


Eighth Annual Andrews University

Celebration of Research & Creative Scholarship

PROGRAM AND ABSTRACT BOOK

November 4, 2016 | Buller Hall



At Andrews University, research is an inextricable part of the education experience... It informs our commitment to knowledge, faith and service.
~Andrea Luxton, President

Presidential Inaugural Event

1874 | NEXT CHAPTER
OUR STORY | 2016

WELCOME

Welcome to the **Eighth Annual Andrews University Celebration of Research and Creative Scholarship.**



The faculty and students at Andrews University have had a productive year pursuing research and creative scholarship. The breadth of these endeavors is demonstrated by the range of topics covered in today's plenary, oral, and poster presentations. Clearly, there is much to be celebrated at this year's event!

This year, we are celebrating the inauguration of Andrews University's new president, Andrea Luxton. As part of our celebration, during the plenary session, Dr. Luxton will be sharing with us her vision for the future of research at Andrews, ***Research: The Next Chapter***.

Three Plenary Presentations will be given by the 2016 *Siegfried H. Horn Excellence in Research and Creative Scholarship Award* recipients—Karl Bailey (Pure & Applied Sciences), Richard Choi (Religion & Theology), and Ann Gibson (Professional Programs). Stephen Zork, professor of Music, also received the Horn Award in 2016 (Arts, Humanities & Education), however, he is unable to join us today. Karl Bailey, professor of Psychology, will address the issue of internalizing religion and its effect on well-being. New Testament professor Richard Choi will offer six practical rules of research, relating to curiosity, creativity, and community. Ann Gibson, Professor Emerita in the School of Business Administration, will share how culture affects views on money.

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 in the Buller Lobby during our poster session, followed by four 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 March 3, 2017, to celebrate efforts of younger researchers at the Undergraduate Research Scholars and Honors Poster Session. To learn more, please visit www.andrews.edu/research.

Sincerely,

A handwritten signature in cursive script, appearing to read "Gary W. Burdick".

Gary. W. Burdick
Dean of Research

Cover: *Early Christian mosaic discovered at the Andrews University archaeological excavation in San Miceli, Sicily, Italy.*
Photo credit: Dr. Constance Gane.

SCHEDULE OF EVENTS

12:30-2:00 pm

Plenary Session (Newbold Auditorium)

See page 5 for program abstracts.

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

Research: The Next Chapter – **Andrea Luxton**, President

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

Presentations by recipients of the **2016 Siegfried H. Horn Excellence in Research and Creative Scholarship Award:**

PL-1 **Karl Bailey**, Professor of Psychology

The Fullness of the Heart: Internalization of Religion and Well-Being

PL-2 **P. Richard Choi**, Professor of New Testament

The Dos and Don'ts of Research: Curiosity, Creativity, and Community

PL-3 **Ann Gibson**, Professor Emerita, School of Business Administration

Views on Money, Accounting and Ethics: Are they culturally determined?

2:00 - 3:00 pm

Poster Presentations (Buller Hallways)

See pages 10-18 for program abstracts. Refreshments served in the central atrium.

Health Professions

P-01

Nursing

P-02

Physical Therapy

P-03-04

Public Health

Humanities & Social Sciences

P-05

Agriculture

P-06

Community & International Development

P-07-08

Archaeology & Anthropology

P-09-11

Visual Art, Communication & Design

P-12

English

P-13-14

Leadership

P-15-16

Business Administration

P-17-18

Library

P-19

Music

P-20-23

Religion

P-24

Psychology

STEM

P-25-26

Chemistry & Biochemistry

P-27-30

Biology

P-31-33

Mathematics

P-34-35

Physics

P-36-37

Engineering & Computer Science

3:00 - 4:00 pm

Oral Breakout Sessions (Buller Classrooms)

See pages 6-9 for program abstracts.

Session A Learning & Communication (BUL 149)

Session B Biblical Studies & Theology (BUL 150)

Session C Physical Sciences & Engineering (BUL 250)

Session D Life Sciences (BUL 251)

ORAL PRESENTATION SCHEDULE

Session A: Learning & Communication (BUL 149)

- 3:00 pm** **A-1** Oliver Glanz, *BibleOL for Individuals and Institutions: Learning Biblical Hebrew – Not the Old Testament*
- 3:15 pm** **A-2** Glynis M. Bradfield & Kris Knutson, *Student and Alumni Stories: Advisor Qualities & Practices That Increase Student Success*
- 3:30 pm** **A-3** Rachel Williams-Smith, *From Good to Great: Improving the New Faculty Onboarding Experience*
- 3:45 pm** **A-4** Desrene Vernon, Duane McBride, Petr Činčala, Curtis VanderWaal, & René D. Drumm, *Evaluating the Mission Effectiveness of Adventist World Radio: A Global Study*

