



**Graduate Showcase 2020:
Tomorrow's Innovators Today**

Presented by:

The Graduate School

318C DeVos Center

616-331-7105

www.gvsu.edu/gs

gradschool@gvsu.edu

and

The Center for Scholarly and Creative Excellence

049 Zumberge Hall

616-331-2281

www.gvsu.edu/csce

csce@gvsu.edu

Abstracts by Graduate Program

Biology	3
Biomedical Sciences	5
Biostatistics	5
Cell and Molecular Biology	7
Clinical Dietetics	11
Communications	13
Criminal Justice	13
Education-Instruction and Curriculum	15
Education-Literacy Studies	16
Engineering	18
Nursing-Doctorate	20
Physical Therapy	21
Public Administration	22
Public Health	22
Social Work	24
Index by Student	26

Biology (Annis Water Resources Institute)

FARM TO FOREST: A MULTIVARIATE APPROACH TO UNDERSTANDING STREAM HABITAT AND STRESSOR IMPACTS ON COLDWATER DESIGNATION IN A LAKE MICHIGAN TRIBUTARY. Allen, M. E., Rediske, R. R.; Annis Water Resources Institute, College of Liberal Arts and Sciences.

Throughout the world, fertile riparian landscapes and aquatic headwaters are utilized for crop production and enhanced drainage, creating a patchy anthropogenic mosaic of land cover, while introducing a new norm in patterns of ecosystem stress, disturbance and freshwater system stability throughout a watershed. As watersheds of coldwater streams become more developed, this homogenous mosaic of agricultural land cover can have significant impacts on both local and downstream lotic thermal regimes and their associated biological dependents. Our objective was to examine how this agricultural land cover mosaic and the associated geomorphic, hydrologic, and landscape stressors affect the structure of downstream fish and macroinvertebrate communities in a Lake Michigan coastal coldwater stream of Muskegon County, MI, USA. Utilizing multivariate statistics, we found distinct relationships between the macroinvertebrate and fish communities of the three tributaries. These differences were attributed to habitat, geomorphic, and water quality stressors. Habitat unit distribution (riffle, run, glide, and pool) and large woody debris composition were strong determinants of these communities. Glide-pool dominant tributaries were characterized by scrapers and shredders while riffle-run reaches were strong drivers of EPT (Ephemeroptera, Plecoptera, and Trichoptera). Suspended sediment and streambank erodibility were more determinant along two tributaries than the others. Suspended sediment concentration and more-erodible streambank material were associated with glide-pool tributaries while streambank root density was greater in the riffle-run reaches. Variation in fish community assemblage was driven by thermal regimes and showed to be cold-stable to cold-moderate throughout the summer months. Results from this study are being used to manage water quality and stream habitat in the Little Flower Creek watershed and highlight the importance of evaluating several indicators of landscape stress to evaluate the upstream effects of agriculture on coldwater aquatic ecosystems.

Biography

CARBON SEQUESTRATION IN A RESTORED WEST MICHIGAN OAK SAVANNA: IMPLICATIONS ON MANAGEMENT PRACTICES. Heise, J., Woller-Skar, M.; Department of Biology, College of Liberal Arts and Sciences.

The savanna system is an ecotone (i.e. a barrier ecosystem) that lies between forest and grassland ecosystems. They occur across the world in various forms, but in the North American Midwest, they are specifically oak savannas: systems, where the open overstory is dominated by various species of oak (*Quercus* spp.) and the understory consists of carbon-rich prairie grasses and forbs. This is a highly degraded ecosystem that has lost almost 99% of its former range due to agriculture and fire suppression.

PURPOSE: Oak savannas are ecosystems that are maintained by and require disturbances to clear woody encroachment and open the canopy for the diverse understory. This study took place at the Muskegon State Game Area (MSGGA) in Muskegon, Michigan. Our objective was to determine the quality of the oak savanna restoration across three management practices and measure the carbon storage potential of the ecosystem. These findings will be disseminated to the game manager at MSGGA. **SUBJECTS:** We quantified carbon stored in restored plots of savanna, then compared the changes in carbon sequestration to plant species diversity. **METHODS AND MATERIALS:** We established three restoration sites, each with a grid of sample points. At each point, we collected canopy cover and solar radiation data using hemispheric photography, total carbon measures with USDA standard methods, and plant species community composition figures.

ANALYSES: Using multivariate tests, we determined differences in community composition, total carbon, and environmental factors. These differences were then compared using a canonical correspondence analysis to find a link between community composition and carbon sequestration.

RESULTS: The three sites were vastly different in multiple environmental factors and community composition. The site that is undergoing intense restoration saw a moderate increase in carbon storage compared to the minimally managed site, but also had the highest species diversity.

CONCLUSIONS: Management for restoration can have many goals, but sometimes different goals contradict each other. In this site, intense

management will yield higher species diversity but will offer little help with carbon storage in the future.

Biomedical Sciences

THE UNMASKING OF AGGRESSIVE CHEMOSIGNALING VIA THE CRAYFISH MODEL: AN IN-DEPTH URINALYSIS USING HPLC. Ruvina, K., Bergman, D.; Department of Biomedical Sciences, College of Liberal Arts and Sciences.

