

11TH Annual Andrews University
Celebration of Research & Creative Scholarship

October 25, 2019 | Buller Hall

PROGRAM AND ABSTRACT BOOK



“At Andrews University, research is an inextricable part of the education experience.
It informs our commitment to knowledge, faith and service.”

~Andrea Luxton, President



WELCOME



Welcome to the Eleventh Annual Andrews University Celebration of Research and Creative Scholarship. This year's event caps off our 3-day celebration of world changers. We began Wednesday evening with the inaugural lecture of the Kingman Speaker Series on Science and Society with David Reitze, Director of LIGO and colleague of our own Tiffany Summerscales. The celebration continued Thursday evening with the Celebration of Community Engagement, where Grand Rapids philanthropist Charles Stoddard gave the keynote address.

Andrews University faculty and students have been very productive this year. In the 2018-2019 academic year, faculty and students published 324 peer-reviewed books, book chapters, scholarly articles, and general audience articles. Furthermore, faculty members gave or co-authored with students 735 professional presentations. The range of topics covered in today's plenary, oral, and poster presentations demonstrates the commitment to research and creative scholarship of the Andrews community. Again this year, there is much to be celebrated!

Two plenary presentations will be given by recipients of the 2019 Siegfried H. Horn Excellence in Research and Creative Scholarship Award—Harvey Burnett and John C. Peckham. Harvey Burnett, Associate Professor of Psychology and chair of the Behavioral Sciences Department, has an outstanding record of integrating faith, teaching, service and research in his career. Dr. Burnett has a global reputation for his commitment to service in many roles from local conflict resolution and work with police departments to international disaster recovery.

John Peckham, Professor of Theology and Christian Philosophy, has made an impressive contribution to Adventist theology as well as to wider Christian academia. His recent publication, “The Love of God: A Canonical Model,” a book published by InterVarsity Press, received the 2015 Readers' Choice Award.

The Horn Award was established in 2011 to honor Siegfried H. Horn's legacy of scholarship and contribution to the field of biblical archaeology at Andrews University. The award recognizes lifetime achievement in research and creative scholarship for faculty members of Andrews University.

After the plenary session, please join us for refreshments during our poster session in the Buller hallways, followed by two parallel oral sessions covering faculty and student research and creative scholarship across the disciplines.

Thank you for joining us for this celebration. I hope you enjoy engaging the breadth and depth of research and creative scholarship, and I hope you will be encouraged to continue focusing your own creative and intellectual energy into future research projects. Additionally, we invite you to join us on February 28, 2020, to celebrate the accomplishments of our undergraduate students at the Honors Scholars & Undergraduate Research Poster Symposium. To learn more, please visit www.andrews.edu/research.

Sincerely,

A handwritten signature in dark ink, reading "Gary W. Burdick". The signature is fluid and cursive.

Gary W. Burdick
Dean of Research

SCHEDULE OF EVENTS

12:30–2:00 pm

Plenary Session (Buller Hall, Room 251)

Welcome and Introduction – **Christon Arthur**, Provost

Introduction of Speakers – **Gary Burdick**, Dean of Research

Presentations by recipients of the Siegfried H. Horn Excellence in Research and Creative Scholarship Award. See page 4 for program abstracts.

PL-1 **Harvey Burnett**, Associate Professor of Psychology
Psychological Body Armor and Responders: Applications to Building Resilience in the Research Mentor-Mentee Relationship

PL-2 **John C. Peckham**, Professor of Theology and Christian Philosophy
Knowing the God of Love: A Preliminary Discussion

2:00–3:00 pm

Poster Presentations (Buller Hallways)

See pages 5–14 for poster abstracts. Refreshments served.

Health Professions

P-01 Nursing

Humanities & Social Sciences

P-02–03 Sociology
P-04 Social Work
P-05–06 Psychology
P-07 English
P-08 Art
P-09 Library

STEM

P-10–12 Engineering
P-13 Physics
P-14–17 Mathematics
P-18–20 Chemistry
P-21–28 Biology

J.N. Andrews Honors Program

P-29–32 Honors Thesis Posters

3:00–4:15 pm

Oral Breakout Sessions (Buller Classrooms)

See pages 15–17 for program abstracts.

Session A Religion (Buller 108)

Session B Education & Wellness (Buller 251)

PLENARY PRESENTATIONS

PL-1 *Psychological Body Armor and Responders: Applications to Building Resilience in the Research Mentor-Mentee Relationship*

Harvey Burnett, Associate Professor of Psychology

Psychological Body Armor (PBA) is a unique form of human resilience consisting of two key pathways: proactive resilience (one's immunity to crisis) and reactive resilience (one's ability to bounce back from adverse experiences). Recent exploratory research was able to identify several components from each pathway that predicts overall resilience, which disaster mental health and other emergency responders can build to help maintain functioning after exposure to traumatic events. However, these same components can be applied to help strengthen the research mentor-mentee relationship in order to enhance the quality, efficacy and productivity of collaborative research pursuits.

PL-2 *Knowing the God of Love: A Preliminary Discussion*

John C. Peckham, Professor of Theology and Christian Philosophy

The way one conceives of God affects everything else and has massive implications relative to each aspect of theology. This presentation, targeted at a general audience, is a preliminary discussion of how one might approach the doctrine of God, with special attention to the nature of divine love and the God-world relationship.

POSTER PRESENTATIONS

NURSING

P-01 *Effect of Empathy Development on Service-Learning - Andrews University Nursing School/Community Partnership – Benton Harbor Program*

Bea Ade-Oshifogun¹, Shawna Trotman Henry², Khonnah Weithers³, Carlisle Sutton⁴, ¹ Chair, School of Nursing, ²Associate Professor of Nursing, ³Assistant Professor of Nursing, ⁴Director of Community Engagement, Integration & Service

Background: Andrews University's administration acknowledges the university's obligation to seek higher levels of community engagement. Consequently, educators are encouraged to understand and support community engagement efforts to mold students into World Changers. It is with this backdrop that Andrews University embarked on a pilot project with the School of Nursing to see the effect of empathy development on a service-learning program at Benton Harbor High School. **Aim of Project:** To determine the level of empathy among selected nursing students; evaluate the effectiveness of community engagement activities on nursing students' level of empathy, and to evaluate the effect of Andrews University's nursing students' community engagement activities on the community's perception of empathy. **Method:** Andrews University School of Nursing sought a partnership with Benton Harbor High School (BHHS) through the Andrews University Community Engagement Office. With the approval of the BHHS and parents of BHHS students, School of Nursing Students (NS) completed 5 visits to BHHS for the service-learning project. The project consisted of ice-breaker sessions; hands-only CPR training; one to one bonding experiences; First Aid training; and a project completion celebration event. NS completed cultural competency, mentoring, and applicable health training before the start of the project. They also completed the Empathy Quotient (EQ) questionnaire pre and post-project implementation. BHHS student volunteers completed pre and post knowledge questions related to first aid and hands-only CPR. Both groups had focus group interviews pre and post-project. Pre and post-test scores for EQ and knowledge questions were compared using t-tests. Focus group interviews were manually analyzed by themes. The project was completed during 1-hour sessions on 5 Fridays in the Fall 2018 semester. **Results:** 15 NS participated in the project and 13 successfully complete the project. Though 23 BHHS students volunteered for the project, only three completed the project. Initial analysis revealed no significant difference in the NS EQ scores for empathy. The number of BHHS students who completed the project made knowledge scores comparison difficult. There was an observed increase in scores from the three students that completed the project. NS and BHHS students made positive and encouraging comments about the service-learning project via the focus interviews. **Limitations and Plans:** Empathy is part of the nursing profession, so this may account for the lack of increase in NS EQ scores observed in the project. There were competing activities during the project implementation at BHHS, and this may account for decreased participation. The number of interactions may not be sufficient to see tangible results. We plan to conduct a needs assessment at BHHS, increase the number of NS-BHHS students' interactions, and utilize a more sensitive indicator to measure the effect in future projects. **Conclusion:** The service-learning project is a worthwhile project that positively affected the lives of NS and BHHS students though there were no statistically significant results as assessed by these variables.

