meningitis, and certain food-borne illnesses have been attributed to TPS pathway containing gram-negative bacterial species. Systematically, TpsA members are activated concomitant with Tps-dependent secretion across the outer membrane. Upon secretion, TpsA members elicit a variety of functions including cytolysis, adhesion, contact-growth inhibition, and iron sequestration. Collectively, these TpsA functions provide advantageous invasion and proliferation strategies within host cells. Structurally, TpsA members can be divided into a two-partner secretion (TPS) domain and a functional domain. All TPS domains are constructed from a 300-residue right-handed, parallel β -helix structure, and recognize their cognate TpsB partner. In order to further understand the relationship between TPS domains and TpsA structure and function, we have implemented a truncated form of hemolysin A (HpmA265), a TpsA member from *Proteus mirabilis*. In previous studies, HpmA265 was structurally separated into three sequential folding subdomains: polar core, non-polar core, and carboxy-terminus. Specifically, these research investigations targeted valine 158 (V158) and phenylalanine 215 (F215) located within the first and last parallel, beta-strands of the non-polar core subdomain. A series of site-selective variations were established at both V158 and F215. These variant forms of HpmA265 were characterized structurally via protease sensitivity and protein folding techniques, while functionality was ascertained within a template-assisted hemolysis assay. Structurally, the V158 variants have destabilized the unfolding transitions associated with both the polar and non-polar core subdomains, while leaving functionality unaffected. Site-selective variants at F215 have selectively destabilized the non-polar core subdomain, while leaving the unfolding transition attributed to the polar core subdomain unaffected. Additionally, the F215 variants do not affect template-assisted hemolysis. Therefore, our results have been able to dissect the structural stability within the non-polar core subdomain from template-assisted function. These results have expanded the understanding for the implementation of TPS domains within gram-negative bacteria.



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Design and Fabrication of Microfluidic Device to Entrap Single Human Cells and Measure Extracellular pH

Hannah Exner*, Bridget White, & Miranda Bader-Goodman

*indicates presenting at Seven Rivers

Institution: **UW-Platteville**

Faculty Mentor: ***Dr. Jorge Camacho***

Discipline: ***Biomedical Engineering***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #3***

Abstract:

Our research demonstrates the design and fabrication of a bio-compatible microfluidic device capable of entrapping single cells and measuring their extracellular pH. The fabrication process involves a specific sequence of photolithography, chemical etching, metal and chemical deposition, and chloridation to create a device with multiple picoliter-size traps to isolate the cells, and dual working and reference thin-film electrodes to measure pH in the surrounding media. This technology will be used to facilitate quantitative, real-time assessment of the biochemical output of single human colorectal carcinoma and control cells in response to drug treatment.



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Structure-Activity Relationship of Inhibition of Bacterial Beta-Lactamase by Phthalic Acid Derivatives Using Colorimetric Assay

Curtis Felton*

*indicates presenting at Seven Rivers

Institution: **Winona State University**

Faculty Mentor: ***Dr. Myoung E. Lee***

Discipline: ***Biochemistry***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #4***

Abstract:

As a Cell and molecular major with a Pre-pharmacy emphasis, medicine has been an interest of mine. The major cause of increasing bacterial resistance to beta-lactam antibiotics is due to the expression of the enzyme beta-lactamase in bacteria. This leads to the inactivation of the antibiotics and preventing cell death. The currently known inhibitors of beta-lactamase are clavulanic acid, sulbactam, and tazobactam. These are the only inhibitors that have reached clinical importance. Phthalic acids derivatives have been identified as potential inhibitors. Phthalic acid, Terephthalic acid, and 1,2-Phenylenediacetic acid were tested for beta-lactamase inhibition at various concentrations to determine the KI values of inhibition. The data showed that terephthalic acid was the most inhibitory of beta-lactamase. The IC50 for terephthalic acid was not fully determined, however the smallest concentration of terephthalic acid tested, 1.5 mM, yielded a beta-lactamase activity of 34%, in other words an 66% inhibition. The IC50 values for phthalic acid and 1,2-phenylenediacetic acid was 8.3 mM and 4.8 mM respectively. Phthalic acid and 1,2-Phenylenediacetic acid are both similar in structure and inhibition of beta lactamase. Terephthalic is the most different with its carboxyl groups spread out the furthest. This could point towards the distance of the carboxyl groups having a greater impact on inhibition of beta-lactamase. Although all three phthalic acid derivatives showed the ability to inhibit b-lactamase, it is unlikely that these molecules would make it to the clinical level due to the high concentration of each molecule needed to inhibit beta-lactamase activity. Clinical drugs used are in the concentration of nanomolar while this experiment showed that millimolar concentrations were necessary for inhibition. In the future, I hope another student continues this research and takes a further look into the effect of the distance of the carboxyl group has on the inhibition of beta lactamase activity.



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Identification of Antidepressant Metabolites, Venlafaxine, Escitalopram and Duloxetine, in Rat Liver Microsomes Using CMS

Dani Schmaus*

*indicates presenting at Seven Rivers

Institution: **Winona State University**

Faculty Mentor: ***Dr. Myoung E. Lee***

Discipline: ***Biochemistry***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #5***

Abstract:

Antidepressants are commonly used for depression and anxiety. It is known that most drugs are metabolized by enzymes within the liver. The enzymes metabolize drugs by altering them to become more polar so that they can be excreted through the urine or bile. As a future pharmacist, I want to know how antidepressants are altered within the body before I distribute them. This study was done to determine the outcome of metabolism within three different antidepressants: venlafaxine (Effexor), duloxetine (Cymbalta) and escitalopram (Lexapro). These three drugs were mixed with rat liver microsomes and NADPH-generating system in phosphate buffer at pH 7.4. All samples were incubated for two hours at 37 degrees C. Each sample was subjected to the compact mass spectrometer fitted with a C18 reverse phase column. The results indicated that escitalopram and duloxetine underwent demethylation but not hydroxylation during metabolism. However, venlafaxine underwent both hydroxylation and demethylation when metabolized. When looking at the area of the peaks within each metabolized drug, duloxetine metabolized the most out of all three drugs. Up to 30-70% of duloxetine was metabolized. Several controls were also incubated and analyzed, such as the mixture without the drug, the mixture without NADPH-generating system, the mixture without the rat liver microsome and a mixture of just the drug and buffer. Some of the controls without the drug or the microsome still showed MS peaks with the same molecular weight as the drugs or the metabolites. These peaks could indicate that there are contaminants within the solvent or the phosphate buffer that have similar molecular weights. The future goal is to repeat these experiments using HPLC/CMS to further separate the metabolites. Using different drugs would also explain the outcome of metabolism a little further, such as if a drug can be both demethylated and hydroxylated.



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Biodegradation of Aromatic Compounds by Aerobic Bacteria

Aaron Streed*

*indicates presenting at Seven Rivers

Institution: **UW-Stout**

Faculty Mentor: ***Dr. Miller-Rodeberg***

Discipline: ***Biochemistry***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #6***

Abstract:

Herbicides such as Banvel leave harmful chemicals in our soils that can negatively affect our environment. Some bacteria strains can degrading these chemicals using aromatic degradation pathways. Microbes capable of growing on a minimal medium with an aromatic compound, p-hydroxybenzoate, were isolated from soil samples from Menomonie, Wisconsin. In this study, four different strains were isolated. Gram staining identified the microbes as all being classified as gram negative. Oxidation activity by the bacteria with the aromatic compound, p-hydroxybenzoate as a co-substrate, was detected and measured using a Vernier oxygen probe. Two strains utilized O₂ to degrade the aromatic compound. Results of this research will be presented here.



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VITERBO UNIVERSITY

Structural and Functional Effects of Altering the Nonpolar Core of Hemolysin A

Gage Stuttgen*

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: ***Todd Weaver***

Discipline: ***biochemistry***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #7***

Abstract:

The protein structure and function paradigm, a foundational tenet of biomolecular science, underlies many infectious diseases. Hemolysin A (HpmA), a hemolytic protein produced by *Proteus mirabilis*, was used as a model to investigate the protein structure-function paradigm. HpmA is a member of the two-partner secretion (TPS) pathway, which is used by gram-negative bacteria to export predominantly virulent proteins outside of the cell. Through this mechanism, the A-component (HpmA) is translocated, folded, and activated by its cognate B-component in the absence of high-energy bond and electrochemical gradient dependency. All TpsA components are relatively large and can be further divided into two domains, the two-partner secretion domain and the functional domain. Universally, all known TPS domains harbor a right-handed, parallel B-helix architecture and are essential for cognate TpsB-dependent recognition and secretion. Conversely, functional domains provide TpsA diversification including, cytolysis, host cell adhesion, contact-growth inhibition, and iron sequestration. A truncated version of hemolysin A (HpmA265) was implemented to define the contributions of the TPS domain toward TpsA structure and function. Recently, our group has further dissected HpmA265 into three sequentially folded structural units termed the polar core, non-polar core, and carboxy-terminal subdomains. This research project aims to expand upon our recent results and structurally map the role of the nonpolar core during TPS domain dependent secretion, folding and function. Specifically, residues within the non-polar core subdomain have been selectively targeted and modified. The structural and functional effects of these site-selective modifications have been evaluated via chemical denaturation, protease sensitivity and hemolytic assays. Each site-selective alteration selectively shifts the unfolding transitions attributed to the non-polar core and carboxy-terminal subdomain, while leaving the polar core transition unaffected. Furthermore, non-polar core subdomain destabilization differentially alters secretion levels, and both increases and decreases hemolytic activity. More broadly, these results further define B-helix TPS domain contribution during gram-negative bacterial infections like whooping cough, meningitis, and urinary tract infections.



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Studying the Effects of Macromolecular Crowding on Conformational Change Using Intrinsic Tryptophan Fluorescence

Jessica Liebau* & Katelyn Weeks*

*indicates presenting at Seven Rivers

Institution: **UW-Eau Claire**

Faculty Mentor: ***Sanchita Hati***

Discipline: ***Biochemistry***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #8***

Abstract:

Macromolecular crowding in the cytosolic environment is proposed to influence substrate binding affinity and enzymatic activity of proteins. However, the mechanism of dynamic changes that occur during substrate binding and catalysis in the presence of crowders has remained underexplored for modular enzymes like aminoacyl-tRNA synthetases (AARSs). AARSs catalyze the ligation of an amino acid onto its cognate tRNA, an important step in protein synthesis in all living cells. Currently, we are investigating the impact of macromolecular crowding on the conformational dynamics of prolyl-tRNA synthetases (ProRSs), a member of AARSs family, using intrinsic tryptophan fluorescence measurements and molecular dynamic simulations. We are using synthetic crowding agents to mimic the cytosolic crowding conditions. The impact of both charge and size of crowding agents are being investigated. Herein, we will present the preliminary results of our study, which suggest that crowding agents have significant impact on the conformational dynamics and function of bacterial ProRSs. This knowledge can potentially be used to further our understanding of intracellular enzyme dynamics, as well as to develop selective drugs against pathogenic AARSs.



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Nutrient Analysis of the Lake Winona Watershed

Josh Balsgier* & Michele Remer*

*indicates presenting at Seven Rivers

Institution: **Saint Mary's University**

Faculty Mentor: ***Dr. Joshua Lallaman***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #9***

Abstract:

Nutrient pollution, caused by excess nitrogen or phosphorus, is a major concern for aquatic ecosystems in the United States. Lake Winona, located next to the city of Winona, is listed as impaired for total phosphorus and chlorophyll a by the Minnesota Pollution Control Agency. Sources of nutrient pollution in the Lake Winona watershed include Gilmore Creek, which is a small cold water trout stream that flows into the relatively shallow (<1m) Bollers Lake before entering Lake Winona. This project investigated water quality in the Lake Winona watershed to help local managers identify and prioritize areas of concern. Water samples were collected regularly at 11 sites from March through October, 2018. Measurements of dissolved oxygen, temperature, and water clarity were taken in the field at each site. Further analysis of nitrates, phosphates, total phosphorus, and chlorophyll a was conducted in the laboratory. We found major differences in nutrient concentrations across seasons and between the Gilmore Creek, Bollers Lake, and Lake Winona sites. Our data shows that the flow of nutrients, especially phosphorus, into Lake Winona comes from several sources and will require multiple management strategies to address these nutrient impairments.