PURPOSE: It is well established in the scientific community that decapod crustaceans secrete molecules via nephropores to communicate with each other. These molecules have been shown by numerous conducted studies to affect animal behavior, especially aggression. However, studies in decapod crustaceans have yet to elucidate the chemical nature of aggressive chemosignals during agnostic/fight interactions. **SUBJECTS AND HYPOTHESIS:** The main goal of this study was to identify the chemical profile of crayfish urine via HPLC. **METHODS AND MATERIALS:** The urinalysis of stressed crayfish revealed 47 different chemicals present in the urine minutes after the stressful episode. **ANALYSES:** We were able to identify only four of ten chemicals of interest: uric acid, guanosine, L-tryptophan and N-acetyl-serotonin. **CONCLUSION:** It is still unclear whether there is one specific chemical or a combination of chemicals that convey information in the form of an aggressive chemosignal. The role of these specific chemicals in agnostic interactions are still under investigation.

Biostatistics

MONTCALM CARE NETWORK BIOSTATISTICS INTERNSHIP: SELF-ASSESSED HEALTH STATUS ANALYSIS. Pokora I.; Department of Statistics, College of Liberal Arts and Sciences.

PURPOSE: An internship experience is integral to the Professional Science Masters in Biostatistics Program to apply concepts learned through coursework. This took place at Montcalm Care Network (MCN), the community mental health system, located in Stanton, MI. **CHALLENGE:** To examine what factors are most important in determining the health of an individual in Montcalm County and see how Social Determinants of Health (SDOH) are being considered for the Montcalm County community.

Simultaneous learning and application of new programs to synthesize deliverables. Techniques and strategies were used to overcome missing data and independent problem-solving. **EXPERIENCE:** Data was extracted using Structured Query Language (SQL) and exploratory analysis was performed in Microsoft Power BI. Further analysis was performed using RStudio. Reports were generated and presented to managers to explain the results and provide an opportunity for data-driven decisions. **OUTCOME:** Ordinal logistic regression with backward model selection and model validation was applied to assess what factors were most significant in determining patient-perceived health status. **IMPACT:** Projects completed at MCN furthered knowledge of the mental healthcare system and the application of statistics out in the field. Real-world experiences and application of skills learned from coursework are invaluable to progressing in the biostatistics field.

Biostatistics

HENRY FORD HEALTH SYSTEM BIOSTATISTICIAN INTERNSHIP.

Springer, K.; Department of Statistics, College of Liberal Arts and Sciences.

PURPOSE: As part of the Biostatistics program at Grand Valley, I interned at Henry Ford Health System (HFHS) in Detroit as a Biostatistician. At HFHS, I worked on a collaborative team on a variety of healthcare studies while utilizing programming techniques and knowledge gained in the Biostatistics graduate program. **CHALLENGE:** One of the main challenges which came from the experience included working with larger, more complex, datasets than I am used to, and working with professionals who do not have much of a statistical background. **EXPERIENCE:** During my internship experience, I learned efficient ways to program in SAS with the utilization of macros and SQL, and efficient ways to create results documents for the clients that I was working with. Additionally, I learned what it was like to work in an office setting with other professionals in my field of study. I gained knowledge of the manuscript and IRB process, which are vital to understand in this career field. **OUTCOME:** From my internship experience, I became a better professional, programmer, and statistical consultant. I gained my first publication, and now have more confidence when it comes to applying my statistical knowledge that I have gained from the graduate program. **IMPACT:** My internship has allowed me to value the classes that I have had

during my education, and gain an enhanced appreciation for the application of statistics in healthcare. My experience has prepared me to enter the working world as a Biostatistician.

Cell and Molecular Biology (Biotechnology)

“I DID RNA-SEQ, NOW WHAT?”: APPLICATIONS AND EXAMPLES OF GENE SET ENRICHMENT ANALYSIS (GSEA). Apostle, S.; Department of Cell and Molecular Biology, College of Liberal Arts and Sciences.

Next-generation sequencing (NGS) has become a powerful tool in the realm of biology as it yields high through sequencing for a wide range of applications with its many different flavors; DNA-seq, RNA-seq, scRNA-seq, ATAC-seq, etc. One main feature of NGS is the sheer volume of data that is produced due to the mechanism of sequencing. To complement its efficiency, new computational methods have been developed for high throughput analysis. RNA-seq is a technique employed to sequence the transcriptome of a sample, allowing us to understand the genes being expressed at that moment. By sequencing both a treatment and control group of an experimental design, we can compare gene expression levels to understand treatment effects. Different tools such as edgeR, DESeq, and voom+limma are essential in calculating the differential expression (DE) of genes between the two groups and yield specific genes that have been up or down regulated. Despite the novelty in a list of genes, these can be on the order of hundreds and even thousands, making it nearly impossible to parse each gene for relevance in our observed study. With previously assembled or custom sets of genes, we can use Gene Set Enrichment Analysis (GSEA) post-DE calculation to study combinations of biologically grouped genes which are differentially expressed together, allowing us to investigate pathways and interactive gene networks. Results from GSEA lead us to conclusions that help explain higher-level biological questions and provide a larger insight into RNA-seq experiments.

Cell and Molecular Biology (Biotechnology)

TARGETED DINUCLEOTIDE CPG METHYLATION IN A UTERINE

FIBROID CELL LINE. Grey, J.A., Carpenter, T. J. ¹, Paul, E. N. X. ¹, Teixeira, J.M. ¹; Department of Cell and Molecular Biology, College of Liberal Arts and Sciences.

¹Michigan State University, College of Human Medicine, Department of Obstetrics, Gynecology and Reproductive Biology.