SOCIOLOGY

P-02 *Does Medical Crowdfunding Increase Social Inequality?*

Kristen Witzel, Assistant Professor of Sociology

In recent years, more Americans have turned to crowdfunding sites to help with medical bills and related expenses. Since its launch in 2010, the donation-based crowdfunding platform GoFundMe has raised over \$5 billion from its "community" of more than fifty million donors, with medical campaigns representing the site's largest category (GoFundMe.com, 2018). While GoFundMe promotes itself as a "digital safety net" (Harris, 2017), scholars have been less optimistic, claiming that medical crowdfunding may actually deepen existing social inequalities, by diverting attention from systemic problems in the health care system to campaigns based on individual appeal and worthiness. These evaluations of worthiness can be prejudiced by attitudes about race, age, or gender, and influenced by donor preferences for particular kinds of illnesses. Although many scholars agree that these variables are relevant to crowdfunding success, few studies have systematically examined them. The present study aims to address this issue by scraping data from the crowdfunding platform GoFundMe to create a database of all its medical crowdfunding campaigns in Michigan. Variables for gender, race/ethnicity, age, and illness type will be created and compared with measures of project support and project success to determine if inequalities exist.

P-03 *What Does Crowdfunding for School Shooting Victims Tell Us about Inequality?*

Kristen Witzel¹, Abigail D. Lopez², Malachi O. Regis², Aubrey Kibble², ¹Assistant Professor of Sociology,
²Undergraduate Student, Behavioral Sciences

Previous research on medical crowdfunding has suggested that it may deepen existing social inequalities, while drawing attention away from systemic problems in the welfare state. Few studies have examined the effect of race/ethnicity, gender, or age on crowdfunding success because these variables are not reported on most crowdfunding platforms. Our present study on the prevalence and success of crowdfunding campaigns for victims of school shootings has the potential to address this gap in the literature. Because school shootings are heavily publicized in the media, we can obtain nearly complete lists of victims, as well as biographical information from interviews and obituaries that provide more trustworthy data on race/ethnicity, gender, and age than could be obtained through analysis of crowdfunding campaigns alone. We also examine how injury status and community characteristics are associated with the prevalence and success of crowdfunding campaigns on the platform GoFundMe.com. Case studies of the 2018 shootings at Marjory Stoneman Douglas High School and Santa Fe High School (n=53) showed that teen victims raised more than adults, killed victims raised more than injured victims, male victims raised more than female victims, and killed white victims raised more than killed racial/ethnic minority victims. Unexpectedly, injured racial/ethnic minorities raised more than white injured victims. Community factors, including higher income and support for gun control, were also associated with more money raised for victims. We are in the process of expanding this study to include all high school shootings in the United States between 2010 and 2019.

SOCIAL WORK

P-04 *Disability and Belonging in the North American Division of Seventh-day Adventists*

Shannon M. Trecartin¹, Petr Cincala², Mikelle Wile³, ¹Assistant Professor of Social Work, ²Assistant Professor of World Mission, ³Graduate Student, Social Work

The Dimensions of Belonging Framework is used to explore church participation and experiences of belonging among people with disabilities. This poster draws on findings from the 2017/2018 Global Church Survey of Seventh-day Adventists living with various disabilities in the North American Division. Implications for improving congregations for persons with disabilities are discussed.

PSYCHOLOGY

P-05 *The Effects of Physical, Sexual, and Emotional Abuse on Social Development in Children*

Myshira Oliver, Graduate Student in Counseling Psychology

This literature review examines the effects of physical, sexual, and emotional abuse on social development in children. Over four million cases of child maltreatment are reported annually. The goal of this research is to help educators understand students who may be victims of abuse and their behaviors, and to help counseling psychologists understand as well as implement appropriate interventions for their clients. Understanding the effects of abuse is especially important for psychologists because abuse has lasting effects and early intervention with children could be key to reducing harmful effects.

P-06 *Spirituality and Life Skills and Their Relationship with Reasons for attending Four Selected Adventist Universities in Asia*

Jimmy Kijai¹, Rachelle E. Pichot², ¹Professor of Research and Statistical Methodology, ²Graduate Student, Educational Psychology

The purposes of this study are: (a) to report on the reasons for attending four Adventist universities in Asia; (b) to describe the universities' perceived influence on student development of spirituality and life skills; and (c) to determine if reasons for attending and perceived influence on development of religiosity and life skills may be related. Survey research methodology was the design used to collect data using printed questionnaires. We designed the questionnaire to elicit information on reasons for attending the universities, engagement in curricular and extra-curricular activities, and the extent to which the university influenced student development of life skills, spirituality and altruism. One thousand nine hundred and ninety-eight (1,998) students participated in this study. Approximately 50% selected these universities for their spiritual atmosphere and spiritual values. Students generally agree that the universities have positively influenced the development of their life skills (M=4.05, SD=0.59) and spirituality (M=4.15, SD=0.69). There are no significant class status or gender differences on these variables. There are some variation among the universities but the effect size is small ($\eta^2 \leq .05$). Approximately 15% of the variance on the linear combination of the development of religiosity and life skills are associated with the reasons for selecting Adventist universities.

ENGLISH

- P-07** *Negotiating the White Gaze: American Moor and Adaptation as Revision/Re-vision*
Vanessa Corredera, Associate Professor of English

This poster presents a work-in-progress: a comparative analysis of three versions of the play American Moor. In this performance, Keith Hamilton Cobb uses Shakespeare's Othello as a frame to tackle stereotypes about black masculinity and the ways they shape black men's everyday experiences. This meditation on race, Shakespeare, American culture and black masculinity's belonging (or lack thereof) directly confronts how white perceptions of blackness—the white gaze—delimit the roles black men can play in Shakespeare and in the society around them. Cobb's production insists on adaptation—a willingness to see both Shakespeare and black men differently—as a powerful response that allows for a re-vision of entrenched racial thinking. But the play itself stages the difficulty of adapting to new racial views, a difficulty the play's transformations across time and for different performance spaces exposes. This project explores the effects of the revisions undertaken as American Moor transforms for predominantly white audiences. Preliminary analyses suggest that the play's producers push for changes that make the audience's potential complicity in anti-black ideology less prominent. Yet Cobb's commitment to audience education via a range of strategies powerfully counters attempts to mute the play's racial polemic, which insists on a re-vision, a new vision, of race.