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VITERBO UNIVERSITY

The Impact of Oxysterols on the Cell Cycle in Colon Cancer

Andrew Wegner*

*indicates presenting at Seven Rivers
Institution: **Viterbo University**

Faculty Mentor: **Ryan Anderson**
Discipline: **Biochemistry**

Presentation Type: **Poster Presentation**
Presentation Location: **Reinhart Center Boardroom Poster #10**

Abstract:

The Impact of Oxysterols on the Cell Cycle in Colon Cancer

Andrew Wegner (1), Jessica Warns (2), and Othman Ghribi (2)

(1) Biology Department, Viterbo University, La Crosse, WI, 54601

(2) Department of Biomedical Sciences, University of North Dakota School of Medicine & Health Sciences, Grand Forks, ND, 58202

Oxysterols are cholesterol metabolites composed of 27 carbon molecules created by enzymatic or reactive oxygen species oxidation. Oxysterols influence signaling pathways, membrane fluidity, and the activity of some membrane-bound proteins. However, oxysterols have also been found to impact cancer cell proliferation rates. Previous research has shown that the cholesterol metabolite 27-hydroxycholesterol (27-OHC) causes a significant decrease in cancer cell proliferation in the Caco2 colon cancer cell line. We determined in this study the extent to which the decrease in cell proliferation by 27-OHC involve effects on cell cycle. We further examined the effect of 24-OHC, another major oxysterol that its effects on cell proliferation have not been yet determined. Caco2 colon cancer cells were treated with 1uM, 5uM, and 10uM of 27-OHC, 24-OHC, and a combination of 27-OHC + 24-OHC for 24 hours. MTT proliferation assays, quantitative PCRs, western blotting, and senescence detection assays were conducted. We found a significant decrease in cellular proliferation at the concentration of 5uM of 27-OHC + 24-OHC and the concentration of 10uM of 27-OHC + 24-OHC. Western blotting showed a significant decrease of CDK-4 expression for 10uM of 27-OHC + 5uM of 24-OHC. The decrease in cellular proliferation may result from a change in CDK and/or cyclin expression. Future experiments will investigate the role of 27-OHC and 24-OHC on CDK4 and cell cycle progression. Future experiments will include a variety of treatment times as a substitute for a single treatment time of 24 hours.



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Serum Testosterone Levels Following a MyPlate Diet Intervention in Women with Polycystic Ovary Syndrome

Jessie Benson*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Christopher Mayne***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #11***

Abstract:

Polycystic Ovary Syndrome (PCOS) is an endocrine disorder common among women of reproductive age. Symptoms can include excessive hair growth, irregular menstrual cycles, obesity, and ovarian cysts. Androgens (male development-associated hormones), such as testosterone (T), play an important role in PCOS. At optimal levels, T is essential for maintaining follicle growth and ovulation. In PCOS, however, the ovarian theca cells produce more androgens in response to increased levels of LH and insulin. When in excess, studies have shown that T reduces follicle health, ovulation rates and impairs oocyte development in women. High T levels are also associated with obesity and insulin resistance. The purpose of this portion of the pilot study is to test how the dietary intervention of an 8-week MyPlate diet will affect weight loss and hormonal balance of T. A total of three participants are currently involved in the study; two are in the intervention group and one in the control. The participant's blood was drawn before and after following the MyPlate or control diet. It was then aliquoted and stored in a freezer for later testing. All participants will have their T levels analyzed using a Free Testosterone ELISA. Due to the low number of participants, further testing will be done until a total of thirty people are in the intervention and control groups.



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The Effect of an 8-Week MyPlate Dietary Intervention on Those with Polycystic Ovary Syndrome and Their Insulin Levels

Bailey Benson*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Christopher Mayne***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #12***

Abstract:

Polycystic Ovary Syndrome (PCOS) is one of the most common endocrine disorders and is a major cause of infertility among women. It is characterized by two of the three following conditions: irregular or no menstrual cycles, polycystic ovaries, and high levels of male development-associated hormones (androgens). The purpose of this research is to see if following a MyPlate diet will help relieve the symptoms of PCOS and decrease weight among individuals who are overweight or obese. The MyPlate diet is the standard USDA guide for a healthy and balanced diet. This pilot study is a collaborative work with students and advisors from a variety of disciplines. The focus in this part of the study is to test and evaluate insulin levels, as PCOS is often associated with insulin resistance. If participants lose weight, in particular fat, from the MyPlate diet plan, we hypothesize that insulin levels will decrease. If insulin levels are reduced, the risk for complications such as diabetes can also be expected to decrease. Insulin levels are tested from participant's fasting blood samples via ELISA. A total of four participants have been enrolled in both the intervention and control groups. All participants have their insulin levels analyzed pre- and post-intervention. As the study continues, it will be important to continue to enroll participants to increase sample size in each group to determine whether insulin levels have lowered.



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Error Prorogation in Atomistic Modeling

Amber Drewek*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Sheldon Lee***

Discipline: ***Mathematics***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #13***

Abstract:

In this project we use random walk simulations along with Dynkin's formula to approximate solutions to the Laplace and Poisson equations...The goal of this project is to study the errors involved in approximating the solution to the Laplace and Poisson equations with these methods. The random walk method was used to solve a variety of Laplace and Poisson problems in two and three dimensions. First the analytic solution for the equation was found, and this was compared with the codes estimated solution to find how the number of iterations and step size impacted the error. As expected the error was shown to decrease when the number of iterations was increased, and when the step size was decreased.



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Research Proposal: The possible connection between gut bacteria and behaviors associated with good mental health.

Derek Fuchsberger*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***David Saunders-Scott***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #14***

Abstract:

Abstract

The human gut contains trillions of microbes, including bacteria that regulate our immune system (Cryan & Dinan, 2012), neurotransmitters such as serotonin and dopamine (Bravo et al., 2011), and consequently our physical and mental health. We will evaluate several behaviors in twenty Long Evans rats to determine positive emotions as measured by level of licking and grooming that indicate affiliative behaviors and response in the elevated plus maze test to assess level of anxiety. By introducing probiotics, including Lactobacilli and Bifidobacteria into a randomized half of the rats and noting whether there are noticeable changes in the animals' behavior over time, I will evaluate the influence of these bacteria on behaviors associated with positive mental health. Behaviors will be assessed using the EthoVision XT software program, which uses a camera footage upload to track the rat activity. Then using a t-test the rats given probiotics will be compared to a placebo control group rats. This study may verify whether certain bacteria influence improved mental health as measured by behaviors indicative of positive mental health in rodents. A potential application of this study is in finding an alternative or adjunctive treatment for anxiety and depressive disorders.

References

Cryan, J. F., & Dinan, T. G. (2012). Mind-altering microorganisms: the impact of the gut microbiota on brain and behavior. *Nature Reviews: Neuroscience*, 13, 701-712. doi:10.1038/nrn3346

Mangiola, F., Ianiro, G., Franceschi, F., Fagioli, S., Gasbarrini, G., & Gasbarrini, A. (2016). Gut microbiota in autism and mood disorders. *World Journal of Gastroenterology*, 22(1), 361-368. doi: 10.3748/wjg.v22.i1.361



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Z2-graded Complex Associative Algebras: Background, Deformations, and Maple v.s. SageMath

Tyler Gonzales*, Grant Keane*, Jack Lazowski*, Ellie Lochner*, Carolyn Payne*, Jory Wagner*, & Haotian Wu*

*indicates presenting at Seven Rivers

Institution: **UW-Eau Claire**

Faculty Mentor: **Michael Penkava**

Discipline: **Mathematics**

Presentation Type: **Poster Presentation**

Presentation Location: **Reinhart Center Boardroom Poster #15**

Abstract:

In this talk, we will share the research we have completed during the summer REU mathematics program. We begin by sharing some definitions, and examples, of topics we have learned relating to the field of noncommutative geometry and deformation theory. We will open this talk with a discussion on the concepts of algebras, graded vector spaces, tensor products, and the tensor algebra. We will then move into the notion of deformation theory, including an example of how to compute the bracket of what is called a versal deformation. We will conclude this talk with a comparison of Maple and SageMath, and discuss why we hope to continue the translation of the computer software from one to the next.



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Red-bellied Woodpeckers (*Melanerpes carolinus*) scavenging: a possible alternate dietary substrate

Mark Leonard*

*indicates presenting at Seven Rivers

Institution: **Saint Mary's University**

Faculty Mentor: ***Benjamin Pauli***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #16***

Abstract:

Red-bellied Woodpeckers (*Melanerpes carolinus*) are insectivores that consume mainly insects found within trees but may also feed on seeds and small vertebrates. On rare, isolated occasions, Red-bellied Woodpeckers opportunistically scavenge carcasses or carrion. Here we document the first recorded instances of repeated and sustained visits by Red-bellied Woodpeckers to a deer carcass presumably for the supplementation of diet via scavenging. Between December 2016 and March 2017, a tree-mounted, motion sensor trail camera directed towards a deer carcass, on a site in Winona, Minnesota, captured 1815 photos of Red-bellied Woodpeckers from 381 separate visits. We analyzed the photos to determine if time of day or month affected the frequency of pictures of Red-bellied Woodpeckers at the carcass. The timing of Red-bellied Woodpecker visits was not uniformly distributed in time with more pictures being taken during the middle of the day; however, the frequency of photographs did not differ by survey month. Results of this study are useful for expanding our understanding of Red-bellied Woodpecker diets and the role that scavenging may play in diet supplementation during winter months.



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Investigating SRSF1 Regulation of MAPT Alternative Splicing in Frontotemporal Dementia

Kristin Schneider*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Brianne Sanford***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #17***

Abstract:

Frontotemporal Dementia (FTD), a neurodegenerative disease, affects around 50,000-60,000 Americans. There is not much known on what causes neurodegenerative diseases, but one known cause of Frontotemporal Dementia is linked to the protein tau. Tau has 6 isoforms coded by the gene MAPT. On protein tau there are two regions, the projection domain and the microtubule binding region, which has either three or four repeating domains. In a healthy brain, the ratio of the repeating domains is close to equal, but in a diseased brain, the ratio is skewed causing a clumping of tau proteins called tauopathies. A build-up of tauopathies result in cellular death. Isoforms are made during RNA splicing when splicing factors are incorporated to change the RNA sequence. Bioinformatics were conducted to learn more about the possible splicing factors that can be used in intron 9 of MAPT to affect the repeating domains in the binding region, which showed that splicing factor, SRSF1, was the best candidate. SRSF1 was then transfected into HeLa cells. The cells were harvested and analyzed to observe the outcome. It was observed that with the increased amount of SRSF1 results in an increase in three repeating domain proteins in the cell.