Uterine fibroids are benign smooth muscle tumors estimated to occur in 25-89% of reproductive age women; 25% of those women suffer from clinically significant symptoms including excessive menstrual bleeding, dysmenorrhea, and infertility. Non-invasive treatment options for fibroids such as hormone regimens are unsuitable for long-term applications, and hysterectomy remains the only permanent treatment for fibroid-associated morbidities. Three molecular subtypes of fibroids account for 80-90% of incidence which are characterized by *MED12* mutation (*MED12mt*), or *HMGA1/HMGA2* overexpression (*HMGA1hi* and *HMGA2hi*, respectively). Clustering of DNA methylation profiles segregated subtypes from normal tissue and revealed differential hypomethylation in the *HMGA2* gene body in *HMGA2hi* fibroids. *HMGA2* overexpression is most commonly reported with translocations at 12q15, but hypomethylation in the *HMGA2* gene body is present in *HMGA2hi* fibroids with no detected translocation suggesting hypomethylation may be an additional mechanism for upregulation of *HMGA2*. DNA methylation at CpG dinucleotides is a key epigenetic modification with critical roles in gene regulation, genomic integrity, and DNA-protein interactions including CTCF-binding, which we hypothesize to be involved in restructuring the chromatin around fibroid-associated genes. Specific methylation events in uterine fibroid development have not yet been explored. Here, we demonstrate site-specific *de novo* methylation in the *HMGA2* gene body in a uterine fibroid cell line using a fusion protein of nuclease deficient Cas9 (dCas9) and prokaryotic DNA methyltransferase MQ1. Cells were co-transfected with dCas9-MQ and sgRNA transfer plasmids and isolated by FACS for DNA methylation analysis by NGS. This tool can be used to further explore site-specific DNA methylation events.

Cell and Molecular Biology

INVESTIGATING MICRORNA MIR-34B AND MIR-34C EXPRESSION IN A PARKINSON'S DISEASE CELL LINE MODEL. Cunningham, M.; Department of Cell and Molecular Biology, College of Liberal Arts and Sciences.

PURPOSE: The motor symptoms of Parkinson's disease (PD) are caused by the degeneration of dopaminergic neurons in the midbrain. These dying neurons are characterized primarily by large aggregates of alpha-synuclein protein. miR-34b and miR-34c are two microRNAs that repress alpha-synuclein expression. We hypothesize that treating degenerating neurons with these microRNAs will decrease alpha-synuclein aggregation and increase cell survival. **SUBJECTS:** SH-SY5Y, a neuroblastoma cell line, was cultured and treated with retinoic acid, brain-derived neurotrophic factor (BDNF), and rotenone to induce a PD-like phenotype. **METHODS AND MATERIALS:** Live cells were counted on a hemocytometer after staining with trypan blue. Brightfield images were taken using an inverted compound microscope. Cells will be stained using specific antibodies for tyrosine hydroxylase (TH) and alpha-synuclein. **ANALYSES:** Quantification of proteins in fluorescence microscopy images will be done using ImageJ software. All experiments will be run in triplicate and statistical significance will be evaluated with t-test. **RESULTS:** Cell counts in brightfield microscopy confirmed that SH-SY5Y cells can be differentiated to a neuronal phenotype after 10 days of retinoic acid and BDNF treatment. **CONCLUSIONS:** Our next step is to use immunofluorescent staining and fluorescence microscopy to visualize TH and alpha-synuclein in differentiated and rotenone-treated cells. We will verify that differentiated cells express TH, a dopaminergic marker, at higher levels, and that rotenone treatment induces the formation of alpha-synuclein aggregates. We will then transfect these PD model cells with miR-34b and miR-34c and use additional immunostaining to measure their effects on alpha-synuclein aggregation.

Cell and Molecular Biology

THE ROLE OF LATE EMBRYOGENESIS ABUNDANT (LEA) PROTEIN 6 IN DESICCATION TOLERANCE IN *ARABIDOPSIS THALIANA* SEEDS.

Thomson, J., Blackman, S.; Department of Cell and Molecular Biology, College of Liberal Arts and Sciences.

PURPOSE: Seed development is divided into three major phases: morphogenesis, storage deposition, and maturation drying. During maturation drying, the seed loses water until it reaches approximately 10% moisture. At some point, the seed acquires the ability to tolerate this extreme water loss, possibly due to the accumulation of protective biomolecules such as Late Embryogenesis Abundant (LEA) proteins. In the genetic model organism, *A. thaliana*, there are 51 LEA proteins divided into seven groups based on the amino acid sequence. I wished to determine the involvement of one member of the Group 1 LEA proteins (“LEA6”) in desiccation tolerance (DT) by comparing the physiology of mutant seeds lacking the gene and those possessing the gene (wild type (WT)). **METHODS AND MATERIALS:** We compared the extent of germination of experimentally desiccated and non-desiccated mutant and WT seeds at varying time-points during maturation drying. **ANALYSES:** Germination data were analyzed using Kaplan-Meier analysis. **RESULTS:** We found that WT seeds become dependent on drying for germination during a window (14 to 16 days after anthesis) of maturation drying. Prior to this time, seeds cannot germinate quickly IF dried, but after this, seeds cannot germinate quickly if NOT dried. Mutant seeds lacking the LEA6 gene were delayed in acquiring this trait of “drying dependence”. **CONCLUSIONS:** LEA6 improves the rate of germination *after* but not before drying. Our results thus do not support the involvement of LEA6 in DT but suggest they play a role in the switch of seeds to drying dependence for germination during late maturation.