ART

- P-08** *Architectural Models of Khirbet 'Ataruz Conservation and Restoration Project*
Stefanie P. Elkins, Assistant Professor of Curriculum & Instruction

This project involves the conservation and restoration of seven architectural models from the archaeological site of Khirbet 'Ataruz, an Iron Age site in the country of Jordan. These models were brought to the Horn Archaeological Museum at Andrews University five years ago and have been undergoing cleaning and repair work. My Faculty Research Grant is allowing for the completion of the restoration process, primarily that of the largest architectural model – a nearly two foot tall cult stand that is covered with painted and modeled artistic motifs. In addition to assisting in restoration, the grant is covering the designing and building of mounts for the models so they may be properly and safely displayed when they are returned to Jordan. Lastly, the grant will allow me to travel back to Jordan with the models and oversee their installation at the Madaba Archaeology Museum, which will be their permanent home. Once in Jordan, I will provide educational materials about architectural models for the museum as well as help train the museum staff on how to care for the artifacts.

LIBRARY

- P-09** *Using Google Translate in Cataloging*
Xiaoming Xu, Cataloger, James White Library

Abstract: With limited staffing in cataloging and a robust global collection policy, original cataloging in many different languages is a huge challenge. One tool I use is Google Translate. This poster illustrates how this has benefited my cataloging in languages I do not know. **Goal:** Share a practical tool every cataloger can use. **Outcomes:** Catalogers can use Google translate in their cataloging.

ENGINEERING

- P-10** *Machine Learning Assisted ECL Sensor Analysis*
Hyun J. Kwon¹, Rodney Summerscales², Elmer Rivera³, Jonathan Swerdlow⁴, Mabio Cohelo⁵, Padma Uppala⁶, ¹Chair and Professor of Engineering, ²Associate Professor of Computing, ³Visiting Scholar of Engineering, ⁴Undergraduate Student, Computing, ⁵Graduate Student, Theology, ⁶Professor of Public Health

Current biosensor data analysis is based on calibration curves, which are generated based on a single key feature of the sensor signal, while other features in the biosensor are generally ignored. Inclusion of these ignored features allows us to make more informed predictions regarding unknown concentrations. In this work, a multimodal electrochemiluminescent (ECL) sensor was explored to improve on the data analysis using machine learning (ML) techniques. The multimodal ECL sensor data was collected for light intensity and electrochemical data in the Ru(bpy)₂⁽³⁺⁾/tri-n-propylamine system, and a disposable electrode was used as a sensor unit. The results from ML based analysis demonstrate the potential to replace the traditional calibration curve based method and have potential to improve development of low-cost point-of-care diagnostic devices.

- P-11** *A Map Seeking Circuit Approach to Approximating Field-line Curves in the Magnetosphere*
Carson O'Fallon¹, Jay Johnson², ¹Undergraduate Student, Engineering, ²Professor of Engineering

Using electron beam accelerators attached to satellites in Earth orbit, it may be possible to measure arc length and curvature of field-lines in the inner magnetosphere if the accelerator is designed with the capability to vary the beam energy. In combination with additional information, these measurements would be very useful in modeling the magnetic field of the inner magnetosphere. We have developed a method to approximate field lines based on a map seeking circuit algorithm that constructs a probability distribution for paths having a fixed length between two points given a set of observational constraints. Data gathered from firing an electron beam from space provides the initial and final points in space for this algorithm to run. The time required for the beam to reach earth constrains the length of the field line. The field-line curve can be further constrained by assuming a prior based on an existing field line model, which could be an empirical model based on average observations or a theoretical model that satisfies the equilibrium condition. This constraint will bias field lines that are "closer" to the prior so that field lines are selected that prefer a path that deviates the least from the selected field line. This path provides an approximation to the field line curve that can serve as a foundation to improve the underlying model.

- P-12** *Potential Compact Fiberboard From Combining Shredded Corrugated Cardboard and PET Water Bottles*
Joshua Lim Khye Shuen, Undergraduate Student, Engineering

Corrugated cardboard and plastic bottles (PET) can each be recycled; however the current research is looking at recycling both cardboard and PET into a new combined material. The current method of recycling corrugated cardboard is to shred and recombine the material to make new cardboard. According to the Container Recycling Institute (<http://www.container-recycling.org/>), only 7.5% of PET manufactured in the US and Canada are recycled. The sheer amount of corrugated cardboard and PET bottles can be recycled for other practical uses. Corrugated cardboard and PET bottles, when shredded and placed into a 3x3x6 inch mold, can be combined together and baked in an oven under compression. The shredded PET bottles will act as the combining agent to hold the shredded cardboard in the shape of a compact fiberboard.

PHYSICS

- P-13** *Astronomy from Ripples in Spacetime*
Tiffany Summerscales, Professor of Physics

The LIGO and Virgo detectors have made a total of 11 confirmed measurements of gravitational waves, the faint ripples in the fabric of spacetime predicted by Einstein's theory of general relativity. Ten of these gravitational wave events were caused by the inspiral, collision, and merging of a pair of black holes and the remaining event by a pair of neutron stars. These measurements have helped us learn about the objects that produced the gravitational waves. Regular candidate detections are now shared in real time with both astronomers and the public.

MATHEMATICS

- P-14** *Using Item Analysis to Identify Common Algebra Misconceptions*
Alma Navarrete Vargas¹, Lynelle M. Weldon², Lisa Johnston³, ¹Undergraduate Student, Secondary Math Education, ²Chair and Associate Professor of Mathematics, ³Undergraduate Student, Mathematics, Data Science and Biophysics

This research study was conducted with the goal of identifying which mathematical misconceptions are most commonly observed in student work on the last two exams of the remedial math curriculum at Andrews University. In the first phase, we sorted and scanned all the exams saved for about 15 years, then selected a random sample. Our random sample consisted of 600 "Linear" exams and 600 "Non-linear" exams. The second phase of the research consisted of data collection and analysis. In order to collect the data, we designed a framework that identified the question types on the exams and the corresponding question numbers on different exam versions. The data collection started with tallying incorrect exam responses and recording these by frequency. We then chose some questions to analyze in more detail and recorded these within the designated framework. The final analysis identified the prevalent mathematical misconceptions.

P-15 *Classifying Links Obtained by Strong Fusion*

Anthony Bosman¹, Gabriel Palacios-Worley², Benjamin Dronen², Jonathan Homan², ¹Assistant Professor of Mathematics, ²Undergraduate Student, Mathematics

Band fusion modifies a link by fusing together two components of the link with a band. The effects of fusion on link invariants has been studied and the fusion pathways between links have been tabulated. We extended this work with an analysis of the effects of strong fusion, a modified form of fusion that preserves the number of components of a link by introducing an unknotted component around the fusion band. In particular, we determine the exact effect of strong fusion on several link invariants including the Alexander polynomial, Jones polynomial, and their generalization of the HOMFLY polynomial. We determine values for which of these polynomials remain unchanged by strong fusion. We also studied the Q-polynomial, signature, and the xi invariant. The work on the orientation independent invariants, the Q-polynomial and the xi invariant, is original; the effect of strong fusion on signature and HOMFLY has been studied by Kaiser ('91), but we extend and compliment his results. We also used link invariants —including knottedness, linking number, and the dichromatic invariants of J. Hoste and M. Kidwell—to classify which links are the result of strong fusion, tabulating all such links with up to 9 crossings.