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Expansion of the synthetic approach to curcumin and curcuminoids

Andres Guerrero**, *Kyle Wolmutt**, & *Joshua Cook

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: ***Dr. Valeria Stepanova***

Discipline: ***Biochemistry***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Reinhart Center Boardroom Poster #18***

Abstract:

Curcumin is a compound that has multiple applications in the food and pharmaceutical industries. It is known as a natural colorant, but more importantly for its anti-inflammatory, antioxidant, anti-bacterial and chemotherapeutic properties. Curcumin consists of an extended conjugated system with a hydroxy and methoxy functional groups on the aromatic rings. Modification of the aromatic ring substituents leads to a class of compound known as curcuminoids. In curcuminoids, the extended conjugated system remains the same, but aromatic rings contain various functional groups introduced through the choice of a corresponding starting aldehyde. The difference in aldehydes used is important because it directly affects the electron density on the oxygen atoms of the extended conjugation and alters the physical, chemical, and biological properties of the final product. Although curcumin can be isolated from *Curcuma longa*, this method is not efficient and limited to curcumin only. The common synthesis of curcumin developed in 1964 by Pabon or its later modifications are not environmentally friendly nor atom economical and not applicable to syntheses of various curcuminoids. Our hypothesis was that clever implementation of solvent-free and silica gel reaction protocols will not only allow us to “greener” the synthesis, but also obtain novel curcuminoid compounds. Here we report results of our study on applicability of solvent-free approach to obtain a series of curcuminoids, the optimization of synthetic and isolation methodologies. Our preliminary findings on the development of catalytic synthesis using of silica gel supported boron-based catalyst for chloro-substituted aldehydes are also discussed.



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Professional Development in Education

Amanda Hemmersbach*, Sydney Schmutzer*, & Alexis Vertein*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: **Melinda Langeberg**

Discipline: **Education**

Presentation Type: **Poster Presentation**

Presentation Location: **Fine Arts Center Main Theater Lobby Poster #19**

Abstract:

This past spring, eight Education Club members attended University of Wisconsin Stout's Early Childhood Education Conference. This experience was a two-day event filled with informational sessions concerning classroom management strategies and motivational talks. We gained understanding in professional development related to ways to comfort an emotionally insecure child, strategies for helping those children affected by trauma, and we networked with other educators. Both days started off with inspirational keynote speakers such as, Dr. Jean who addressed brain breaks and transitions, and then we all broke off into different sessions for the remainder of the day.

During our time at this conference we attended sessions titled "Ways to Incorporate Movement in the Classroom" and "I am Perfectly Imperfect". In the "Ways to Incorporate Movement in the Classroom" session, Kris Franzini discussed using brain breaks throughout the class day and using movement to learn. The "I am Perfectly Imperfect" session focused on the need for educators to take time for themselves in order to prevent teacher burnout. During this session, Linda De Moe also spoke about taking care of yourself first and others second. As educators, she reminded us to recall what it is like to be a kid. All of the new understandings we gained from University of Wisconsin Stout's Early Childhood Education Conference have helped us become more informed future educators.



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Quality and Scarcity of Water in Africa and How It Impacts People

Hannah Cowan*

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: ***Dr. Gita Pai, Dr. Anna Keefe***

Discipline: ***Humanities***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #21***

Abstract:

Access to clean and sustainable water has been an issue in many developed and developing countries for multiple years. This paper will primarily focus on Africa as a whole with discussions on a few regional areas in the continent along with comparative material discussed throughout. This research paper will discuss the many struggles of certain areas in Africa and around the world for comparisons, and will reflect upon the potential solutions to the world-wide struggle of the water crisis. Multiple areas and sources of research will be considered when gathering the information placed in this paper. One of these sources is the academic scholar and Kenyan expert on water quality and scarcity-Daniel Sambu, a professor of geography, along with some of his research such as Institutional water reforms in Kenya: an analytical review. Information will be obtained from a collaboration of intergovernmental organizations such as the United Nations and the African governments and their published works: The Africa Water Vision for 2025 and The Millennium Development Goals of 2015. Other sources such as The Journal of Environmental Economics and Management, an academic journal, and the World Health Organization (WHO) website will be included. Some organizations specific to Africa such as the African Development Bank Group and the African Water Facility will play a key role in this research paper as well. Water quality and accessibility, global warming, and human patterns will be interpreted upon examination. The Millennium Development Goals of 2015 and the World Water Vision for the year 2025 will be assessed as to whether Africa has or will reach these goals. This paper will also identify the threats to known water sources and how water sustainability is impacted by economic factors. It will further be observed that the water crisis in Africa is the result of a number of factors such as human impact, environmental changes, and economic developments. It is noteworthy that many organizations are collaborating to find adequate solutions. However, even with proper solutions available, some areas cannot, or will not, implement them due to various reasons (lack of motivation, resources, or knowledge).



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A Beautiful Day in [Certain] Neighborhoods: Backstage Accessibility in Theatre Venues Nationwide

Alethea Bakogorge*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Ryan Anderson***

Discipline: ***Music Theatre***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #22***

Abstract:

Nationwide, there are few opportunities for disabled actors to build healthy careers in theatre. This is due in part to the fact that many venues across the country remain inaccessible at the backstage level. Professional actor and Viterbo Music Theatre and Arts Administration student Alethea Bakogorge experienced access limitations many times during her time as a disabled actor playing a disabled character in the US national tour of Daniel Tiger's Neighborhood Live, where she toured to 67 venues in 37 US states. Using this qualitative data, Bakogorge examines the different degrees of backstage accessibility in venues nationwide. The research evaluates the experiential data through the lens of federal disability legislation (the Americans With Disabilities Act), challenges faced by venues that are also historic buildings, and discrepancies between access for disabled patrons and access for disabled performers. The research bears out that venues remain inaccessible in part because cultural administrators fear renovating for accessibility will be costly. However, the Internal Revenue Code permits businesses to deduct up to \$15,000 yearly to cover expenses associated with removing barriers to access. Venues also remain inaccessible due to structural inequity built into professional theatre, inequity that begins at the academic level and persists all the way to commercial theatre (e.g. Broadway). Building on her findings, Bakogorge has created a list of best practices for cultural administrators at regional venues to remove barriers to access (both tangible and metaphorical) in order to increase the number of markets disabled actors can readily work in.



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An Exercise in Marxist Literary Criticism: Conflict Theory in Anjea

Rebecca Houge*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Vickie Holtz-Wodzak, Andrew Hamilton, Marlene Fisher***

Discipline: ***Humanities***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #23***

Abstract:

My research includes a creative writing piece in the fantasy genre, "Testimony," and its accompanying analytical paper. The short story applies Karl Marx's conflict theory--that society can be largely understood through the lens of class conflict--and sociologist C. Wright Mills' notion of the "power elite"--the politicians, businessmen, and military figures who control the majority of a country's wealth and power and have a monopoly over decisions made in the Nation's (and its citizens') name--to a fictional continent, combined with historical examples given a fantasy twist. The end result is unique to my own personal history, studies, and the society/time period in which I've lived. It is a blunt parallel of how I see and understand the rampant social and economic inequalities in our own world.



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Suicide and Homicide: How we can Prevent Tragedies

Levi Orr* and Megan Ripp*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***David P Saunders-Scott***

Discipline: ***Psychology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #24***

Abstract:

Suicide and homicide have become increasingly prevalent in our society today, and there is much pressure on lawmakers and those from the mental health field to combat the issue. This can be significantly challenging since it is a multi-faceted issue and can be difficult to identify a root cause for each case of violence. We conducted a systemic review of scholarly articles and credible sources in order to research the etiology of suicide and homicide, along with finding answers about possible treatments and prevention strategies. Many of the results focused on gun control strategies, recognizing periods of heightened risk for violence, and implementing new policies to remove handguns from those who are experiencing episodes of psychosis. There is a stigma in society about mental health that may prohibit these at-risk individuals from seeking treatment. It is easier to pinpoint those who will not commit acts of violence, compared to pinpointing those who will commit violent acts. Future research needs to be aimed at better screening for these individuals in order to create better prevention strategies.



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Understanding impacts of consumerism on climate change and how we can become more ethical consumers.

Nicole Broz*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Stephen Minnema***

Discipline: ***Ethics***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #20***

Abstract:

Living in the 21st century within the United States, we tend to place a high value on material items. Although individuals tend to think of consumerism as simply demanding and buying products, the implications of our purchases go far beyond the initial instant gratification and few hours of satisfaction. As consumers, we often separate ourselves from the environmental impacts of our purchases. Almost any type of production of material goods has drastic and devastating environmental impacts. This poster presentation aims to address some specific implications of our consumerism on the global problem of climate change. Although climate change is a controversial subject, it is undeniably real, and it is an issue we need to continue discussing. This poster and conversation will also contain recommendations for how we can all be more ethical consumers and fight back against climate change now and in the future.



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The Role of Empathy in Strengthening Children's Connection with Nature

Lexi Bird*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Liza Ware***

Discipline: ***Psychology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #25***

Abstract:

The present study assesses how affective components, specifically empathy and perspective taking, strengthen children's connectedness to nature. Participants (N = 25) in this study were children (ages 7-11) at a local farm camp that provided children the opportunity to interact with nature. Participants completed journal entries encouraging the control group to write about their nature experience and the empathy group to take the perspective of nature. Pre- and post-measures of the Connection to Nature Index (CNI) assessed the participants' connectedness to nature over the course of the four-day camp. Children in the control condition showed no overall increase in CNI scores, however, those in the empathy condition did show increased CNI scores. These findings support the importance of affective components in nature education as a means to increase children's connection with nature.



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An Analysis of Trauma, Meaning in Life, and Forgiveness in Puerto Rico, Armenia, and Haiti.

Ryan Cook* and Chi Pham*

*indicates presenting at Seven Rivers

Institution: **Luther College**

Faculty Mentor: **Loren Toussaint**

Discipline: **Psychology**

Presentation Type: **Poster Presentation**

Presentation Location: **Fine Arts Center Main Theater Lobby Poster #26**

Abstract:

This study examines levels of trauma, meaning in life, and forgiveness of self and others as related to education levels and age group in Armenian, Puerto Rican, and Haitian participants. It was hypothesized that with older age group or higher levels of education would be associated with higher levels of forgiveness of self and others. Also consistent with prior research, it was hypothesized that older age group or higher levels of education would be associated with less trauma and more meaning in life. Data were collected from a sample of 197 Haitians, 191 Armenians, and 511 Puerto Ricans. The demographic information collected reflects a variety of age group, educational level, nationality, and regions. Measures included the Harvard Trauma Questionnaire, the Meaning in Life Questionnaire, and two single-item measures of forgiveness of self and others. Results will discuss in detail the established relationship among traumatic experience, the presence of meaning in life, and levels of forgiveness in correspondence with different demographic categories.



7 RIVERS
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RESEARCH SYMPOSIUM



VITERBO UNIVERSITY

God's Chosen People

Cali Gurnicki*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Emily Dykman***

Discipline: ***Religious Studies***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #28***

Abstract:

In the Old Testament, God has His chosen people, the Israelites, and everyone else is portrayed as the enemy. In the New Testament, though, there is an emphasis that God is for everyone and free will means that anyone can come to Him. How can someone freely choose God if God has already chosen people to call His own? Are the people who freely come to God already chosen? What does it mean to be chosen and not chosen? In order to discover what it means to be chosen, I went straight to Scripture where God reveals Himself and some of His ways. I used specifically the book of Exodus and its redaction history to learn how the story alone reveals truths about God and His Chosen people and how the editors could have changed the story to reflect their own cultures. As one of the most important and influential books in the Old Testament, Exodus tells the story of God freeing the enslaved Israelites, their journey in the desert, and the covenant that is made between them and God. Like many before me, it is the perfect place to start to discover God's intentions for His Chosen and the Covenant He establishes with them.