Clinical Dietetics

FOOD INSECURITY AMONG ELEMENTARY SCHOOL STUDENTS OF MICHIGAN'S MARQUETTE COUNTY. Skelton, J.; Department of Allied Health Sciences, College of Health Professions.

The United States Department of Agriculture (USDA) defines food insecurity as “A household- level economic and social condition of limited or uncertain access to adequate food.” This definition is justifiably broad, as there are a large number of varying factors that contribute to food insecurity in the United States and food insecurity takes many different forms. Food insecurity does not simply mean that an individual or family does not have enough food. Rather, those who are food insecure may also be living with very unhealthy diets that may be contributing to the global epidemic of overweight and obesity. Rates of food insecurity in the US ranged between 10.1 and 11.9% from 1998 to 2007, jumped to 14.6% with the onset of the 2008 financial recession, and stayed at or above 14% throughout 2016. American households with children are even more susceptible to food insecurity, with food insecurity affecting nearly 20% of all US households with children in 2014. One very useful indicator of food insecurity among American children is their utilization of the National School Lunch Program’s (NSLP) free and reduced-price meals. A 2017 study by the Journal of Consumer Affairs identified a correlation with food insecurity and students’ use of the School Breakfast Program, indicating those students who are eligible for free and reduced-price meals have a greater likelihood of being food insecure, and that free and reduced-price meals help reduce the effect of that food insecurity.

Clinical Dietetics

SELF-REPORTED CONFIDENCE IN TREATING DISORDERED EATING: MICHIGAN REGISTERED DIETITIAN NUTRITIONISTS. Welles, E.; Department of Allied Health Sciences, College of Health Professions.

INTRODUCTION: Despite the crucial role dietitians play in treating eating disorders, many dietitians have reported not feeling adequately trained to work with this patient population. Dietitians have a role in screening patients to identify disordered eating behavior; however, more research is

needed to assess the ability of RDNs to identify eating disorder behavior, provide evidence-based treatment and feel confident in their role on the multidisciplinary team. The intent of this research project is to investigate the level of training dietitians receive to prepare them to work with patients with disordered eating. Research questions include: Do Michigan based registered dietitians feel their education and other training adequately prepared them to identify and treat patients with disordered eating? Does confidence level in treating disordered eating vary by type and length of education, additional training, clinical experience, and interest level? **METHODS:** Registered dietitians were invited via the Michigan Academy of Nutrition and Dietetics monthly e-newsletter to participate in a 10-minute online survey administered through Qualtrics. Participants were required to be registered dietitians including retired practitioners but excluding students. Quantitative data were analyzed using SPSS version 20. Additionally, open-ended responses were analyzed qualitatively using content analysis with an inductive coding method to identify themes. **RESULTS:** Thirty-four RDNs completed the survey, with most (71%) indicating that they occasionally work with patients who have disordered eating. However, 88% of participants (n = 30) reported that they do not feel adequately trained to work with patients with disordered eating. On a scale of one to ten (one being least confident, ten being most confident), participants ranked their confidence level at 4.9 on average. Self-reported comfort level increased with the amount of disordered eating training completed. However, participants with graduate degrees indicated that graduate-level training related to disordered eating was more valuable than that received as an undergraduate student. **CONCLUSIONS:** Many participants identified the need to be trained in disordered eating, regardless of their dietetics practice area. From qualitative data analysis, a common theme from open-ended responses was that Michigan RDNs consider eating disorders and obesity/ weight loss as the most challenging populations that they work with. It appears that there is a disconnect between the desires of registered dietitians and the training they are receiving, which needs to be addressed in each step of the dietitian training process. More research is needed on a broader scale, to determine if training is consistent across the United States, as this study focused on Michigan-based dietitians. However, initial findings suggest that graduate education programs represent an opportunity to increase confidence and competence of RDNs at treating patients with disordered eating.

Communications

ALL WOMEN ARE EQUAL BUT SOME WOMEN ARE MORE EQUAL THAN OTHERS: PSEUDO-FEMINIST ORIENTALISM IN FILM. Kheder, E.; School of Communications, College of Liberal Arts and Sciences.

PURPOSE: Around the First Gulf War, Middle Eastern women went from being seen as exotic and seductive to being the wives of terrorists. Hollywood and its audiences are confused. But whether Middle Eastern women are painted as belly dancers or burqa donners, they are always painted as *other* and *oppressed*. This is where Edward Said's theory of Orientalism and variations of it are at play, such as Joyce Zonana's Feminist Orientalist theory. This paper looks at Middle Eastern women in film in light of the aforementioned theories. **SUBJECTS:** The sample is made up of 11 films and TV shows. **METHODS AND MATERIALS:** The paper demonstrates how Hollywood embodies Feminist Orientalism by performing a qualitative content analysis of *The Princess and the Marine* and 10 other productions. **ANALYSES:** A qualitative content analysis of 11 films is performed. **RESULTS:** The 11 films analyzed are rife with examples of Orientalism and Feminist Orientalism. **CONCLUSIONS:** The author makes the assertions that Orientalism explains *what* is happening to Middle Eastern women in the media and that Feminist Orientalism explains *why* it is happening. She also suggests that the theory of Feminist Orientalism be given a more appropriate name; Pseudo-Feminist Orientalism. Finally, the author names and defines new theories; Reverse Pseudo-Feminist Orientalism, the Orientalist Gender Hierarchy, and the assertion that Pseudo-Feminist Orientalism manifests itself both in the media's characters *and* audiences.