Session B: Biblical Studies & Theology (BUL 150)

- 3:00 pm** **B-1** Mihai Bijacu, *The Fall or The Rise of Humankind? An Analysis of Genesis 3 and Its Echoes throughout the Canon*
- 3:15 pm** **B-2** Rodrigo G. Barbosa, *Philological Problems In Isaiah 6: An Investigation of the Dead Sea Scroll Evidence*
- 3:30 pm** **B-3** Paul B. Petersen, *Stephen's Defense Speech*
- 3:45 pm** **B-4** Christopher R. Mwashinga, *Personality and Function of the Holy Spirit: A Biblical and Theological Investigation*

Session C: Physical Sciences & Engineering (BUL 250)

- 3:00 pm** **C-1** Erik Vyhmeister, Mike Wang, Keong Yong, Lauber de Souza Martins, & Sung Woo Nam, *Graphene Kirigami and Its Use in Biocompatible Strain Sensors*
- 3:15 pm** **C-2** Jay Johnson & Simon Wing, *An Information-Theoretical Approach to Discovering Solar Wind Drivers of the Outer Radiation Belt Environment*
- 3:30 pm** **C-3** Boon-Chai Ng, *Examination of Anodized Aluminum for Surface Defects after Thermal Cycles*
- 3:45 pm** **C-4** Greg Zdor, Lauber de Souza Martins, & Diogo Londero da Silva, *Mathematical Modeling and Simulation of Thermal Load of Terrestrial Transport of Refrigerated Systems*

Session D: Life Sciences (BUL 251)

- 3:00 pm** **D-1** Warit Chirachevin & Robert Zdor, *Soil Sand Content Influences the Weed Suppressive Effects of Mustard Seed Meal*
- 3:15 pm** **D-2** Maximino Alfredo Mejia, Anneris Coria-Navia, Griselda Uriegas-Mejia, Sherine Brown-Fraser, Sergio E. Uriegas, Maria de Jesus Martinez, Rembrandt Reyes, Armando Ramirez, Maria Elena Acosta, Gregory Morrow, Gretchen Krivak, Yadhira C. Hernandez, Dacia Camacho, & Albert Sanchez, *The Victoria Trial: A School-Based Health Education Program to Reduce the Risk of Obesity Among a High-Risk Population*
- 3:30 pm** **D-3** Bea Ade-Oshifogun & Temitope Ade-Oshifogun, *Medical Students' Perception of Their Educational Environment in a Medical School in Africa: A Cross-sectional Study Using the Dundee Ready Education Environment Questionnaire (DREEM)*

PLENARY PRESENTATIONS

PL-1 *The Fullness of the Heart: Internalization of Religion and Well-Being*
Karl Bailey, Professor of Psychology

Religiosity is often defined by frequency of attendance at religious services, or self-reports of personal importance of religion. While these are measures that allow for comparison across very different forms of religious belief, I will propose that there is value in understanding religion from a multi-level behavioral sciences perspective that examines not only individual religious behavior, but also the community context that defines what actions matter for belonging. I will do this by introducing a psychological theory of motivation that defines internalization as a function of moving from controlled to autonomous regulation of motivation for some particular behavior. I will then use a variety of visualization techniques to examine internalization of common Christian low-cost behaviors and specific high cost behaviors among Seventh-day Adventists, focusing particularly on different levels of internalization among emerging Seventh-day Adventist adults (age 18-25, a cohort that has a higher likelihood of disaffiliation from the Seventh-day Adventist church). I will argue that the data supports investment in religious communities in internalizing those behaviors that allow belief to be translated into belonging.

PL-2 *The Dos and Don'ts of Research: Curiosity, Creativity, and Community*
P. Richard Choi, Professor of New Testament

In this presentation, I offer six practical rules of research for aspiring researchers based on my experience. They are organized under three headings: curiosity, creativity, and community. Due to time constraints, only two rules will be discussed per component. For *curiosity*, they are: (1) Don't become passive and (2) Write; for *creativity*: (1) Don't try to be great and (2) Avoid vices; and for *community*: (1) Don't work alone and (2) Join a research community. These rules do not seek to replace or overlook the technical aspects of research easily available in many handbooks and instructional videos that deal with research. My aim is to deal with the generative and motivational aspects of research, namely, how to get started on research and how to stay motivated through the process so you can bring the project to a successful completion in a timely manner.