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VITERBO UNIVERSITY

Resilience in Social Work

Abby Thurk*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Janet Holter***

Discipline: ***Social Work***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #29***

Abstract:

During my summer research I studied the understanding social workers have of the resiliency in their clients. Having a better understanding of resilience in addicts or those struggling can help social workers find other ways to help them. Throughout this research I created a qualtrics survey and sent it to Viterbo Social Work alumni. The questions were based on their clients and how they saw their use of resilience. These questions included information about the social worker themselves and how long they have been in practice and what type of practice they are involved in. After receiving the results from these surveys, I created a graph displaying the different understandings and different types of social work that they are involved in. Separating the chart by the amount of years they have in practice and analyzing if the amount of time in practice changes the understanding they may have on resilience. It was found that there are many different factors in understanding resiliency, but there is no exact pattern.



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VITERBO UNIVERSITY

Impact of Anxiety on Learning

Jolene Lansin*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Jennie Anderson-Meger***

Discipline: ***Social Work***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #30***

Abstract:

The purpose of this study was to examine faculty member's knowledge and experience of student anxiety within their classrooms. It is important to examine the prevalence of anxiety within college universities because nearly 40% of college students experience anxiety, depression, and other mental illnesses. By becoming more aware of students' anxieties at Viterbo University, we can promote awareness and create programs to help reduce these anxieties. To get these results, nine faculty members were interviewed at Viterbo University, and were asked questions pertaining to their awareness of anxiety, handling student anxiety, and their campus recommendations. All interviews were audio-recorded and then later transcribed to see similarities and common themes between interviews. Findings show that anxiety is evident in classrooms at Viterbo University, and this anxiety can lead to a lack of concentration, missing class, self-medicating, and dropping classes. Several faculty members interviewed had mental health backgrounds, and have several strategies when working with their students with anxiety. Faculty noticed that some of the barriers to students getting help for mental illnesses included financial barriers, stigma effects, and availability of services. While it is important for professors to connect with students, faculty still need to maintain appropriate boundaries when helping students with mental illnesses. Some recommendations that were provided included more education and training on mental health, safe places, and accommodating resources. In conclusion, it is evident that anxiety and other mental illnesses can play a negative role in college classrooms. Future implications may be aimed at helping to reduce stigma effects, reducing barriers to treatment, and providing more education and awareness to students and faculty at Viterbo University.



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VITERBO UNIVERSITY

Hmong Community Needs Assessment

Houa Yang*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Jennie Meger***

Discipline: ***Social Work***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #31***

Abstract:

The purpose of the research was to assess the resources needs in the Hmong community. This research is a continuation from the previous summer research in 2017; however, this research was designed to collect qualitative data from professionals who work with the Hmong population within the La Crosse area. Questions were focused the gaps between resources available and the needs in the Hmong population. Ten participants were interviewed. Each participant was from a different agency within the La Crosse Area. The data were transcribed and analyzed through a level 1 and level 2 coding system. Common themes found were the importance of education, use of respectful terminology to address Hmong individuals, and the importance of face-to-face interaction with Hmong clients. Some implications for the practice of this research included advocating for the Hmong population and their needs; as well as, increased awareness for the need for educational training on the Hmong culture and population.



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VITERBO UNIVERSITY

Cultural Competence in Law Enforcement

Hannah Erickson*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Ryan Anderson***

Discipline: ***Criminal Justice***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #33***

Abstract:

With police-minority interactions becoming so violent the past few years, cultural and lingual competence (the ability to effectively deliver services that meet the cultural and linguistic needs of an individual or group) within the criminal justice system is a very pertinent issue. Also, the Hispanic community is the largest growing minority group in the United States (Taylor, B. A., Gambourg, M. B., Rivera, M., & Laureano, D., 429). Themes that will be covered in the literature review are language barriers (a barrier in communication between people who are unable to speak a common language) and how they impede communication between civilians and police officers, as well as how the outcome or resolution of the circumstance in question might be hindered. Other articles will look at family, mental health, substance abuse, and how cultural and lingual competence plays a large role in improving patient and counseling outcomes. Finally, this paper will discuss the training that officers complete, and the conclusion that the Law Enforcement Basic Training 720-Hour Curriculum is producing improvement in some, but not all, subjects covered in an assessment of current police officer-to-civilian affairs.



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VITERBO UNIVERSITY

The Correlation Between Personality Characteristics and Employee Motivation

Sydney Wallace*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Annette Roter***

Discipline: ***Psychology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Fine Arts Center Main Theater Lobby Poster #34***

Abstract:

The main goal of the research was to understand if there is a correlation between personality characteristics and motivation. This was able to be determined through two survey results. One of the surveys was previously taken through Annette Roter a DISC personality test administrator, and the other motivation test was distributed through email in a self reported questionnaire format. An indirect goal of this research was to better understand the current use of the DISC assessment test and to find out how this test could be used to help human resources staff motivate employees. Key learnings from this research was that there is not a significant correlation between personality and motivation according to the data collected. The only personality type that showed a significant correlation between personality and motivation was the personality type S. Those who were a personality type S were 34% more likely to be intrinsically motivated. There was significant data that claimed that males were more likely to be consider a D personality type. Also, females are more likely to be considered a S or C personality type. Therefore, personality may be a small factor in motivation, but it is not the sole factor that will keep a workforce engaged.



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VITERBO UNIVERSITY

Establishing the need for a Nuclear Medicine and Molecular Imaging Pediatric Specialty

Dawn Lawry*, Emily Seib*, Kellie Shaw*, & Brianna Wirkus

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: ***Aileen Staffaroni***

Discipline: ***Nuclear Medicine***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 35***

Abstract:

Objectives: The field of Nuclear Medicine and Molecular Imaging (NMMI) has been prospering with continual technological, diagnostic, and therapeutic advancements in both the adult and pediatric populations. Since the first NMMI pediatric patient in 1946, this population has increased, highlighting a lack of standardization that has limited NMMI professionals. Today, 90% of pediatric patients are being treated at adult-focused hospitals. As the profession advances in diagnosing and restoring health in today's youth, the lack of standards makes it difficult for adult-focused hospitals to find the support that enables them to ethically care for pediatrics and acquire quality images. This results in a deficit in the practices, education, and awareness surrounding pediatrics in NMMI. This research will investigate the need for a specialty within NMMI for pediatrics.

Methods: Questionnaires consisting of 25 questions were distributed to various professionals associated with NMMI in the central chapter region, spanning both adult-focused and pediatric-specialized hospitals. A compilation of 65 questionnaires, represented 51 technologists, 3 radiologist, 3 physicians, and 8 other professionals.

Results: Data shows 71% of professionals desire more education surrounding pediatrics. However, 48% noted their departments do not disclose nor provide further education around pediatrics and 48% of departments need assistance from child life specialists. Pediatric dose activity calculation was not a concern for 84% of professionals. However, 72% of professionals stated a pediatric specialty would be beneficial for patients and themselves, as well as 68% said that it would be a step forward for NMMI. This data indicates a need for education surrounding pediatrics within NMMI to increase quality care.

Conclusion: Results highlighted desires for more education in NMMI regarding the pediatric population.

Illustrating a pediatric specialty would benefit patients and professionals, aiding in diagnosing and restoring the health of our society's children.



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RESEARCH SYMPOSIUM



VITERBO UNIVERSITY

Inflammatory cytokine levels in overweight and obese participants following a 12-week vegetarian diet intervention

James Scoles*, Melissa Edgar, Angela Riederer, & Kendal Schmitz

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Chris Mayne***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 36***

Abstract:

Obesity is one of the biggest public health concerns that we face in today's society. Obesity has also been shown to increase levels of inflammatory cytokines systemically, which is associated with heightened risk for chronic diseases. Metabolic diseases and cardiovascular disease are two broad categories of chronic health issues that are more prominent in people with chronic low-grade inflammation. Changes in the diet may be one mechanism to help lower this systemic inflammation. Specifically, diet has been shown to affect the immune system and inflammatory status. Certain types of fats, like saturated fats, have been shown to increase inflammation. Saturated fats are increased in animal products and red meats, which would not be found in vegetarian diets, leading to the hypothesis that vegetarian diets could lower systemic inflammation. Our study looked into the efficacy of a 12-week vegetarian intervention on IL-1 levels in the serum of obese participants. Six participants have had their serum analyzed at this point in the study. Moving forward, we will also investigate TNF- α and other inflammatory cytokines. Further, we will continue to enroll more participants to increase statistical power, and thus make greater conclusions as to whether or not the vegetarian diet had effects on systemic inflammation.



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RESEARCH SYMPOSIUM



VITERBO UNIVERSITY

Efficiency of Viterbo Campus Building Windows

Benjamin Gibson*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Ted Wilson***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 37***

Abstract:

There are differences in the heat efficiencies of the windows of two buildings on Viterbo campus. The research I conducted over the winter of 2017 and into the summer of 2018 examined the difference in the efficiency of the windows of the Reinhart and Murphy buildings on Viterbo campus. In the winter, I measured the amount of heat that was lost through the windows and their frames to the outside. The internal temperature of the room was compared to the external temperature and an efficiency calculation based on the R-value of the window was determined. Additionally, I used a FLIR thermal camera to identify the leaks in windows. Similarly, in the summer I used the thermal camera to quantify the number of leaks in windows as before, the only difference was that I measured a set of windows on each floor of the buildings. I also took the temperatures of the interior room and exterior as before. I determined that the windows of Reinhart Center are more efficient than those of Murphy, both in the efficiency of heat loss and in number of window leaks. In one year alone, roughly 275 thousand dollars is wasted to heat rooms in Murphy buildings in which heat is lost through the windows. The research is important in the fact that it may provide enough evidence to decision makers that the windows of Murphy building should consider being replaced with newer and more efficient windows.



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VITERBO UNIVERSITY

Importance of Rural Health Nursing Exposure

Hunter Barry*, Ashley Bohn*, & Haley Polin*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Robin Haugh***

Discipline: ***Nursing***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 38***

Abstract:

This presentation discusses why it is imperative that nursing students are exposed to rural health nursing experiences during their academic career. Many rural health facilities are facing nursing shortages and are finding it hard to attract and retain nurses to a rural setting. A literary analysis was conducted along with interviews of current nurses working in a rural health setting. Fifty-six nurses in rural health care settings were asked to complete a questionnaire regarding their experiences in a rural health care setting. Findings revealed five recurring themes in response to the questionnaire: ability to be a more well-rounded nurse, having a better understanding of local culture, ability to form better relationships with patients, better multitasking skills, and enhanced critical thinking skills. A review of the literature was completed to support the same recurring themes from the interview portion. Twenty-three articles were analyzed and synthesized. Findings support that rural health nursing provides unique nursing opportunities that may not be offered in urban areas. Challenges to working as a nurse in a rural setting include lack of resources or outdated resources for patient care, low staffing, limited specialty care for patients, and lack of or limited continuing education opportunities for practicing nurses.

Keywords: rural health, nursing, benefits, advantages



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VITERBO UNIVERSITY

Initial Investigation of the Effects of a 12-Week Vegetarian Diet Intervention on Insulin Levels in an Obese Population

Melissa Edgar*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Christopher Mayne***

Discipline: ***Biology***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 39***

Abstract:

Obesity is a condition of excess fat storage in the body that affects over 700 million people worldwide. This condition greatly increases the risk of type 2 diabetes, a leading cause of death globally. Type 2 diabetes is characterized by insulin resistance, a condition wherein cells have a weak response to normal or elevated levels of insulin, resulting in improper glucose intake by those cells. The pancreas can produce more insulin, but, depending on the degree of insulin resistance, the elevated levels of insulin may not be able to keep glucose levels in the blood in a normal range. Vegetarian diets have been shown to counter insulin resistance in humans. This study examined the ability of a 12-week vegetarian diet intervention to significantly alter insulin levels in individuals with obesity. The hypothesis was that a vegetarian diet would increase insulin sensitivity, leading to a decrease in insulin levels. Participants, 18-65 years old with a BMI of 25.8-40 kg/m², were randomly placed into either the vegetarian diet intervention (n=2) or a control diet (MyPlate guidelines) intervention (n=3). Fasting blood draws were taken prior to and post dietary intervention. Blood glucose levels were determined and sera were prepared from whole blood samples. Insulin measurements were determined for all participants via capture ELISA. As this study continues, more participants will be enrolled to increase the sample sizes for each intervention group. This will help determine whether a vegetarian diet has a significant effect on insulin levels of obese individuals.