Criminal Justice

THE IMPACT OF TRAUMA AND THE USE OF TRAUMA-INFORMED PROGRAMMING WITHIN A CORRECTIONAL FACILITY. Bates, K. M.; School of Criminal Justice, College of Community and Public Service.

PURPOSE: The "tough on crime" narrative has dominated the corrections system for the past few decades, which has led to mass incarceration and high recidivism rates. The emphasis on punishment within corrections ignores many important patterns that emerge within the United States'

prison population, specifically examining how trauma plays a role in offending. The need for trauma-informed care will be demonstrated through an extensive literature review on trauma and examining the impact of trauma-informed care at Carson City Correctional Facility in Michigan.

CHALLENGE: The main challenges during the experience were navigating the administration of the Michigan Department of Corrections and learning how to effectively communicate with the various populations within the facility. **EXPERIENCE:** Worked with counselors, social workers, and psychologists to develop treatment plans for individuals. Observed violence prevention, domestic violence, sex offender, and mental health programming. Developed rapport with inmates of various criminal backgrounds and levels of security. **OUTCOME:** Established a deeper understanding of programming within a correctional setting and how trauma impacts individuals within the justice system, specifically adult males. **IMPACT:** The internship provided vital insight into the correctional system and reiterates the literature on trauma within correctional facilities. The experience exposed me to different age groups, communities, and cultures that are affected by the criminal justice system.

Criminal Justice

INTIMATE PARTNER VIOLENCE: A FOCUS ON THE OFFENDER.

Christenson, C. S.; School of Criminal Justice, College of Community and Public Service.

PURPOSE: This presentation focuses on the topic of intimate partner violence. IPV is one of the most common and hidden ongoing dark figure crimes in the United States. This issue will be the main focus of this presentation and will cover issues such as victims of IPV, PTSD, teenage dating violence, and stalking. The research will address the issue that there is a lack of info on IPV offenders, how the cycle of violence hypothesis explains the cause of IPV and an updated profile on IPV offenders.

SUBJECTS: IPV offenders & victims of child abuse and neglect. **METHODS AND MATERIALS:** A literature review using Google Scholar, ProQuest, and Bureau of Justice Statistics. **RESULTS:** Both physical and sexual abuse during childhood showed the most influence on future IPV offending. Furthermore, in terms of contributing new findings to the topic of IPV offenders, social factors such as sexual orientation discrimination and gender discrimination influenced IPV offending. Out of all types of IPV

victims, bisexual females experienced the most IPV victimization. Results also showed that there is very limited information on current rates of IPV offending. **CONCLUSION:** It is important to provide early intervention against child abuse and neglect to prevent victimized youth from learning aggressive behaviors that may be used in future partner violence offending. More research that focuses specifically on IPV offenders is needed. IPV treatment facilities need to change it's one size-fits-all approaches, to ones that include LGBTQ victims of IPV as well.

Education-Instruction and Curriculum

THE BENEFITS OF STUDIO THINKING FOR MIDDLE SCHOOL STUDENTS BEYOND THE VISUAL ARTS CLASSROOM. Minnebo, H.; Teaching and Learning, College of Education.

Research conducted by experts from the fields of both business and education has proven that creativity, communication, collaboration, and critical thinking are just a few of the essential skills students must have to be successful in our current and future global society. It also shows that US schools are failing to equip students with these necessary competences. Educators cite Federal and state education regulations mandating increased standardized testing as well as expanded academic content coverage as reasons for this deficit. This project seeks to address these academic shortfalls with a unit of study based on the Studio Framework, developed by Harvard's Project Zero. Designed to be implemented in a visual arts classroom, this unit of study focuses on the skill of active self-reflection for learning, one of the Studio Habits of Mind. It includes a unit overview, organization of learning and activities, as well as three methods for evaluation. Arts education offers a potential solution to address the needs of our current education system, and equip students with many of the skills, habits, and characteristics needed for success in our global society.

Education-Literacy Studies (Reading)

READING MOTIVATION AND ENGAGEMENT: INTEGRATING COMPETENCY-RELATED BELIEFS AND LITERACY INSTRUCTION IN ENGLISH LANGUAGE ARTS. Rogers, M.; Literacy and Technology, College of Education.

INTRODUCTION: Many adolescents today have reached a state of stagnation regarding the development of their literacy skills. Strategic reading motivation and engagement instruction, when combined with standard English Language Arts curriculum, can benefit and increase student reading skills in the secondary classroom. **CHALLENGE:** Students are transitioning from middle school and graduating high school with reading levels that fall short of the basic required standards needed to become contributing, successful, and literate members of society. Thus, this project focused on finding resources to build student motivation and engagement through the continual development of student reading identities in the classroom. **OUTCOME:** Research empirically shows that students need a clear understanding of their reading tasks and why reading is important to become self-motivated readers and develop competency-related beliefs and skills. Furthermore, research advocates for student choice as a motivational strategy. Students need an active role in their reading lives, which includes making decisions about what they read in class. With this philosophy, teachers become classroom facilitators who guide students on their individual reading journeys. **IMPACT:** Through the support of literacy intervention and motivational strategies, English Language Arts instructors can provide students with the opportunity to improve their self-efficacy around reading and guide them towards recognizing the value literacy holds as a universal skill. This project offers students essential tools and resources to help them break the stagnant cycle of low literacy levels, while simultaneously promoting student autonomy in their individual reading lives and fostering motivational and engagement practices.