P-16 *Positive Solutions to a Developed Elliptic Model*

Joon Hyuk Kang, Professor of Mathematics

The purpose of this paper is to give the sufficient conditions for the existence and uniqueness of positive solutions to a rather general type of elliptic system of the Dirichlet problem on a bounded domain. Also considered are the effects of perturbations on the coexistence state and uniqueness. The techniques used in this paper are super-sub solutions method, eigenvalues of operators, maximum principles, spectrum estimates, inverse function theory, and general elliptic theory. The arguments also rely on some detailed properties for the solution of logistic equations. These results yield an algebraically computable criterion for the positive coexistence of competing species of animals in many biological models.

P-17 *Recent Developments of V^T -rectifying Submanifolds*

Yun Oh, Associate Professor of Mathematics

The idea of rectifying curves in E^3 was introduced in 2003 by B.-Y. Chen, and he extended the notion to the rectifying submanifold in E^n in 2016. The following year he introduced the rectifying submanifold in an arbitrary Riemannian manifold associated with a torqued vector V . In this talk, we investigate another idea of rectifying submanifold in terms of the normal component of a torqued vector field V . Some recent results will be discussed.

CHEMISTRY

P-18 *Copper(II) Ion Sequestration by PAMAM-octyl Dendrimers*

Ryan T. Hayes¹, Lauren Bitterman², ¹Professor of Chemistry & Biochemistry, ²Undergraduate Student, Chemistry

Nanomaterials, such as dendrimers, are currently being evaluated for new products because of their unique size, properties, and reactivities. Dendrimers can act as nanocontainers to entrap materials within the interior of their highly branched polymeric structure. We have developed a General Chemistry laboratory experiment that utilizes Generation 2-PAMAM-octyl surface dendrimers to entrap copper(II) ions. These dendrimers were able to transfer transition metal ions, such as copper(II) ions, from an aqueous solution into the non-polar solvent, dichloromethane. The transition metal was then released from the dendrimer structure by lowering the pH of the solvent mixture. The previous laboratory experiment provided a capstone activity that highlighted a variety of General Chemistry topics along with an introduction to Organic Chemistry. This project focuses on quantitating the copper(II) sequestration by these same dendrimers and would make an informative activity for an upper-division analytical chemistry project in an undergraduate curriculum. We have developed a method to quantitate the amount of copper(II) ions that are being bound by the octyl-dendrimer using ICP spectroscopy. This research project provides a quantitative assessment of the copper(II) ion binding capacity within the octyl-dendrimers and shows how nanomaterials could be a valuable tool for selective heavy metal remediation.

P-19 *Anticancer Activity of Heteroaromatic Cyanostilbenes*
Joshua Rotich, Graduate Student, Biology

Cancer is currently the second leading killer disease. There are many different kinds of cancer that are associated with almost every organ in the human body (e.g., brain cancer, colon cancer, breast cancer, prostate cancer, blood cancer, lung cancer, etc.). In the Biology Department, Dr. Smith and Dr. Murray are researching glioblastoma brain cancer cells. Glioblastoma is a very invasive cancer that is highly lethal. Chances of not surviving when its at stage four is more than 98%. Detecting this cancer while it is developing is difficult because symptoms are mild headache, fatigue, nausea and slight loss of weight. By the time one gets blurred vision, the cancer is already at stage four, and at this stage, it generally kills in less than three months if not treated and in thirteen months if treated. The major challenge with this type of cancer is that it cannot be treated using chemotherapy or radiotherapy. Furthermore, it is aggressively invasive. To date, there is no cure, and not more than 3% of those diagnosed have lived more than three years. There are compounds which have shown anticancer invasion properties. Some include stilbene, benzoamidazole and benzothiazole acetonitrile. In my research, I will be synthesizing a hybrid drug—hybrid because it is made of two compounds which have shown anticancer invasion activity. Once I synthesize the drug, I will use glioblastoma cells in the lab to test the activity of the drug.

P-20 *Characterization of CgX Tautomerase and Mutants with Acetylenecarboxylic Acid*
Daniel Chi¹, Karen Draths², Amaya Sirinimal³, ¹Undergraduate Student, Chemistry, ²Assistant Professor of Chemistry, Michigan State University, ³Graduate Student, Chemistry, Michigan State University

In the production of commodity chemicals through microbial synthesis, the use of renewable sugars as a raw material is increasingly common. However, this generates competition between its use in the chemical industry and the food industry. Therefore, developing alternative biosynthetic pathways involving other renewable feedstocks to replace starch-derived feedstocks is crucial. CgX, a tautomerase native to *Corynebacterium glutamicum*, catalyzes the hydration and subsequent decarboxylation of acetylenecarboxylic acid (ACA), a compound that can be produced from methane gas and carbon dioxide, both abundant greenhouse gases. The products formed from the CgX (wild-type)-catalyzed reaction of ACA results in a mixture of malonic semialdehyde and acetaldehyde. Six amino acids have been identified as the catalytic residues. The research project involves monitoring the formation of products and building product profiles, in addition to kinetic characterization, of various mutants of CgX. In addition to the six critical amino acids, Q5 site-directed mutagenesis will be used to generate other mutants of CgX. In this presentation, the synthesis methodology and the products formed, as determined by NMR, will be discussed. In addition, results from kinetic studies using coupled enzyme assay will be presented.

BIOLOGY

P-21 *Function and Origin of Pseudoenzymes within the Metalloprotease Family*
Peter Lyons¹, R. Christian McDonald², Daniel Fajardo³, Constantia Atmadja³, ¹Associate Professor of Biology, ²Graduate Student, Biology, ³Undergraduate Student, Biology

The M14 family of metalloproteases (MCPs) is a large family of proteins. Most of these proteins function as proteolytic enzymes by trimming specific amino acids from the carboxy termini of substrate proteins. However, several members of this protein family lack enzymatic activity due to the substitution of critical active site amino acids. These pseudoenzymes are poorly characterized due to the lack of enzymatic activity. Recently we have attempted to learn more about the function of two such pseudoenzymes, *S. cerevisiae* Ecm14 and *D. rerio* Cpxm1a. In order to investigate the function of Ecm14, we employed a synthetic lethal assay, in which random mutagenesis of yeast was used to identify genes whose function was required in the absence of Ecm14. Screening of 27,000 yeast identified 22 putative synthetic lethal mutants which are currently being analyzed. In order to investigate the function of the vertebrate pseudoenzyme, Cpxm1a, we obtained a zebrafish containing a point mutation that resulted in the premature truncation of the protein. Following development of a genotyping method, we have begun the preliminary characterization of a craniofacial phenotype in this organism. It is apparent that pseudoenzymes have important function in biology. The origin of these functional pseudoenzymes is thought to be the duplication of an active enzyme gene followed by mutation. Through an analysis of the almost 200 vertebrate genomes found in the Ensembl database, we have identified many unique MCP gene duplications, with the expectation that some will encode new enzymes or pseudoenzymes.