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VITERBO UNIVERSITY

8 week dietary intervention of MyPlate guideline and PCOS and it's effects on inflammation and quality of life

Jennifer Cash* & Abigail Weighner*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Cameron Kiersch***

Discipline: ***Nursing***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 40***

Abstract:

Polycystic ovary syndrome (PCOS) causes a hormonal imbalance and metabolic problems that affect a woman's fertility (due to higher than normal levels of androgens) leading to irregular or absent menstrual cycles. A woman's physical appearance and overall health is also affected including symptoms such as excess or unwanted hair growth, acne, thinning hair, and weight gain or the inability to lose weight, as well as insulin resistance which can lead to the development of diabetes mellitus. Additionally, studies have shown that PCOS is accompanied by elevated inflammatory biomarkers. This may lead to low-grade systemic inflammatory symptoms in individuals with PCOS which can manifest as GI upset and malnutrition, sleep disturbance, and fatigue/depression. Because of the disease process and its accompanying symptoms, many women with PCOS report psychological issues of anxiety, depression, decreased sexuality, social isolation, eating disorders, and overall decrease in quality of life. Diagnosed women are often not provided with counseling or any mental health support to cope with PCOS and its co-morbidities. Our goal is to examine the effects of inflammation and quality of life in participants with PCOS or who have PCOS-like symptoms (at least two of the following: excess facial hair, acne, irregular menstrual cycles) by looking at symptoms of systemic inflammation as well as mental status in participants. We will examine this using an eight-week dietary intervention where experimental participants will adhere to a MyPlate diet and control participants will adhere to their normal lifestyle. Both groups will complete pre- and post-intervention questionnaires covering systemic signs and symptoms of inflammation and quality of life. Additionally, blood levels of pro- and anti-inflammatory cytokines will also be measured before and after the eight-week intervention as further possible evidence of systemic inflammation.



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VITERBO UNIVERSITY

12-Week Vegetarian Diet Intervention Effect on Inflammatory Status and Cardio-Metabolic Parameters: Resting Energy Expenditure

Kendal Schmitz*, Will Fisher, Cameron Reider, Angela Riederer, Melissa Edgar, & James Scoles

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Maria Morgan-Bathke***

Discipline: ***Nutrition***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 41***

Abstract:

Obesity, the most common nutritional problem in the United States, is now recognized to be associated with both systemic and adipose tissue inflammation. Evidence from a number of in vitro and animal studies indicate that saturated fatty acids play a role in the induction of this inflammation. However, the impact of saturated fatty acids on inflammation has been poorly understood in the human population. Foods high in saturated fatty acids tend to be meat and dairy; therefore, in this current study we aimed to determine if providing a vegetarian diet intervention to individuals with obesity over a twelve-week period could reduce chronic inflammation as well as improve cardio-metabolic parameters that are precursors to the co-morbidities associated with obesity. In this twelve-week study, participants were randomly assigned to either the control or intervention group. The control group was told to follow a MyPlate diet, while the intervention group was told to follow a vegetarian diet. Both groups were counseled on how to follow their diet regimens. The COSMED Fitmate was used to collect resting energy expenditure, while the Maltron machine was used to measure body fat percentage and visceral fat. Other body composition measures such as waist to hip ratio were performed using a measuring tape. Four participants completed the study. Two participants were in the control group, while the other two were in the intervention group. Due to a small sample size, statistical analyses could not be run. One major issue that arose when conducting this research was low recruitment of participants. The goal for recruitment is 15 participants per group. Upon reaching this goal, stats will be run for statistical significance.



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RESEARCH SYMPOSIUM



VITERBO UNIVERSITY

Market Baskets Program: The Impact on the Low-Income Population of La Crosse

Claire Bowar*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Pamela Dixon***

Discipline: ***Nutrition***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 42***

Abstract:

Today, nearly 86% of individuals do not consume the United States Department of Agriculture's (USDA) recommended servings for fruits and vegetables. With the proliferation of convenience foods, individuals are less likely to learn about nutrition, cooking skills, and ways to incorporate fresh foods into their diet. In La Crosse, nearly 12% of the population is food insecure, and these individuals often lack nutrition related knowledge and rely on convenience foods. Studies have continued to show that changes in behavior, attitude, and knowledge about nutrition and cooking are much stronger with hands-on cooking classes. The Market Baskets program in La Crosse teaches cooking classes to low-income individuals through free, hands on classes. This then raises the question, what impact does the Market Baskets program have on the low-income population of La Crosse? To help answer this question, an evaluation study was conducted using a survey and focus group that collected data regarding learning outcomes. The purpose of the study was to determine the extent to which Market Baskets program taught participants how to prepare healthy meals in a safe manner. Participants took part in a nutrition education cooking class, completed a survey, and had a discussion in a focus group. It was indicated that the Market Baskets program does teach the participants how to prepare healthy meals in a safe manner. The focus groups were effective in that participants were able to elaborate more when asked follow up questions. However, it was determined that the Market Baskets classes are not fulfilling their mission of serving the food insecure individuals of La Crosse. Further research needs to be done to determine where the food insecure populations are located in La Crosse, and connections need to be made with stakeholders and community members to determine how to best reach the food insecure population.



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VITERBO UNIVERSITY

12-Week Vegetarian Diet Intervention Effect on Inflammatory Status and Cardio-Metabolic Parameters: Fasting Blood Glucose and Food Frequency Questionnaire Emphasis

Angela Riederer*, William Fisher RN, Cameron Reider RN, James Scoles, Melissa Edgar, & Kendal Schmitz

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Maria Morgan-Bathke***

Discipline: ***Nutrition***

Presentation Type: ***Poster Presentation***

Presentation Location: ***Nursing Center Room 195 Poster # 43***

Abstract:

12-Week Vegetarian Diet Intervention Effect on Inflammatory Status and Cardio-Metabolic Parameters: Fasting Blood Glucose and Food Frequency Questionnaire Emphasis

Angela Riederer, Kendal Schmitz, William Fisher RN, Cameron Reider RN, James Scoles, Melissa Edgar, Maria Morgan-Bathke Ph.D. RDN, Christopher Mayne Ph.D.

Obesity, the most common nutritional problem in the United States, has been associated with both systemic and adipose tissue inflammation. Following a vegetarian diet has been shown to have benefits like reducing inflammatory biomarkers and reducing adipose tissue inflammation. The purpose of this study was to investigate if following a vegetarian diet influences lipid profile, fasting blood glucose, insulin, resting energy expenditure, blood pressure, and body composition between the vegetarian diet intervention and the control diet intervention. This study included 5 overweight individuals ages 26-58. The dietary intervention was a consumption of a lacto-ovo vegetarian diet for 12 continuous weeks. The body composition measurements taken were height, weight, BMI, waist hip ratio, and visceral fat. A Maltron 920 II was used to measure visceral fat and total body fat percentage. Besides body composition, each participant received nutrition counseling, a lipid profile reading, fasting blood glucose measurements, and a food frequency questionnaire. All measurements were taken at baseline and endpoint screenings. Due to the low number of participants statistical analyses were not able to be run. Recruitment was a challenge and in the future more recruitment measures will be taken with the goal of eventually having 30 participants total in order for statistical tests to be run.



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RESEARCH SYMPOSIUM



VITERBO UNIVERSITY

8-Week Dietary Intervention of MyPlate Guidelines and Its Effect on Polycystic Ovary Syndrome (PCOS)

Brooklyn Seiler* & Sam Totsky*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: **Maria Morgan-Bathke**

Discipline: **Nutrition**

Presentation Type: **Poster Presentation**

Presentation Location: **Nursing Center Room 195 Poster # 44**

Abstract:

Polycystic Ovary Syndrome (PCOS) causes a hormonal imbalance that affect a women's fertility, physical appearance, and overall health. It is the most common cause of female infertility.

Symptoms of PCOS include: excess or unwanted hair growth, acne, thinning hair, weight gain or inability to lose weight, and irregular or absent menstrual cycles.

Previous studies suggest that weight loss may help alleviate PCOS symptoms. The MyPlate diet is a nutritional guideline that implements the five food groups (fruits, vegetables, grains, protein, and dairy) to help individuals lose weight.

Objectives:

Evaluate the effectiveness of MyPlate guidelines to improve the symptoms of PCOS in females of child-bearing age.

Methods:

Participants that fit the inclusion criteria (adult females, aged 18-50, with a BMI of 25-40 kg/m² that have been diagnosed with PCOS or experience two or more symptoms listed above) went through a series of examinations to test for specific parameters that pertain to PCOS. The tests included: height, weight, and waist and hip measurements, body composition (Maltron), resting energy expenditure (Cosmed), lipid panel and fasting blood glucose (Cholestech), and nutrition counseling. Each participant was randomly assigned to a control or MyPlate diet to follow for the duration of the study.

Conclusion:

Results are not conclusive due to a lack of participants. Further research will need to be conducted to conclude any results from this research project. It is suggested to continue this project and recruit more individuals that fit the inclusion criteria. The recruitment goal is 15 participants in the control group and 15 participants in the MyPlate diet group. The expected results are to reduce the symptoms of PCOS by inducing weight loss using the MyPlate diet recommendations.



7 RIVERS
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RESEARCH SYMPOSIUM



VITERBO UNIVERSITY

Development of green catalytic heterogeneous synthesis of curcuminoids

Sophia Kero*

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: **Valeria A. Stepanova**

Discipline: **Organic Chemistry**

Presentation Type: **Poster Presentation**

Presentation Location: **Nursing Center Room 195 Poster # 45**

Abstract:

When people hear the word “curcumin,” the typical response is “Oh! You do research with a spice! I think that’s in curry, right?” Though that is true, curcumin has been studied for years for its medicinal purposes. There have been reports of curcumin and its derivatives that show valuable biological properties, such as anti-inflammatory, anti-ulcer, antimicrobial effects, wound healing and analgesic. In Dr. Stepanova’s research group, we develop and study a green chemistry approach to the solvent-free synthesis of curcumin and its analogous derivatives.

The objective of the experiment is to create a green catalytic heterogeneous synthesis of curcumin and curcuminoids by using micro-scale reactions. The goal of this experiment is to create the product of curcumin or curcuminoid using a silica-supported boron trifluoride catalyst to make the synthesis greener and to isolate a high percent yield of product to conclude that the experiment is reasonable and effective. To determine if silica supported boron trifluoride is limited to a heterogeneous or homogeneous reaction, vanillin and a series of aldehydes will be used to see if the reaction produces a pure product. The silica gel present in the catalyst will also be tested for its water removal capabilities since water is formed as a byproduct of the reaction. The activity of catalyst after its recovery from reaction mixture will be investigated to ensure that the catalyst still remains active. The potential reuse of the catalyst in the reaction will be assessed to enhance the green aspect of the proposed reactions.