Education-Literacy Studies (Reading)

STUDENT MOTIVATION AND THE GROWTH MINDSET: ADDRESSING GAPS BETWEEN RESEARCH AND PRACTICE FOR THE EVERYDAY TEACHER. Slack, J.; Literacy and Technology, College of Education.

PURPOSE: This study examined why most students lack motivation by the time they reach secondary education and subsequently identified methods to reverse this trend through practical classroom applications.

PROCEDURES: A literature review focused on educational psychology and educational history was conducted to create practical classroom guides for increasing student motivation and success. **OUTCOME:** Research empirically shows that many current educational reforms, supports, and systems are actually undermining student motivation and shifting students into a mindset that can be detrimental to their success in academics and life beyond. Despite this fact, evidence shows that educators can influence students' habits of mind, motivation, and potential through autonomy-support, self-regulation, and the growth mindset. Although there is a generous amount of literature dedicated to applying this research to educational practices, these suggestions for teachers and schools are mainly theoretical or conceptual proposals and do not provide the means for practical application. To address this gap between research and the everyday classroom, this project offers a solution to the concern with the creation of practical classroom principles, frameworks, and lessons for a secondary level ELA curriculum. **IMPACT:** When teachers adopt these philosophies and implement the created elements, student mindset and motivation will shift, allowing students to reach greater success and well-being. Creating the spaces outlined in these guides can transform the lives of students, and these classrooms are within reach for any teacher that is willing to reimagine their educational environment.

Education-Literacy Studies **(Teaching English to Speakers of Other Languages)**

PREPARING TEACHERS FOR CULTURALLY RESPONSIVE PRACTICES WITH CULTURALLY & LINGUISTICALLY DIVERSE STUDENT POPULATIONS. Merriott, K. E.; Literacy and Technology, College of Education.

As student populations across the United States become more culturally and linguistically diverse, teachers must be prepared to deliver content that is responsive to students' academic needs and cultural backgrounds. Culturally and linguistically diverse students often experience a lack of academic achievement and may feel disconnected from their learning. Unfortunately, the research indicates that teachers are inadequately supported to face the challenges related to teaching heterogeneous student bodies. This project examines what the research literature has identified regarding how culturally responsive teaching (CRT) practices can foster academic development, cultural responsiveness and the use of academic language, the current lack of teacher preparedness to deliver CRT strategies and approaches to addressing the problem. Using the theories of multicultural education and second language acquisition of Krashen, the project focuses on helping teachers become more knowledgeable on student diversity and providing an education to students that is responsive to their culture, language and experiences so that all learners have the opportunity to connect with the content and learn in a way that is relevant to their specific needs and background. Strategies and resources for continued support were compiled into a virtual handbook for teachers that will be maintained and further developed by a professional learning community and staff. It is hoped that this project will promote teacher confidence and effectiveness with culturally responsive practices so that more students can experience academic success.

Engineering

FPGA-DRIVEN DIGITAL SIGNAGE. Basnet, P.; School of Engineering, Padnos College of Engineering and Computing.

Digital signage is being used by many industries to promote special offers. Schools, colleges and universities around the world have also started using

digital signage to share exciting information such as events, scholarships, study abroad news and such to students and guests. The primary reason digital signage has become popular is that it engages the audience in a much more effective way than static signage. Scrolling messages, visually appealing graphics and the ability to change the content on the fly ensures that signage displays look extremely exciting and relevant. Digital signage systems can be as simple as a single LED display or as complex as cascading several LED displays. Handling several displays requires sufficient processing and Field Programmable Gate Array (FPGA) has proven to be efficient in handling parallel computations quickly. This capstone project presents one solution where FPGA is used to drive the LED signage.

Engineering

WIRELESS COMMUNICATION BETWEEN FPGA AND MICROCONTROLLER. Shrestha, P., Subedi, B., Girard, M.; School of Engineering, Padnos College of Engineering and Computing.

This project offers a new method to the design and implementation of wireless communication between an FPGA device and a microcontroller. Wireless Bluetooth communication is utilized, as the Bluetooth modules are low-cost compared to other wireless modules and provide easy interfacing with both the FPGA and microcontroller. FPGAs have a higher parallel processing ability and can accomplish very precisely timed continuous and simultaneous tasks. This is done using the UART protocol, as a means to exchange the data. With these predominant abilities, FPGAs can be crafted into a central unit for processing. By using the FPGA to take on some of the processing tasks, it improves system performance and frees up the MCU from cycle-intensive tasks. In this display of wireless communication, the microcontroller and sensors are mounted remotely. Communication between the microcontroller and FPGA is attained through Bluetooth, which operates in the 2.4 GHz frequency. UART protocol is utilized for interfacing the Bluetooth module with both the microcontroller and FPGA. As FPGAs do not have any dedicated logic to communicate with microcontrollers, a UART module was designed and implemented with an FPGA using a state machine design.

Nursing-Doctorate

A QUALITY IMPROVEMENT PROJECT TO IMPROVE FINANCIAL SUSTAINABILITY AND EFFICIENCY OF HOME PALLIATIVE CARE. Giffel, A., Cardosa, R., Spoelstra, S.; Doctor of Nursing Practice, Kirkof College of Nursing.