P-22 *Exploring the Role of Carboxypeptidase O in Chylomicron and Lipid Droplet Formation*

Erika Bauza Nowotny¹, Peter J. Lyons², ¹Graduate Student, Biology, ²Associate Professor of Biology

Carboxypeptidase O (CPO) cleaves acidic and polar C-terminal amino acids of peptides and proteins; however, its biological function remains unknown. At the subcellular level, CPO is anchored to the inner leaflet of the endoplasmic reticulum (ER) membrane and associated with lipid droplets. The ER membrane is the site of lipid droplet and chylomicron formation, the latter of which occurs only in the intestine where CPO is expressed. This study aims to determine if CPO has a role in chylomicron formation, and to explore the intracellular function of CPO through the identification of its binding partners and substrates. To do so, we have made an inactive CPO mutant by site-directed mutagenesis. Transfection of human colon carcinoma (Caco-2) cells with plasmids expressing wild-type and mutant CPO, as well as GFP as control, has been successful. However, selection of cells stably-integrating this DNA is currently being optimized in preparation for immunocytochemistry to assess any differences in the amount of lipid droplets and chylomicrons that associate with CPO. Immunoprecipitation and tandem mass spectrometry will be used to identify binding partners and substrates.

P-23 *Exploring Soil Texture Effects on Mustard Seed Meal Suppression of the Weed Velvetleaf*

Robert Zdor, Professor of Biology

The use of mustard seed meal (MSM) as a biofumigant in managing weeds in agricultural settings has been well documented. However it has been suggested that soil types may differ in their ability to foster the deleterious effects of the meal on undesirable plants. Work with MSM in altering velvetleaf seedling soil growth has shown that certain soils were better suited for weed suppression than other soils. The most effective soils had elevated levels of sand in comparison to less effective soils. Furthermore enriching the sand content in soil resulted in reduced seed germination and growth. It is hypothesized that elevated sand content in soil creates air spaces resulting in the effective diffusion of inhibitory volatile MSM compounds throughout the soil and maximizing seed/seedling contact with these compounds. In contrast soil mixtures with elevated silt/clay content should result in less weed inhibition by MSM due to reduced diffusion of volatiles. Experimental results testing this prediction will be discussed.

P-24 *Correlating a Behavioral and Neuronal Response in an Insect Model*

Benjamin Navia¹, Brandon Shin², ¹Professor of Biology, ²Undergraduate Student, Biology

Phonotaxis in female cricket *Acheta domesticus* can be selective or unselective in response to model calls with varying syllable periods. Discriminating a call and walking towards it implies that networks of neurons are activated when the call is recognized as attractive. Several approaches to demonstrate the influential role of auditory neurons in phonotaxis have been used with different levels of success. The current study seeks to evaluate the behavioral and neuronal responses in the same animal, using identical auditory stimuli. This approach allows us to establish a correlation between the neuronal and behavioral responses, and to predict the behavior of the animal based on the response of an auditory neuron. Several auditory neurons in this model have been identified and proposed to play an influential role in phonotaxis. The L3 prothoracic auditory neuron has been proposed to influence selective phonotaxis in this species. In response to calls with attractive syllable periods, the L3 produces a burst of action potentials, which diminish in response to consecutive syllables. Such a decrease is calculated as percentage and is called decrement. Preliminary results suggest syllable periods which produce positive phonotaxis, also elicit higher decrement values in the neuronal response of the same animal. In the lab, 5-10 day-old virgin females are more likely to respond phonotactically to calls with syllable periods ranging between 50 and 70 ms. Females older than 20 days, exhibit more variability in the range and number of syllable periods they respond to, which may or may not overlap with the range indicated for young ones.

- P-25** *Characterization of Side Scan-sonar Images Produced by Amazonian River Dolphins (Inia Geoffrensis) to Reduce Potential Confusion during Surveys of Amazonian Manatees (Trichechus Inunguis)*
 Daniel Gonzalez-Socoloske¹, Camila Carvalho de Carvalho², Miriam Marmontel³, ¹Associate Professor of Biology, ²Student, Laboratório de Ecologia e Conservação da Megafauna Marinha-EcoMega, ³Researcher and Lab Director, Amazonian Aquatic Mammal Lab

Side-scan sonar (SSS) has been successfully used to detect West Indian and African manatees; however, sonar images of Amazonian manatees have yet to be obtained. One potential difficulty is differentiating manatee images from other large aquatic vertebrates. The Amazonian manatee shares its habitat with two cetaceans, the Amazonian River dolphin (ARD, *Inia* spp.) and the Tucuxi (*Sotalia fluviatilis*). In this study we characterize the sonar image produced by the ARD and note their behavior during surveys for Amazonian manatees. Boat surveys using SSS were conducted during the high (15-30 July 2017 and 17-21 March 2019) and low (13-21 December 2017) water seasons in Amanã Lake, Amazonas, Brazil. ARD acoustic images contain sharper angles and narrower shadows compared to manatees. At slow speeds (1-3 km/h), the shadow resembles an ARD, with a low profile dorsal fin, a narrow beak, and a narrow tail with a fluke. At faster speeds (4-5 km/h), the acoustic image can be elongated with a wavy tail due to the ARD swimming alongside the boat. ARD in Lake Amanã repeatedly followed our boat for kilometers during several hours, swam under the boat and approached the SSS transducer, suggesting they could hear the sonar, but were not distressed by it. ARD were usually seen in small pods (1-4); however, several pods would aggregate over time in relatively large numbers (10-20). In conclusion, ARD acoustic images have unique characteristics and can be reliably distinguished from known manatee acoustic images, though care must be taken when surveying for Amazonian manatees.

- P-26** *Preliminary Data for How Manatees (Trichechus Manatus Manatus) Locate Food in Their Natural Environments*
 Amanda Moore¹, Daniel Gonzalez-Socoloske², ¹Graduate Student, Biology ²Associate Professor of Biology

Manatees, which are members of the order Sirenia, are completely aquatic herbivores. How manatees find their food in their natural habitats remains unknown. It is unlikely that manatees use tactile cues or auditory cues to find food given their herbivorous lifestyle; however, tactile cues likely play a role in the decision to consume a plant once it has been located. It is therefore likely that manatees either find food using visual or chemical cues and the use of both provides increased efficiency in finding food. Additionally, manatees may find food recalling where food has been found before. To test the sensory modalities that Antillean manatees (*Trichechus manatus manatus*) use to find food, a field study was conducted in Bocas del Toro Providence, Panama. Sensory modalities used to find food were tested for long distance and short distance detections. Short distance detection was examined by testing visual, chemoreceptive, and visual + chemoreceptive cues using dichotomous choice trials where food items were placed in a plexiglass box next to a plexiglass box without food items. The plexiglass box containing food was randomized to prevent bias or memorization. Long distance detection was examined by testing chemoreception and chemoreception + visual cues. The amount of time required to find the food was measured. To avoid the potential effect of memorization, plexiglass boxes were placed in random locations within their natural habitat. Choice experiments and long-distance time trials will be compared to control settings to determine the efficiency of these two modalities in isolation and combined.