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VITERBO UNIVERSITY

Sweet Potato Yield by Variety in Western Wisconsin

Sarah Prill*

*indicates presenting at Seven Rivers
Institution: **Viterbo University**

Faculty Mentor: ***Lucy Slinger***
Discipline: ***Biology***

Presentation Type: ***Poster Presentation***
Presentation Location: ***Nursing Center Room 195 Poster # 46***

Abstract:

The purpose of this study was to determine which variety of sweet potato (Beauregard, Centennial, Dianne, Georgia Jet, Hernandez, Jewel, or Vardaman) produces the highest yield in the clay-like soil and cold climate of Western Wisconsin. Sweet potatoes thrive in well-drained, loamy, and sandy soils, but can still be grown in heavier, clay-like soil, like that found in the Franciscan Sisters' garden. Determining which variety of sweet potato is the most successful in this environment is essential for maximizing yield in a limited garden space. In this study, 7 varieties of sweet potatoes were planted in a naturally raised bed at the outset of the growing season in late May. Plants received equal amounts of compost tea at weekly intervals until being harvested in late September. After digging, weights were recorded for total production of each variety, as well as Grade 1 production by variety. Calculations indicated that the Centennial variety produced the most sweet potatoes overall, with an average of 1.8 pounds per plant. However, the Georgia Jet variety produced the highest amount of Grade 1 sweet potatoes, with an average of .84 pounds per plant. The results of this study suggest that the Georgia Jet variety may produce the highest number of quality sweet potatoes in the clay-like soil and colder climate of northern Wisconsin.



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RESEARCH SYMPOSIUM



VITERBO UNIVERSITY

The 13th Century and John of Plano Carpini's Journals

Patrick Bogard*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Keith Knutson***

Discipline: ***History***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 101 at 12noon***

Abstract:

This presentation will be addressing the historical findings of John of Plano Carpini on the Mongols during the 13th century. At the turn of the 13th century, Christendom was at a cross roads. Christianity was waging a religious war with the Muslims. Holy cities, honor, relics, wealth were all on the minds of the crusaders and those who sent them. The Catholic church would declare 9 distinct crusades with varying degrees of success, but never truly took back the holy lands of the middle east. During this period a new enemy was arriving: the Mongols. With what little Christendom knew about the Mongols, Pope Innocent IV would send John of Plano Carpini was sent as an ambassador of the church to study this new enemy and possibly broker a deal. In Carpini's return, he would formulate a journal, History of the Mongols, helping Christendom understand the culture of this impending threat.



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VITERBO UNIVERSITY

Journals of John of Plano Carpini and William of Rubruck

Benjamin Gibson*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Keith Knutson***

Discipline: ***History***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 101 at 12:20pm***

Abstract:

This presentation will be addressing the historical findings of John of Plano Carpini on the Mongols during the 13th century. At the turn of the 13th century, Christendom was at a cross roads. Christianity was waging a religious war with the Muslims. Holy cities, honor, relics, wealth were all on the minds of the crusaders and those who sent them. The Catholic church would declare 9 distinct crusades with varying degrees of success, but never truly taking back the holy lands of the middle east. During this period a new enemy was arriving: the Mongols. With what little Christendom knew about the Mongols, Pope Innocent IV would send John of Plano Carpini as an ambassador of the church to study this new enemy and possibly broker a peace deal. In Carpini's return, he would formulate a journal, History of the Mongols, helping Christendom understand the culture of this impending threat.

Ben's Abstract

For part of the honor's contract for VUSM 200, I was tasked with exploring the travels of William of Rubruck and comparing his travels with those of John of Plano Carpini. William of Rubruck was born in what would have been present day Belgium, and he grew up to be a traveler. He spent many of his years traveling, but his most famous mission was when he went to Mongolia. The journey to Mongolia began as a request from King Louis IX of France to accompany the French in the seventh crusade. Part of his mission was to convert those he encountered, from their religion to Christianity. I will discuss in my presentation the irony of the fact that he was asked to be a proselytizer by a King, while John was sent as an envoy of the pope. He encountered many different cities and people during his travels, some of the largest being Constantinople and Mongolia. While with the Mongols, he got himself into a religious debate with the Khans on religion. I will discuss some finer details of the debate and also why William "won" the debate as he says. William of Rubruck was also important for being one of the first people to explore the eastern lands of the Mongols, and he set an example for future explorers like Columbus. As part of my presentation as well, I will discuss how Columbus and William are connected, as William's journey would have served as some inspiration and guidance for Columbus. Overall, this dive into William's travels is important to understanding how we derived our notion of the Mongols and religion at the time.



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VITERBO UNIVERSITY

Alcohol Consequences and Aristotelian Subjective Well-Being

Austin Kleman*

*indicates presenting at Seven Rivers

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Molly O'Connor***

Discipline: ***Psychology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 101 at 12:40pm***

Abstract:

The desire to be happy, an underlying component of Subjective Well-Being (SWB), is something that prevails across humanity and often is influenced by a number of factors in daily life. In philosophical terms, happiness has been defined for centuries. Aristotle in his Nicomachean Ethics practically lays out the foundation for happiness or SWB. And with young adults, alcohol plays heavily into their SWB, especially in America. Today's college students consume very high levels of alcohol and often with the purpose of getting drunk (Schulenberg et al., 1996), but how does that affect SWB? This study compared the consequences of college student drinking to three SWB tests, one of which was written using Aristotle's Ethics as the baseline. The survey consisted of four different scales, the Rutgers Alcohol Problem Index (RAPI), the Oxford Happiness Questionnaire, Ed Diener's Satisfaction with Life Scale, and the Philosopher's Index (PI). The PI is the scale I wrote using Aristotle's Ethics as the primary source and is a scale testing for SWB. The main regression test compared the score of the RAPI to the three SWB tests and was insignificant ($r = .226, p = .054$). When the test was ran after being split by gender, females were significant with ($r = .348, p < .05$) compared to men ($r = .259, p > .05$). Being the PI's first use, there was found to be low internal consistency (Cronbach's $\alpha = .485$) and an indication of a correlation to the other SWB scales ($r_{OHQ} = .538, p < .05$) ($r_{SWLS} = .643, p > .05$). The results suggest that it would be worth looking into the differences between how different genders react to alcoholic consequences and how that affects their SWB. Future work could also be done revising the PI and seeing how an Aristotelian approach can be used in modern SWB.



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VITERBO UNIVERSITY

The Kalevala: A Foundation for Finnish Music, Culture, and Identity

Aubrie Jacobson*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Mary Ellen Haupert***

Discipline: ***Music***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 101 at 1pm***

Abstract:

The country of Finland is a relatively young nation, having won independence from Russia just over one hundred years ago in December of 1917. Finland has a complex relationship and history with several other European nations, specifically, Sweden and Russian. Before Russia, Sweden ruled Finland for over six hundred years. Finland is isolated from other European nations linguistically as well. Because of these things, Finland has struggled to form a distinct identity and culture. The "Kalevala", the national epic of Finland, was composed by Dr. Elias Lönnrot in the 1830's and 40's after Lönnrot collected thousands of lines of folk poetry in the form of rune song from the Karelian region of Finland and Russia. The Kalevala has become a large part of Finland's strong literary foundation and is a basis for much of the nationalist music and unique cultural aspects of the country that arose during Finland's fight to become an independent nation in the early twentieth century. I researched Finnish music and culture by reading books, articles, and journals extensively and doing museum and field research in Finland and Upper Michigan this past summer. I wanted to better understand my own heritage and the culture of my hometown and region in the Upper Peninsula of Michigan, a place with strong ties to Finland. I wanted to be able to educate people in the Upper Peninsula on the music and culture of the region in which they live and spread awareness of the beauty of the Finnish culture to other parts of the country, such as Southwestern Wisconsin, where Finnish culture and music is much less known. I made connections within the Finnish-American community and can now better advocate for Finnish arts and history. I also explored the question of what makes a nationalist art work nationalist in nature.



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VITERBO UNIVERSITY

American Romanticism in Monster Hunter Stories

Claire Trussoni*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Susan Cosby-Ronnenberg***

Discipline: ***English***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 101 at 1:20pm***

Abstract:

My research is focused on analyzing the video game *Monster Hunter Stories* through the view of the American Romantic literary movement, looking specifically at the game's themes, characters, and narrative. There have been relatively few attempts to analyze a video game as an artistic or narrative work, so a part of my research was on how that could be done. I chose to examine a primarily narrative focused game with a static story arc to better draw comparisons to existing forms of media.

I read through several theoretical works in the literary movement, a collection of Emerson's lectures, Henry David Thoreau's work *Walden*, and finally James Fenimore Cooper's *The Deerslayer* to see how American Romanticism worked in a fictional narrative. While reading these works, I was also playing through *Monster Hunter Stories* and comparing similar themes/tropes that I found between the two mediums. I did indeed find an abundance of themes and ideas in the game that mirror those of the American Romantic movement, such as a oneness with nature, the spiritual importance of nature, as well as a young protagonist that is an outsider to the main society, to name a few.

This research has given me a greater understanding of how, by incentivizing certain player behaviors, gameplay mechanics can support the themes of a video game. For example, the idea of self-sufficiency is supported by the player gathering better resources in the field than they could ever buy in town. This interactivity is part of what differentiates video games from other forms of narrative media, and learning how to critically examine the way that interactivity affects narrative will be vital in humanities research into this medium going forward.



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VITERBO UNIVERSITY

Quality and Scarcity of Water in Africa and How It Impacts People

Hannah Cowan*

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: ***Dr. Gita Pai, Dr. Anna Keefe***

Discipline: ***Humanities***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 101 at 1:40pm***

Abstract:

Access to clean and sustainable water has been an issue in many developed and developing countries for multiple years. This paper will primarily focus on Africa as a whole with discussions on a few regional areas in the continent along with comparative material discussed throughout. This research paper will discuss the many struggles of certain areas in Africa and around the world for comparisons, and will reflect upon the potential solutions to the world-wide struggle of the water crisis. Multiple areas and sources of research will be considered when gathering the information placed in this paper. One of these sources is the academic scholar and Kenyan expert on water quality and scarcity-Daniel Sambu, a professor of geography, along with some of his research such as Institutional water reforms in Kenya: an analytical review. Information will be obtained from a collaboration of intergovernmental organizations such as the United Nations and the African governments and their published works: The Africa Water Vision for 2025 and The Millennium Development Goals of 2015. Other sources such as The Journal of Environmental Economics and Management, an academic journal, and the World Health Organization (WHO) website will be included. Some organizations specific to Africa such as the African Development Bank Group and the African Water Facility will play a key role in this research paper as well. Water quality and accessibility, global warming, and human patterns will be interpreted upon examination. The Millennium Development Goals of 2015 and the World Water Vision for the year 2025 will be assessed as to whether Africa has or will reach these goals. This paper will also identify the threats to known water sources and how water sustainability is impacted by economic factors. It will further be observed that the water crisis in Africa is the result of a number of factors such as human impact, environmental changes, and economic developments. It is noteworthy that many organizations are collaborating to find adequate solutions. However, even with proper solutions available, some areas cannot, or will not, implement them due to various reasons (lack of motivation, resources, or knowledge).



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VITERBO UNIVERSITY

When Perfect Isn't Good Enough: Motivational Antecedents of Perfectionism

Allison Dunne*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: **Dr. Michael Parker**

Discipline: **Psychology**

Presentation Type: **Oral Presentation**

Presentation Location: **Nursing Center Room 104 at 12noon**

Abstract:

Prior research in the field of perfectionism has almost exclusively defined the construct as a personality trait. The purpose of this research is to reframe perfectionism as a result of motivated social cognition. Building on self-discrepancy theory and regulatory focus theory, we propose tolerance of ambiguity (TA) mediates the relationship between prevention focus and attitudes about performance. Moreover, the strength of this relationship should increase as the tendency to think dichotomously increases. A total of 181 participants were recruited from Amazon's MTurk. They were randomly assigned to one of two conditions in which they were primed with either a promotion or prevention focus using a word sorting task. They then completed a survey assessing tolerance of ambiguity (i.e., the MSTAT-II), dichotomous thinking (i.e., DTI) and perfectionism (the discrepancy subscale of the APS-R). Results indicated higher TA in the promotion condition compared to the prevention condition. In turn, there was a strong negative correlation between TA and perfectionism, and the indirect effect indicated significant mediation. However, there was no evidence that the DTI moderated the direct or indirect effects. Implications of these findings suggest that the relationship between TA and perfectionism merits further investigation, while the effect of dichotomous thinking may need further scrutiny. The results of this study allow for, and support, future research into the reframing of perfectionism as a motivated social cognition.