PURPOSE Home palliative care services are challenging to bill due to the complexity of services and competing time demands on staff. A protocol was developed for providers to guide coding and billing to increase Relative Value Unit generation to improve financial sustainability. **SUBJECTS:** Nurse practitioners (N=7). **METHODS AND MATERIALS:** A mixed method quality improvement project was conducted in a home-based palliative care program in the Midwest. Data were collected during on observation of advanced care planning conversations on home visits; and on advanced care planning and billing, visits by discipline, revenue generation, and codes utilized were examined and feedback provided to individual providers. Knowledge and satisfaction (pre/post) were examined. **ANALYSES:** Thematic analysis and descriptive statistics and chi-square were used. **RESULTS:** Clinician knowledge increased a mean of 2.0 (2.7-4.7 [of 5]) after education; and 100% were satisfied. There were 16.7% (n=60) initial visits examined prior to implementation and 83.3% (n=55) after. Improved advanced care planning length (2.3-minutes; [18.5 to 20.8]), documentation (18.3% [61.7% to 80%]), and billing (36% [16.7% to 52.7%]) occurred as a result of the project. **CONCLUSIONS:** Billing and coding practices can be improved through use of coding protocol, education, and audit and feedback to support financial sustainability.

Nursing-Doctorate

SELF-MONITORING OF BLOOD PRESSURE IN COMMUNITY-DWELLING SENIOR ADULTS. Love, L.N.; Doctor of Nursing Practice, Kirkhof College of Nursing.

PURPOSE: The purpose of this evidence-based practice (EBP) project is to determine whether self-monitoring of blood pressure (SMBP) improves hypertension knowledge and increases the SMBP frequency in a low-income senior, senior adult community. Another outcome of interest

is a reduction in mean blood pressure for the cohort. **PROCEDURES:** Participants must self-report a diagnosis of hypertension and reside in the senior apartment community. Participants will attend four educational sessions about hypertension. Participants will receive a calibrated, automated BP monitor. They will learn how to correctly perform SMBP. Participants will measure, record, and categorize (normal, elevated, high) four blood pressures each week for six weeks. The participants will learn how modifiable and nonmodifiable risk factors affect BP control.

OUTCOME: Measures of interest include program attendance, ability to categorize blood pressures, SMBP frequency and mean cohort BP. Statistical analysis of these measures will take place before and after the program. BP ranges will be reported using a box-and-whisker plot display. A p-value of $n \leq .05$ will be significant. **IMPACT:** Implementation of SMBP in low-income, senior adult communities may improve long-term management of hypertension. Uncontrolled high BP is the leading cause of heart attack and stroke in the United States. By empowering senior adults to control their blood pressure, this project may prevent or delay a heart attack or stroke and prolong the length of time these high-risk seniors can continue to live independently.

Physical Therapy

MENIERE'S DISEASE AND CONCURRENT BENIGN PAROXYSMAL POSITIONAL VERTIGO (BPPV) IN AN OLDER ADULT: A CASE REPORT.

May, C., Baker, B.; Department of Physical Therapy, College of Health Professions.

INTRODUCTION: Meniere's disease (MD) is an inner ear disorder that frequently predisposes someone to benign paroxysmal positional vertigo (BPPV). The purpose of this case report was to explore the PT management of MD and concurrent BPPV. **CASE DESCRIPTION:** A 66-year old woman, self-referred to PT, was evaluated and treated for complaints of vertigo. She had a previous diagnosis of MD and multiple comorbidities. Two clinical impressions resulted; MD and bilateral BPPV. Examination and intervention for each are described. **DISCUSSION:** The client, in this case, had several risk factors in addition to the MD that predisposed her to BPPV. The MD symptoms were not changed with PT, but her BPPV symptoms were able to be alleviated with PT. **CONCLUSION:** Treatment of BPPV can

greatly improve the quality of life in a person with MD and therefore should be evaluated if symptoms of intermittent vertigo are present.

Public Administration

IDEA GENERATION AND INNOVATION IN THE PUBLIC SECTOR: IDEA MACHINES AND CIVIC PARTICIPATION PLATFORMS. Jacobs, G.; School of Public, Nonprofit, and Health Administration, College of Community and Public Service.

This project examines idea machine systems as an evolution of the traditional employee suggestion system for generating ideas and encouraging innovation in the public sector. The public sector is often seen as having organizational factors that discourage innovative behavior in public servants: red tape, formalization, and centralization. Idea generation systems in Seoul, South Korea and the City of Grand Rapids, Michigan are explored. Idea creation internal to public organizations is compared to e-participation systems in which the public proposes and votes on ideas, which are then implemented by the government. Democracy Seoul, a citizen proposal system in South Korea, is presented as an example of how idea sharing can strengthen democratic participation.

Public Health

RECREATIONAL PHYSICAL ACTIVITY, ADJUVANT HORMONAL THERAPY, AND COMORBIDITIES IN THE AFRICAN AMERICAN BREAST CANCER LONG-TERM (AABL) SURVIVORSHIP STUDY. Busen, K., Moore, S., Wallace, H., Sanderson, M., Nechuta, S.; Department of Public Health, College of Health Professions.