- P-27** *Predator-Prey Dynamics of Eagles and Gulls at Protection Island, Washington*
 Shandelle Henson¹, James Hayward², ¹Professor of Mathematics & Ecology, ²Professor Emeritus of Biology

Bald Eagle populations in North America recovered in the latter part of the twentieth century in response to the outlawing of pesticides such as DDT and increased protection. An unexpected consequence of this recovery, however, was a negative impact on seabirds which serve as prey items for Bald Eagles. During the 1980s, few Bald Eagles visited a large Glaucous-winged Gull colony on Protection Island, Salish Sea, Washington, and breeding gull numbers in this colony rose rapidly during the late 1980s and early 1990s. A noticeable increase in Bald Eagle activity ensued in the 1990s, followed by a large decline in numbers of nesting gulls. We set out to determine if trends in the gull colony could be explained by eagle activity. To accomplish this, we fit a Lotka–Volterra-type predator–prey model to gull nest count data and Washington State eagle territory data collected during most years between 1980 and 2016. Our model fit the data with a generalized $R^2 = 0.82$. This result supports the hypothesis that gull dynamics and eagle population dynamics are linked. Although point estimates of the model parameters indicated a high possibility of stable coexistence, within the 95% confidence intervals for the parameters, 11.0% of bootstrapped parameter vectors predicted gull colony extinction. These results suggest that the impact of Bald Eagle activity on the dynamics of this gull colony could be explained by a predator–prey relationship that included the possibility of coexistence, but also included the possibility of gull colony extinction.

P-28 *Seasonal Variation in Diet of Thirteen-lined Ground Squirrels in Southwestern Michigan*

Austin Menzmer¹, Tom Goodwin², ¹Graduate Student, Plant Sciences, University of Georgia, ²Professor of Biology

Thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*) are omnivorous rodents known to eat a variety of plant and animal matter. Prior work on a population of these ground squirrels in southwestern Michigan hypothesized a sharp shift in diet in late summer, from a diet rich in C₃ plants to one rich in C₄ plants. This hypothesis was based on an abrupt shift in the carbon isotope composition of teeth from squirrels collected in the region but has not been directly confirmed. Here, we present more direct data on diet, based on isotopic evidence and microhistological analysis of fecal samples collected from squirrels. These data confirm that squirrels in a local colony shifted diets during the study season. From June to mid-July, squirrels ate abundant arthropods and C₃ vegetation. In August and later, squirrels ate few arthropods and abundant C₄ vegetation. The latter observation supports the hypothesis originally developed to account for a carbon isotope shift in teeth.

J.N. ANDREWS HONORS PROGRAM

P-29 *Is Natural Selection Shaping Florida Manatees? An Investigation into the Body Shapes Between the Subspecies of the West Indian Manatee*

Juliane Johnson¹, Daniel Gonzalez-Socoloske², ¹Undergraduate Student, Biology, ²Associate Professor of Biology

The West Indian manatee (*Trichechus manatus*) is currently divided into two subspecies: the Antillean (*T. m. manatus*) and Florida manatee (*T. m. latirostris*). Florida manatees (FM) are found at the northern extreme of the species range, primarily inhabiting the waters around the Florida peninsula, while the Antillean manatee (AM) inhabits the remaining range from the Caribbean islands to western Brazil. Water temperature drops below 20°C during the winter in Florida, and these manatees have to seek warm water refuge for thermal regulation. Allen's rule predicts that in colder climates animals will adapt to have smaller surface area to volume ratios (SA:V). It has been reported that on average, FM are larger in absolute body size than AM. However, no one has explored differences in body shape independent of size between the two subspecies. This study proposes that FM have stockier body shapes (smaller SA:V) compared to AM. Data on FM morphometrics (n=543) were obtained from the Florida Fish and Wildlife Commission, while AM measurements (n=90) came from live captures in Quintana Roo and Tabasco, Mexico. SA:V was calculated by creating a geometric model of manatee shape using the standard morphometric measurements. SA:V of FM was significantly smaller even when controlling for body length (p=0.004). It appears natural selection has not only increased the body size of FM, but also altered the body shape in relation to AM. Our results lend further support for Allen's rule and indicate that FM and AM are diverging on separate adaptive trajectories.

P-30 *A Comparative Study of ESL Children's Improvement in Reading, Writing, Listening, and Speaking Using the GrapeSEED Program*

Morgan Mainess¹, Darah Regal², ¹Undergraduate Student, Communication Sciences and Disorders, ²Assistant Professor of Audiology

GrapeSEED is a program currently administered in the Berrien Springs Public School System that is specifically designed to improve literacy, listening, and speaking skills for English as a Second Language (ESL) children. This study analyzed whether the GrapeSEED program would significantly improve participants' development when compared to their pre-tests. Empirical observational data was additionally collected at Mars Elementary during the 2018-2019 academic year. Statistical analysis indicates significant advancement in listening and literacy with increased improvement for younger participants in the GrapeSEED program.

P-31 *Tales of Minden, Louisiana: Collecting and Compiling the Elkins Family Oral Tradition*

Elizabeth Bates¹, Sonia Badenas², Beverly Matiko³, ¹Undergraduate Student, English & Anthropology, ²Associate Professor of French, ³Associate Professor of Communication and English

The oral tradition is often undervalued in comparison with its sister arts of the written and performed word, especially those which claim the title "true." Yet these tales have inherent value through the connections they create between those who tell them and the people and places featured in their stories. The purpose of this project is to preserve the oral tradition of the Elkins family of Minden, Louisiana, through the collection and editing of three stories. To determine which stories constitute family lore, four of five siblings of the eldest generation of Elkins were interviewed. Their stories were recorded and transcribed. From the transcriptions, motifs were identified, and three cohesive stories were created and published for redistribution among the Elkins family and the public.

P-32 *Capturing Oral Voice*

Jessica Bates¹, Douglas Jones², ¹Undergraduate Student, English, Mathematics & Spanish, ²Professor Emeritus of English

The sound of a narrator telling a story can be difficult to depict in written prose, and yet both Ovid and Twain were able to capture the sound of an old man telling a story; Twain in “The Celebrated Jumping Frog of Calaveras County” and Ovid through “Nestor’s Story” in *The Metamorphoses*. Ovid’s *The Metamorphosis* involves several stories within a story and utilizes a more “chaotic” structure than other epics, allowing him the freedom to capture Nestor’s rambling. Nearly two centuries later, Twain uses a frame story, but unlike other contemporary works, he respects the subject’s style of speaking and represents both the dialect and the rambling way of which the narrator communicates.