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VITERBO UNIVERSITY

Ostracism and Personality

Ashley Kast*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Michael Parker***

Discipline: ***Psychology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 104 at 12:20pm***

Abstract:

Previous research on ostracism indicates that there is an automatic negative response that individuals face after being excluded. The current study investigates the relationship between ostracism and personality. Specifically, we sought to determine whether having participants engage in a self-affirmation activity would moderate the indirect effects of ostracism through anger and positive affect. Thus, it was hypothesized that self-affirmation would decrease the negative effects of social exclusion. In turn, individuals self-affirming would have lower anger, higher positive affect, and higher levels of agreeableness than those in the control condition. Additionally, anger and positive affect would lead to a decrease in disagreeableness if participants were given the chance to think about their most important values before an instance of ostracism. Further, anger and positive affect should have led to less vigilance if one was given the opportunity to self-affirm one's most important values before being ostracized. A total of 120 participants were recruited through Amazon's MTurk for this study. First, participants either wrote about their three most important or least important values. Next, ostracism was manipulated through Cyberball in which participants were included or excluded in a computer game of catch. Finally, participants completed surveys assessing levels of anger, positive affect, and prevention or promotion focus. We found that individuals who self-affirmed before being ostracized had lower levels of anger and higher levels of agreeableness. Also, individuals who self-affirmed their most important values did not have a prevention focus after the exclusion. Finally, there was evidence that self-affirmation helped mediate the negative effects of ostracism. As such, individuals in the self-affirmation condition were better able to cope through the experience of ostracism and were less angry. This finding illustrates that the negative effects of ostracism may not be as automatic as previous research had indicated.



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VITERBO UNIVERSITY

An Analysis on the Life Satisfaction of Chinese Elderly

Janet Bebo* & Xiaoxu Wang

*indicates presenting at Seven Rivers

Institution: **UW-Eau Claire**

Faculty Mentor: ***Jianjun Ji***

Discipline: ***Sociology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 104 at 12:40pm***

Abstract:

Utilizing a recent China's national survey on the elderly population in 2014, this study intends to examine the status of life satisfaction of the Chinese elderly while, using the following theories as support, Modernization Theory, Social Stratification Theory, and Social Resources Theory. This study is to test the hypotheses that life satisfaction of the Chinese elderly is associated with their 1) demographic characteristics, 2) economic characteristics, 3) social characteristics, 4) social resources, and 5) psychological well being, by controlling for eight control variables out of 22 variables in total. Since the data is cross-sectional in nature, for the association test, the appropriate statistical methods to be applied in this analysis will be Chi-square significant test, Pearson correlation, first-order table cross-tabulation, and Multiple Linear Regression. It is highly expected that this project will not only shed new light on the linkages between life satisfaction and social-economic-demographic characteristics and psychological well being of the Chinese elderly, but also contribute to the literature archive the elderly research of the Chinese aging population.



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VITERBO UNIVERSITY

Resilience in Social Work

Abby Thurk*

*indicates presenting at Seven Rivers
Institution: **Viterbo University**

Faculty Mentor: ***Janet Holter***
Discipline: ***Social Work***

Presentation Type: ***Oral Presentation***
Presentation Location: ***Nursing Center Room 104 at 1pm***

Abstract:

During my summer research I studied the understanding social workers have of the resiliency in their clients. Having a better understanding of resilience in addicts or those struggling can help social workers find other ways to help them. Throughout this research I created a qualtrics survey and sent it to Viterbo Social Work alumni. The questions were based on their clients and how they saw their use of resilience. These questions included information about the social worker themselves and how long they have been in practice and what type of practice they are involved in. After receiving the results from these surveys, I created a graph displaying the different understandings and different types of social work that they are involved in. Separating the chart by the amount of years they have in practice and analyzing if the amount of time in practice changes the understanding they may have on resilience. It was found that there are many different factors in understanding resiliency, but there is no exact pattern.



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VITERBO UNIVERSITY

Internalized Racism in Media, America, and Ourselves

Maya Richardson*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Matthew Bersagel Braley***

Discipline: ***Activism***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 104 at 1:20pm***

Abstract:

The white experience in America is recognized as something central and significant, whereas the black experience is warped and shamed through our media and education systems. The way African Americans are represented (or not represented) throughout our country strips us of our own self-worth. Deprivation of self-worth in a person is deprivation of power. My results on this topic have stemmed from a unique range of resources. Apart from reading many articles and books on the black experience, researching the great leaders, writers, and educators of black social movements, I was lucky enough to spend fourteen days in South Africa this summer, standing in the soil where the ancestral roots of black America began. I journaled each night about my experience, as well as took notes on the exhibits, museums, and plays that centered black lives. Finally, I have been urging myself to pay closer attention to how I am treated as a black woman in everyday life – and address where it stems from. Racism and sexism draw from the master narrative of our country and its notion of white American exceptionalism. To peel back these layers of pain placed on the minority takes extensive recognition and much critical consciousness of ourselves and the world around us. This oral presentation will address the core of where internalized racism comes from, provide the damaging examples of how African American's are portrayed in the media and our education system, and conclude by advocacy for critical consciousness. I will urge us all to pay attention and make change. Remember -if you aren't angry, you aren't paying attention.



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VITERBO UNIVERSITY

The Influence of PPPC and BII on the Sense of Belonging of Latinx Students In Higher Education

Micaela Julian*

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: ***Berna Gercek Swing***

Discipline: ***Psychology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Nursing Center Room 104 at 1:40pm***

Abstract:

Latinx students are underrepresented in higher education. They make up only 12% of total post-secondary enrollments, and are less likely to complete their college degree compared with their White peers. Sense of belonging has been shown to have a profound impact on Latinx students' college adjustment which in turn could impact their retention. Perceived parental psychological control (PPPC) and bicultural identity integration (BII) have been found to have psychological effects on minority students in higher education. By using an online survey, this study examines the effects of PPPC and BII on the Sense of Belonging of Latinx Students in predominantly White college campuses. This is a continuous project. Possible implications to this study's findings can suggest ways in which retention rates among Latino students can be increased, as well as the enrollment of Latino students in higher education.



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VITERBO UNIVERSITY

Plants Diversity and Attitudes towards Urban Agriculture among Community Gardeners

Brian Szto*

*indicates presenting at Seven Rivers

Institution: **Winona State University**

Faculty Mentor: **Dr. Bruno Borsari**

Discipline: **Agro-Ecology**

Presentation Type: **Oral Presentation**

Presentation Location: **Reinhart Center Room 127 at 12noon**

Abstract:

Rapid urbanization and globalization in various parts of the world may lead to peoples' displacement from rural areas, cause poverty and food insecurity. The US shows a similar trend with 11.8% of its households being food insecure (2017) however, urban agriculture may alleviate the burden of hunger and malnutrition. In this study, we considered the effects that garden plot size had on gardeners' choice of plants species, and also, we studied gardeners' perspectives about community gardening. This investigation was conceived to yield both quantitative and qualitative data. Plant counts were taken from 24 plots of four different sizes (small, medium, large, largest), (6 of each), from June to September 2018. Shannon-Weaver Index of Diversity were calculated and these analyzed through a one-way ANOVA, and Tukey HSD test. Qualitative data were collected through interviews with gardeners (n=8) from the East End Rec community garden of Winona, MN. Plants diversity was significant among the garden plots of different size [F (3,12) = 10.53, p < 0.01]. A post-hoc test (Tukey HSD) indicated that the mean score for smallest plot size (M = 0.57, SD = ±0.12) was significantly different when compared to the other three plot sizes. However, the other three plot sizes (medium, large, largest) showed no statistically significant differences when compared to each other. These results suggest that plot size does not have any effect on species diversity. Qualitative data indicated that growing food was very important and this activity provided several benefits to gardeners. Our results (quantitative and qualitative) suggested that species diversity is dependent on the intentions, motivations and preference of the gardener.



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VITERBO UNIVERSITY

Internship with the Mississippi Valley Conservancy: The Importance of Native Prairies and Oak Savanna's

Haley Kirchoff*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Ted Wilson***

Discipline: ***Environmental Biology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 127 at 12:20pm***

Abstract:

Haley Kirchoff

Viterbo University

Faculty Mentor: Ted Wilson

Internship Advisor: Levi Plath, land manager at the Mississippi Valley Conservancy

Abstract: Internship with the Mississippi Valley Conservancy: The Importance of Native Prairies and Oak Savanna's

This presentation will explore an internship conducted with the Mississippi Valley Conservancy (MVC) during the summer of 2018. The internship with the MVC focused on habitat management and restoration of native prairie, forest, oak savanna, and wetlands on conservancy-protected lands throughout southwest Wisconsin. The MVC internship crew worked to manage the ecological health of the natural communities throughout the Mississippi River Valley. Two of the most important habitats that we managed this summer were oak savanna and native prairies. In this research, a comparison of how the MVC and the FSPA Villa restored these habitats was examined. These practices were then compared to other studies done on restoration work for oak savannas and native prairies. Trying to restore oak savanna ecosystems is important because this habitat contains species from both grasslands and woodlands so there is diverse speciation that occurs here. Converting bare row-cropped fields into lush native prairie will benefit water quality, native species diversity, and recreational experiences.



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VITERBO UNIVERSITY

Determining effects of farming practices at FSPA - Villa St. Joseph on invertebrate soil organism diversity

Nicole Broz*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Ted Wilson, PhD***

Discipline: ***Biology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 127 at 12:40pm***

Abstract:

Organic farming has increased by over 6.5 million hectares since 2014, with hopes that the farming practices are less disruptive and maintain soil health more than conventional farming methods. To determine soil health, soil samples are often sent to a lab for nutrient testing. Another way to test soil health is by sampling for invertebrate organisms in soil cores. The presence of soil organisms demonstrates that the soil is healthy and able to support many micro and macro organisms. Soil samples from 12 land plots at the FSPA - Villa St. Joseph were obtained on September 27, 2018. The soil profiles were determined, as well as quantity and variety of invertebrate organisms. The plots that were tested all fell into one of four categories: organically farmed crop, prairie, orchard, or garden. Samples were analyzed initially for soil profile, visible presence/quantity of *Lumbricus terrestris* (earthworms), and then were run through a Berlese funnel for 3 days to collect soil organisms that would later be analyzed and identified in the lab. The Shannon-Diversity index was used to statistically characterize species diversity in the FSPA Villa community and the Jaccard similarity index compared similarities in species between samples. Most of the plots that were sampled did not have any topsoil or distinguishing layers other than clay, indicating poor soil health for sustaining crops. Overall, this research was done to help understand the effects of current farming practices at the FSPA - Villa St. Joseph to devise new land management strategies for the future.