INTRODUCTION: African American women diagnosed with breast cancer (BC) are more likely to have poorer health outcomes. U.S. guidelines support ≥ 150 minutes of moderate physical activity (PA) weekly, but many may not meet the guidelines. The study aim was to evaluate differences in PA for African American BC survivors by select comorbid conditions and adjuvant hormonal therapy (HT) use. **SUBJECTS:** The AABL survivorship study included 323 BC survivors recruited in 2015-2016. **METHODS:** Women completed a survivorship-focused questionnaire developed with BC survivor/expert feedback using validated measures to collect data on

cancer treatment (including HT), lifestyle, and major medical comorbidities. **ANALYSES:** SAS 9.4 was used for univariate and bivariate analysis. **RESULTS:** The mean age at survey was 59.1 years (range: 27.9-79.5). Nearly all reported at least 7 minutes of PA per week. The most common activities (≥ 1 /month) included routine household cleaning (92.9%), shopping (94.7%), walking slowly (42.1%), and walking briskly (40.6%). Median PA was 146.25 minutes/week (range: 7-2,369 minutes/week). The use of HT varied and a higher median PA was seen among HT users. The most common comorbidities were high blood pressure (64%), high cholesterol (42%), and arthritis (45%), with nearly 90% reporting ≥ 1 major comorbidity. Women with ≥ 1 major comorbidity had lower PA levels, regardless of type. **DISCUSSION:** While most survivors participated in PA after diagnosis, participation varied by major comorbidities and HT use, and many were not meeting duration guidelines. These results inform targeted interventions to increase PA with the goal of improving the long-term health of African American BC survivors.

Public Health

AN ASSESSMENT OF EMERGENCY PREPAREDNESS AND DISABILITY TRAINING IN PHYSICIAN ASSISTANT PROGRAMS AND MEDICAL SCHOOLS IN THE MIDWEST. Roux, G., Christensen, P., VanderMolen, J.; Department of Public Health, College of Health Professions.

PURPOSE: Individuals with disabilities frequently require increased medical attention over their lifetime (Seidel & Crowe, 2017). Having properly trained medical professionals that know how to interact and treat individuals with disabilities is imperative, along with having healthcare professionals who are trained in emergency preparedness when times of disaster hits. The purpose of this study was to evaluate the curriculum of Physician Assistant (PA) and Medical school (Doctor of Medicine (MD) and Doctor of Osteopathic Medicine (DO)) for education about disabilities and emergency preparedness. **SUBJECTS:** Forty-three PA programs and 19 MD programs in the Midwest. **METHODS AND MATERIALS:** The study sent out an electronic survey, through Qualtrics, to the deans and program directors of accredited PA and Medical schools in the Midwest. The survey contained two sections. The first section addressed questions about the education of PAs and MDs regarding emergency preparedness and disabilities. The second section of the survey contained demographic questions. **ANALYSES:**

The data was analyzed through statistical analysis software (SAS). A cross-tabulation was conducted to analyze the data further and to compare whether or not emergency preparedness and disability education were incorporated into the curriculum by state. **RESULTS:** A majority of the responses showed that programs do have lectures that address emergency/disaster preparedness and disabilities. **CONCLUSIONS:** A majority of programs lack a graduate-level track or concentrations, dual-degrees, or extracurricular opportunities related to emergency preparedness/disaster and disabilities. A majority of the programs respond that they have lectures that specifically address these topics, gives insight that students are exposed to this curriculum.

Social Work

AN EXAMINATION OF RELIGIOUS INSTITUTION INVOLVEMENT IN TRAUMA RECOVERY. Brown, C.; Social of Social Work. College of Community and Public Service.

INTRODUCTION: Existing research indicates that most people are exposed to potentially traumatic events and that most of the United States population holds a religious affiliation. This study examines how churches address parishioners who are seeking religious support in the context of their trauma. **SUBJECTS:** The researcher will interview clergy at Christian Reformed Churches (CRCs) in Kent and Ottawa Counties in Michigan that host between 201 and 500 attendants at weekly services. **METHODS AND MATERIALS:** This qualitative study will utilize in-person interview methods. Qualifying churches will be determined using information found on the CRC of the North America website. The researcher will reach out to qualifying churches via email and follow up phone calls. **ANALYSES:** Interviews will be recorded and transcribed. The researcher will then analyze the transcriptions, looking for themes among the interviews. **RESULTS:** Analysis is still ongoing, but preliminary results indicate several themes among the data. While some participating pastors had a degree in or training relating to counseling, most participants stated the importance of explaining to parishioners that their role is to be a pastor and not a counselor. All participants stressed the importance of referring parishioners to counseling services as needed. Overall, there was a lack of training specific to working with traumatized parishioners and participants indicated that they did not have a formal or objective way to evaluate the

effectiveness of the supports they provide to parishioners. **CONCLUSION:** Efforts should be executed to inform churches and faith leaders of the importance of understanding a trauma-informed approach.

Index by Student

Allen: Biology	3
Apostle: Cell and Molecular Biology	7
Basnet: Engineering	18
Bates: Criminal Justice	13
Brown: Social Work	24
Busen: Public Health	22
Christenson: Criminal Justice	14
Cunningham: Cell and Molecular Biology	9
Giffel: Nursing	20
Girard: Engineering	19
Grey: Cell and Molecular Biology	8
Heise: Biology	4
Jacobs: Public Administration	22
Kheder: Communications	13

Love: Nursing	22
May: Physical Therapy	21
Merriott: Education-Literacy Studies	18
Minnebo: Education-Instruction and Curriculum	15
Pokora: Biostatistics	5
Rogers: Education-Literacy Studies	16
Roux: Public Health	23
Ruvina: Biomedical Sciences	5
Shrestha: Engineering	19
Skelton: Clinical Dietetics	11
Slack: Education-Literacy Studies	17
Springer: Biostatistics	6
Subedi: Engineering	19
Thomson: Cell and Molecular	10
Welles: Clinical Dietetics	11