POST-DEADLINE SUBMISSIONS

P-33 *Women and Cyclical Contentious Politics in Madagascar*

Joel Raveloharimisy, Director, Community & International Development Program, Associate Professor of Community & International Development

The purpose of this research is to analyze and create a typology of women’s involvement in contentious politics. There is a gap regarding this issue in the literature because most studies within sociology and the gender and politics literatures have significantly focused on the experiences in North America, Western Europe, and some developing countries. However, in developing countries that tend to be less democratic, many women participate in protest movements. They participate as citizens and activists, side-by-side with men, not necessarily with a women’s rights agenda. I chose a stylized approach and explaining-outcome process tracing method to conduct the analysis using Madagascar as a case study. Madagascar has experienced six major political crises since its independence in 1960. Malagasy women who are political activists have been significantly involved in these events. Through this case study, I am striving to focus more on the contextualization of women’s political activism instead of generating a broad theory generalization. A case study will provide an in-depth and multi-faced understanding of a complex issue in its real-life context because women’s collective actions can have the potential to generate positive changes that have far-reaching consequences for the society.

P-34 *Does Parental Environment Interact with Social Media Use and Well-being in Emerging Adulthood?*

Christiana D. Atkins¹, Cooper B. Hodges², Samuel E. A. Lewin¹, Amante J. Gonzalez¹, Karl Bailey³, ¹Graduate Student, Counseling Psychology, ²Graduate Student, Neuroscience, Brigham Young University, ³Professor of Psychology

Researchers have found recent generational changes in adolescent behaviors that suggest adolescents (ages 13-19) are reaching adult milestones at later times than previous generations. Emerging adulthood has been suggested to be a period of time between the ages of 18 and 25 that has been developed to be a distinct period from adolescence and young adulthood. The way you were raised has been found to have an impact on adult functioning and well-being. Recently, a revised questionnaire has been validated for use with emerging adults that can be used to examine retrospective perceptions of parental environment factors. Social media use has become a common behavior of emerging adults. Research on the relationship between social media and well-being has been found to be complex in that researchers have found both positive and negative outcomes of social media use. We hope to use new measures to clarify the relationship between parental environment, well-being and social media use in a sample of emerging adults. The results could better inform recommended parenting practices and social media practices while also helping us better understand the generation currently experiencing emerging adulthood.

ORAL PRESENTATIONS

A - Religion (Buller Hall, Room 108)

A-1 *Improving Biblical Language Teaching and Learning with BibleOL*

Oliver Glanz¹, Rodney Lee Summerscales², ¹Associate Professor of Old Testament, ²Assistant Professor of Computing
3:00 pm

Biblical Hebrew and Greek can be challenging languages for students. Practice with the language is essential. BibleOL is an online learning environment that allows students to practice Biblical Hebrew/Greek grammar and translating Biblical Hebrew/Greek texts. This tool has been effective for improving students' mastery of Hebrew/Greek. We have collected performance data of Hebrew students from 2016-2018 at the Seventh-day Adventist Theological Seminary. Our statistics show that the average student performs 11% better (approximately a letter grade) when BibleOL was utilized as a major learning tool in the course. One reason for the performance difference is that BibleOL enables students to use their learned vocabulary and grammar in real Hebrew/Greek Bible passages. In addition, students only get graded for their best exercise run. This stimulates students to repeat exercises until they are satisfied with their grade (gamification effect). Our current work involves adding an examination mode to BibleOL. This new feature would allow English, Spanish, German speaking seminaries and institutions to automatize their Hebrew/Greek exams and quizzes. This work is conducted by an interdisciplinary and international team. It includes Seminary and Computer Science students and faculty, as well as developers from Europe. We will demonstrate the progress we have made by showcasing our semi-automated exam production process and our automated grading process.

A-2 *Binding of Isaac: Silence is Not the Last Word*

Arlyn Drew, Graduate Student, Theology & Christian Philosophy
3:15 pm

"Not all Hebrew narrative is a version of the Binding of Isaac, with its stark conjunction of fire, wood, knife and impending sacrifice, its breathtaking violation of human conceptions in man's terrible exposure before God." Yet, Abraham's test strangely remains mysteriously silent, ambiguous, undifferentiated, and according to Eric Auerbach, *fraught with background*. Jacques Doukhan carefully delineated the literary chiasmic structure of the narrative which revealed "human questions and silences at the center." Soren Kierkegaard depicted Abraham as a *silent knight of faith* since nobody could understand him, demonstrating the religious *teleological suspension of the ethical*. Jacques Derrida's deconstruction of Abraham's silence led him to believe God's purpose was to test whether Abraham could keep this secret a secret. Usually secrets protect a shared truth, but Abraham didn't know the secret at the center of their secret, the *why* behind the divine order. Thus, according to Derrida, Abraham's costly obedience hung only on the unique singularity of their bond without shared meaning. Is the final legacy of the Binding of Isaac to be isolated silence? I believe God's final words in the test of Abraham out-derrida Derrida, deconstruct his deconstruction, in other words, subtly expose what was assumed by Derrida to be hidden beyond reach. The *supplement* of Genesis 22:15-18 shows *traces* of six of the seven covenant revelations. The Binding of Isaac appears to be a customized summative, evaluative, diagnostic and formative test. God tested Abraham by a covenant crisis to *elicit* a paternal integrated covenant response from the divinely trained Abraham. If this Covenant Hypothesis is true, Abraham passed his test with a B.

A-3 *Faith, Politics, Utopia, and Deception: The Messiah Is Here*
Bordes Henry Saturne, Associate Professor of Educational Leadership
3:30 pm

Jesus stated that “My Kingdom is not of this world” (John 18:36). Many of his followers, however, have found it impossible to resist the temptation of seeking to establish on this planet a “Christian kingdom” based on their religious ideologies. For centuries, many leaders have tried to enlist the power of money and politics, even the leverage of legislation or the resources of the military, to impose on the larger community their understanding of the “will of God.” They have often been looking for a “messiah” who would seize power and coerce others to comply to “authentic” Christianity. A. Romano wrote, “America is desperate for a messiah” (*Newsweek*, 2011). D. Trump promised in 2016 to “make America great again.” Many Christians see him as the champion who would use the Supreme Court, executive orders, and congressional legislative power, to restore America as a Christian nation. A prominent pastor stated the Donald Trump is “anointed” by God and compared him to Cyrus. Trump, in 2019, referred to himself as “the chosen one” and the “King of Israel.” Is he a cunning impostor taking advantage of gullible believers? Are the religious leaders so eager to gain political power that they are ready to compromise their integrity? Are we observing the desperate efforts of a group of believers trying to make a utopia become a reality? That stimulating conversation will force us to reflect on critical issues and, perhaps, may contribute to making us all stronger ethical leaders in our respective settings.