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VITERBO UNIVERSITY

Optimization of Plastic Production in U.S. Extrusion Company

Erika Schultz*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Kyle Backstrand***

Discipline: ***Chemistry***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 127 at 1pm***

Abstract:

Businesses all around the world work to optimize their production in order to maximize profits. Many different techniques are used and although they are unique to each business, the concept is usually the same. The plastic extrusion company I interned with over the summer was consistently falling short of their daily production goal – with an average daily shortage of 21,314 pounds of custom compounded engineering thermoplastic pellets. Part of my internship research project was to aid in the aggrandizement of the company's US plastic production. My role consisted of developing standard operating procedures (SOP's) for four of the production lines and gathering evidence to justify the purchase of a dryer. Due to the significant variety of raw materials used at this business, lines are dedicated to specific base resins. Developing SOP's would help create a more cohesive environment among machine operators and eliminate any discrepancies. It allows for operators to be cross trained among multiple machines. Several raw materials are hygroscopic and suffer thermal degradation when heated at high temperatures causing excessive moisture. Therefore, several materials need to be dried to a certain moisture level to be below a specific molecular weight. The purchase of a dryer would allow the company to utilize all material held for high moisture. The SOP's were implemented September 1st, 2018, and every new employee working in the plant has been trained using them. The daily shortage has been decreased to 12,000 pounds of pellets per day. A capital expenditure has been written for the dryer and will be purchased in the first quarter of 2019. This presentation will focus on the development of SOP's to enhance efficiency and productivity within an engineering thermoplastic compounding business.



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VITERBO UNIVERSITY

Movement of the American paddlefish in the upper Mississippi River

Abigail Propsom*

*indicates presenting at Seven Rivers

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Josh Lallaman***

Discipline: ***Biology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 127 at 1:20pm***

Abstract:

The American paddlefish (*Polyodon spathula*), is a ray-finned fish native to the United States. They are largely known for their paddle-shaped rostrum that extends nearly one third of their body length. Their current range extends from the Mississippi River basin in New York to central Montana and south to Louisiana. These fish are normally found in large rivers but can also inhabit natural lakes and reservoirs so long as they are connected to these large rivers. Alterations of these rivers, dam construction, flow regulation, habitat alteration, has negatively impacted populations. It has been suggested by various studies that abiotic factors such as river discharge, temperature and moon phase could influence movement of the American paddlefish. Five individuals were tagged using acoustic transmitters in 2014. Since that point, thousands of instantaneous movements, captured by stationary receivers on Mississippi and St. Croix rivers have been collected by the US Fish and Wildlife Service and Minnesota DNR. These data points were analyzed against daily temperature, moon phase and river discharge to determine whether any of these factors have strong correlations to the movement of the American paddlefish in the upper Mississippi River. This analysis could help us manage river conditions that influence migration critical for sustainable populations.



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VITERBO UNIVERSITY

Understanding habitat suitability of invasive wild parsnip (*Pastinaca sativa* L.) in a restored prairie

Erin Hettinger*, ***Cole Van Houter****, ***Dr. Moni Berg-Binder***

*indicates presenting at Seven Rivers

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Moni Berg-Binder, Dr. Benjamin Pauli***

Discipline: ***Biology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 130 at 12noon***

Abstract:

Wild parsnip (*Pastinaca sativa* L.) is one of the main invasive species present in the restored prairies of Cascade Meadows Wetland and Environmental Science Center in Rochester, Minnesota; however little is known about the specific habitat this species prefers. This study was done to gain a better understanding about the habitat suitability of wild parsnip. It was the first step in an effort to identify areas within the restoration that would be more prone to invasion and therefore help to focus future control methods. The relationship between parsnip density and height, as a measure of quality, was assessed through the use of 2x2m quadrat sampling. It was predicted that wild parsnip density would be negatively correlated with the height of the tallest plant per quadrat; however no significant correlation was found between height and density of wild parsnip. Additional insight from a habitat suitability model based on the predictors of distance to trail, distance to water, elevation, and habitat types will also be presented.



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VITERBO UNIVERSITY

Bat Habitat Selection and Environmental Factors in the Driftless Area

Ben Borash*

*indicates presenting at Seven Rivers

Institution: **Saint Mary's University of Minnesota**

Faculty Mentor: ***Dr. Benjamin Pauli***

Discipline: ***Environmental Biology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 130 at 12:20pm***

Abstract:

White nose syndrome is a fungal infection of bats that has caused the death of millions of bats in North America in the last 12 years. Declines in bat populations has created the need for knowledge on where bat activity is most prevalent. Much research has been conducted on bats throughout the Midwest . However, no study has focused on the driftless area of southern Minnesota and western Wisconsin. This unique area contains topographical features not common to the rest of the upper Midwest. We conducted driving surveys of eight routes randomly repeated every two weeks for six weeks starting in June and ending in July, 2018 in an effort to determine bat habitat selection. During these routes, we collected acoustic data using recorders specially designed to record bat echolocation calls while continuously moving at 15-20 miles per hour on low traffic roads. Using a two factor ANOVA without replication, we tested the effects of season and route on total bat activity. This test showed a significant difference in activity throughout the summer (p -value = 0.001) with the lowest activity in the early season and an increase throughout the study period. A difference in bat activity was also found between the individual routes (p -value = 0.048). Additional analysis on the effect of environmental factors and bat habitat selection was also conducted.



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VITERBO UNIVERSITY

Establishing the need for a Nuclear Medicine and Molecular Imaging Pediatric Specialty

Emily Seib*, Kellie Shaw*, Dawn Lawry*, & Brianna Wirkus

*indicates presenting at Seven Rivers

Institution: **UW-La Crosse**

Faculty Mentor: ***Aileen Staffaroni***

Discipline: ***Nuclear Medicine***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 130 at 12:40pm***

Abstract:

Objectives: The field of Nuclear Medicine and Molecular Imaging (NMMI) has been prospering with continual technological, diagnostic, and therapeutic advancements in both the adult and pediatric populations. Since the first NMMI pediatric patient in 1946, this population has increased, highlighting a lack of standardization that has limited NMMI professionals. Today, 90% of pediatric patients are being treated at adult-focused hospitals. As the profession advances in diagnosing and restoring health in today's youth, the lack of standards makes it difficult for adult-focused hospitals to find the support that enables them to ethically care for pediatrics and acquire quality images. This results in a deficit in the practices, education, and awareness surrounding pediatrics in NMMI. This research will investigate the need for a specialty within NMMI for pediatrics.

Methods: Questionnaires consisting of 25 questions were distributed to various professionals associated with NMMI in the central chapter region, spanning both adult-focused and pediatric-specialized hospitals. A compilation of 65 questionnaires, represented 51 technologists, 3 radiologist, 3 physicians, and 8 other professionals.

Results: Data shows 71% of professionals desire more education surrounding pediatrics. However, 48% noted their departments do not disclose nor provide further education around pediatrics and 48% of departments need assistance from child life specialists. Pediatric dose activity calculation was not a concern for 84% of professionals. However, 72% of professionals stated a pediatric specialty would be beneficial for patients and themselves, as well as 68% said that it would be a step forward for NMMI. This data indicates a need for education surrounding pediatrics within NMMI to increase quality care.

Conclusion: Results highlighted desires for more education in NMMI regarding the pediatric population.

Illustrating a pediatric specialty would benefit patients and professionals, aiding in diagnosing and restoring the health of our society's children.



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In vitro effect of combination cesium, vitamin A, and zinc gluconate treatment on human cancer cells

Deijane Banks**, *Katheryn Holter*, *Carley Traverse*, *Bridget White*, & *Marilyn Tufte

*indicates presenting at Seven Rivers

Institution: **UW-Platteville**

Faculty Mentor: ***Dr. Miranda Bader-Goodman***

Discipline: ***Biology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 130 at 1pm***

Abstract:

Previous research at UW-Platteville demonstrated that combination cesium, vitamin A, and zinc gluconate treatment eliminated colorectal tumors in mice without noticeable adverse effects. This project investigates the effect of this treatment on human colorectal carcinoma and normal cells in vitro. Initial dose-response experiments are being conducted to determine optimal in vitro-relevant concentrations for each compound. Preliminary results showed that Cs₂CO₃ tends to be more toxic to cancer cells than CsCl; retinol showed a similar effect. Zinc gluconate assays are underway. Flow cytometry, luminescent, and fluorescent assays will be conducted to determine optimal combination dose(s), presence/extent of apoptosis, and mitochondrial changes. These results underlie a multidisciplinary project employing microfluidic technology and Raman spectroscopy to assess real-time biochemical output of cells in response to treatment.



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Binding and HIV-1 Neutralization of Combinatorially-Optimized 10E8 Antibody

Damon Schmalzriedt*

*indicates presenting at Seven Rivers

Institution: **Viterbo University**

Faculty Mentor: ***Dr. Christopher G. Mayne***

Discipline: ***Biology***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 130 at 1:20pm***

Abstract:

Human immunodeficiency virus (HIV) is a retrovirus that affects more than 1 million Americans. This virus attacks helper T cells in the host's immune system, which can lead to acquired immunodeficiency syndrome (AIDS), an often-fatal condition. A small percentage of infected individuals have developed broad, neutralizing antibodies (bNAbs) that inhibit viral infection of many diverse HIV strains. 10E8 is a recently-isolated bNAb that targets the membrane-proximal external region (MPER) of the Env protein spike on the HIV viral envelope with unprecedented breadth and potency. In the past year, two independent groups modified 10E8 in the hopes of improving its function by increasing membrane favorability. More specifically, each group sought to use point-mutations in membrane-putative sites on 10E8 to promote charge-charge interactions with membrane phospholipid heads and/or hydrophobic packing with membrane tails and the largely-hydrophobic MPER. The two mutated antibodies, 10E8 3R (light chain S30R, N52R, S67R) and 10E8 (heavy chain) V5R S100cF, each improved potency nearly ten-fold. This research investigated the effects of combining individual mutations from each antibody through neutralization assays and MPER-peptide ELISA. Preliminary results from this research indicate that 10E8 S100cF S30R appears to be the most potent antibody among antibodies currently expressed. Also, 10E8 S100cF S30R appears to have the highest affinity for MPER peptide, though no definitive conclusions can be made. Future directions for this work include further investigating neutralization potency and binding of combinatorially-optimized 10E8s in an effort to develop an HIV treatment or prophylactic and inform rational vaccine design.



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Deformations of \mathbb{Z}_2 -graded Complex Associative Algebras

Tyler Gonzales**, *Grant Keane**, *Jack Lazowski**, *Ellie Lochner**, *Carolyn Payne**, *Jory Wagner**, & *Haotian Wu*

*indicates presenting at Seven Rivers

Institution: **UW-Eau Claire**

Faculty Mentor: ***Michael Penkava***

Discipline: ***Mathematics***

Presentation Type: ***Oral Presentation***

Presentation Location: ***Reinhart Center Room 130 at 1:40pm***

Abstract:

In this talk, we will share the research we have completed during the summer REU mathematics program. We begin by sharing some definitions, and examples, of topics we have learned relating to the field of noncommutative geometry and deformation theory. We will open this talk with a discussion on the concepts of algebras, graded vector spaces, tensor products, and the tensor algebra. We will then move into the notion of deformation theory, including an example of how to compute the bracket of what is called a versal deformation. We will conclude this talk with a comparison of Maple and SageMath, and discuss why we hope to continue the translation of the computer software from one to the next.



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Seven Rivers Undergraduate Research Symposium

On behalf of the Seven Rivers Undergraduate Research Symposium, we'd like to take this opportunity to express our gratitude to the following people/groups for making this event a reality:

- **Aramark Services and Mary Simota**
- **All Fine Arts Center Staff: specifically Bridget Misch, Jack Hamilton, & Danita Doerre**
- **Copy Center Staff and Karen Hurtgen**
- **All Student and Staff/Faculty Volunteers, Judges, Facilitators, and Poster Session Coordinators**
- **Dr. Tracy Stewart and Caitlin Fallon for their introductions**
- **Dr. Amit Sood and Nicole Van Ert**
- **Chris Sanger from Institutional Advancement and our generous benefactors**
- **R. Charles Lawrence and the Viterbo Summer Undergraduate Research Fellowship program**

- **And most importantly, all contributing Student Researchers/Presenters, including the faculty mentors who have supported them along the way**

THANK YOU!

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