B - Education & Wellness (Buller Hall, Room 251)

B-1 *Factors Influencing Motivation for Faculty Participation in Professional Development in the Area of Teaching*
Anneris Coria-Navia¹, Scott Moncrieff², ¹Associate Professor of Curriculum & Instruction, Director of the Center for Teaching and Learning Excellence, ²Professor of English
3:00 pm

Faculty participation in professional development in the area of teaching varies greatly by institution. While the most important motivations for improved teaching are internal, the literature shows that institutions use incentives ranging from awards to release time advancement to motivate improved teaching. These incentives target a large range of factors that may influence motivation for faculty engagement in development programs with the purpose of increasing participation. Larger and more resourceful institutions generally offer more robust incentives for participation. The nature of small liberal arts institutions with financial constraints often prevents them from such developed systems of incentives. However, there are not enough studies that conclusively inform faculty developers what factors actually motivate faculty to participate in professional development activities in the area of teaching. This mixed methods study seeks to document the motivation to participate in faculty development in four small liberal arts institutions and two large research institutions. We will focus on the literature review and the methodology in this presentation.

B-2 *Environmental Health Landscape of Berrien County: A Multi-media Analysis*
Padma P. Tadi Uppala¹, Jean Cadet², ¹Chair, School of Population Health, Nutrition & Wellness, ²Graduate Student, Seminary
3:15 pm

Understanding the connection of the environment to health is a critical pathway to begin addressing health disparities and poor health outcomes in communities. This study investigates the environmental determinants of health for a community health needs assessment for Berrien County, Michigan. We examined environmental contaminants in land, air, and water to gain an understanding into the types of contaminants that are released or are present at sites throughout the county. We assessed sources of information for potentially contaminated sites on land in these categories: 1) Toxic Releases, 2) Environmentally-impacted Sites (Land Reuse Sites), 3) Berrien County Brownfields, and 4) Underground and Above-ground Storage Tanks. There are 18 toxic release facilities in Berrien County. The on-site and off-site disposal or other releases in Berrien County total 145,400 pounds. While 0 pounds of releases were reported on land, 36,700 pounds of on-site releases to air and 67,500 thousand pounds of on-site releases to water were reported in 2017 (United States Environmental Protection Agency). The off-site releases totaled 41,200 pounds. Michigan is ranked 18 out of 56 states/territories nationwide based on total releases per square mile. In addition, we created GIS maps overlaid with all-cause mortality data. Zip codes surrounding the Benton harbor area seem to have the highest number of contaminated sites and high mortality rates. Further studies are need to investigate the relationships between toxic release sites and mortality rates.

B-3 *Psychological Perceptions of Disaster Misconceptions: Exploring the Acceptance of Disaster Myths in Relation to Psychological Well-being, Resilience and Conspiracist Ideation*

Harvey Burnett¹, Karl Bailey², Rachelle E. Pichot³, ¹Chair & Associate Professor of Psychology, ²Professor of Psychology, ³Graduate Student, Educational Psychology
3:30 pm

This exploratory study examined psychological wellness and resilience as predictors of conspiracist beliefs, disaster response beliefs, and disaster misconceptions beliefs. Data was collected from 300 participants through Amazon's MTurk. These individuals completed a demographic questionnaire; for Misconception Measures the Myth and Misconception Propositions about Disasters Questionnaire (Alexander, 2007), Beliefs about Disaster Response (Wenger et al., 1975), and Generic Conspiracist Beliefs Scale (Brotherton et al., 2013); for Resilience Measures the 10-item Connor-Davidson Resilience Scale (Campbell-Sills & Stein, 2007), Beliefs about Resilient Behaviors subscale from the Behavior in Mass Emergencies Questionnaire (Drury et al., 2013); and for Psychological Wellness the 2-item Perceived Stress Scale (Buchanan & McConnell, 2017), Spiritual Well-Being Scale (Paloutzian & Ellison, 1991), Brief Symptom Inventory 18 (Degroot, 2000), and 10-item Personality Inventory (Gosling et al., 2003). The M_{age} of participants was 33.6 years ($SD = 10.0$), ranging between 18 and 68 years. Hierarchical regressions revealed that stress, media use, resilience, disaster response beliefs, and disaster misconceptions beliefs contributed significantly to one or more models predicting disaster response beliefs ($R^2 = .64$), disaster misconceptions beliefs ($R^2 = .56$) and conspiracist beliefs ($R^2 = .35$). One implication is that stress could be managed in order to decrease these beliefs.

B-4 *Social Networks in Diverse K-12 Classrooms*

Anneris Coria-Navia¹, Luana Greulich², ¹Associate Professor of Curriculum & Instruction, Director of the Center for Teaching and Learning Excellence, ²Chair, Teaching, Learning, and Curriculum Department
Associate Professor, Special Ed Program Coordinator
3:45 pm

The study of social relationships in K-12 classrooms and schools remains of interest to the field of education, yet the research is underdeveloped and underutilized. Social network analysis (SNA) provides the structure for answering questions concerning peer relationships and how those relationships shape the students' experience in the school setting. Understanding relationships through the mapping of interactions is valuable information for educators and students. This is particularly true for students with disabilities and learning differences. This research project will study the way relationships form and develop in K-12 classrooms with diverse populations, particularly focusing on students with disabilities and learning differences. Observations, surveys and interviews will be used for data collection in order to present the basic network structure quantitatively and qualitatively, which includes but it is not limited to social and academic networks of students in select diverse K-12 classrooms. This study will also seek to identify central and peripheral actors as well as the characteristics and perceived reasons that students operate in a position of influence or in the periphery of the network. In this presentation we will focus on the literature review and the methodology of this research study.

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Upcoming Research Events

Andrews Autumn Conference on Religion & Science

November 1-2, 2019, Seminary, <https://digitalcommons.andrews.edu/aac/2019/>

Leaders of the Field Conference (Graduate Psychology & Counseling)

November 8, 2019, Buller Hall, <https://www.andrews.edu/sed/gpc/>

Fall Honors Thesis Symposium

December 3, 2019, Buller Hall, <https://www.andrews.edu/services/honors/>

Seminary Scholarship Symposium

February 4, 6-7, 2020, Seminary, <http://digitalcommons.andrews.edu/sss/>

Music & Worship Conference

February 13-15, 2020, CYE, <https://www.cye.org/ministries/music--worship>

Honors Scholars & Undergraduate Research Poster Symposium

February 28, 2020, Buller Hall, <https://digitalcommons.andrews.edu/honors-undergraduate-poster-symposium/>

Medical Laboratory Science Research Symposium

March 5, 2020, Chemistry Amphitheater, <https://www.andrews.edu/chhs/mls/>

Michigan Academy of Science, Arts and Letters (MASAL)

March 13, 2020, Lawrence Technological University, <https://www.alma.edu/offices/michigan-academy/>

AU Teaching and Learning Conference

March 26, 2020, <https://digitalcommons.andrews.edu/autlc/2020/>

E. G. White Symposium

April 6, 2020, <http://digitalcommons.andrews.edu/scs/>

Honor Thesis Symposium

April 10, 2020, Buller Hall, <https://www.andrews.edu/services/honors/>

Michigan High School Math & Science Symposium

April 2020, Buller Hall, <http://www.berrienresa.org/cms/One.aspx?portalId=148604&pageId=414230>

Andrews Research Conference: Early Career Researchers in the Social Sciences

June 16-17, 2020, Buller Hall, <http://digitalcommons.andrews.edu/arc/>

Adventist Human-Subject Researchers Association Conference

June 17-20, 2020, Buller Hall, <https://digitalcommons.andrews.edu/ahsra/2020/>