PL-3 *Views on Money, Accounting and Ethics: Are They Culturally Determined?*
Ann Gibson, Professor Emerita, School of Business Administration

This presentation will explore the impact of culture on one's views of money, accounting transparency, and ethics, with particular emphasis on how these factors are viewed by either collectivistic or individualistic cultures. Individualistic cultures are based on the Calvinist tradition of free will, free choice, and accountability, while collectivistic cultures place great emphasis on cooperation and harmony. The presentation will specifically address the cultural differences relating to the transparency of accounting records, the pressure to share resources, and the necessity of using resources immediately. Experiences and lessons learned during my work in training treasurers and CFOs for the Seventh-day Adventist Church around the world will be shared, along with a discussion of the impact of this work on my current research agenda.

ORAL PRESENTATIONS

A - Learning and Communication (BUL 149)

A-1 *BibleOL for Individuals and Institutions: Learning Biblical Hebrew – Not the Old Testament* Oliver Glanz, Old Testament, Seventh-day Adventist Theological Seminary

BibleOL is an online learning environment that allows students to practice Biblical Hebrew grammar and translating Biblical Hebrew texts. We have collected performance data of Hebrew students over the last two years at the SDA Theological Seminary. Our statistics show that the average student performs 11% better (= 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 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). In our research project we are working to add an examination mode so that this system may be used for testing and certifying the level of Hebrew proficiency. In order to offer an examination mode for institutions, we have to develop linguistic rules that help us detect ambiguous forms in Hebrew (similar to the English “you”). In the future, we intend to improve the present BibleOL learning environment by adding novel Biblical Hebrew texts to the learning process, which will remove the crutch for Biblical Hebrew students who tend to translate Biblical Hebrew texts not by relying on their language skills but on their Bible knowledge.

A-2 *Student and Alumni Stories: Advisor Qualities & Practices That Increase Student Success* Glynis M. Bradfield¹, Kris Knutson², ¹Distance & Non-traditional Student Services, Student Services Department, School of Distance Education, ²Coordinator of Undergraduate Advising Services, Student Success Center

What qualities make a good advisor? Which advising strategies increase persistence and vocational satisfaction? This presentation will share findings from recent Andrews Advisor Evaluation Surveys, the first Andrews Alumni Advisor Reflection Survey and the presenters’ advising experience at Andrews University. The impact of developmental and servant leadership approaches to academic advising at undergraduate and graduate levels will be shared, along with specific strategies that support students identified as probationary, underprepared, online, and those with documented disabilities. Come be inspired by the advising stories of students and alumni; leave with strategies to recharge your advising commitment and skills.

A-3 *From Good to Great: Improving the New Faculty Onboarding Experience* Rachel Williams-Smith, Department of Communication

Onboarding is a process aimed at helping new employees adjust to their new work environment. This action research project was aimed at discovering (1) how the onboarding process at this university could be improved and (2) the unique challenges new faculty might face in adjusting to this small, rural, faith-based, and highly culturally diverse environment. First, an improvement proposal was drafted and presented to a focus group, and feedback was collected. Next, the proposal was revised and sent to 62 new faculty participants, along with a survey and invitation for additional involvement. Ultimately, survey and in-depth interview feedback was collected from 19 respondents. Results revealed (1) the proposal was considered a satisfactory improvement of the existing onboarding process and (2) unique challenges included feeling overloaded/overwhelmed with work/time demands and with experiencing difficulty in finding a “fit,” establishing connections, developing a network of support, and receiving informative feedback. The conclusions were (1) the expectation for establishing a fit and developing meaningful connections is heightened by the expectation of joining a religious and culturally diverse environment, but the reality of living and working in it is more challenging than expected; (2) recognition of this reality and intentionality in addressing it and in providing training and support is needed; and (3) though the proposal offered many important improvements, it did not fully address employee needs.

A-4 *Evaluating the Mission Effectiveness of Adventist World Radio: A Global Study* Desrene Vernon¹, Duane McBride², Petr Činčala³, Curtis VanderWaal⁴, René D. Drumm⁵, ¹Communication, ²Behavioral Sciences, ³Institute of Church Ministry, ⁴Social Work, ⁵Social Work, University of Southern Mississippi

Evaluating the mission effectiveness of Adventist World Radio (AWR) is a study commissioned by the General Conference Office of Archives, Statistics and Research. The study is three-fold: (1) A review of literature was conducted to assess and compare the operations and effectiveness of international religious broadcasters comparable to AWR; (2) an audience impact survey is being conducted in India and Russia to determine the market penetration of and program evaluation of AWR; and (3) several focus groups are being conducted in Asia, Africa and Europe to gather narrative feedback firsthand from AWR listeners. The literature review showed that Christian radio is responsible for bringing new listeners to the medium at a rate that is higher than other public radio programs. Programs that are contextualized have proven to be more appreciated by listeners than programs that are simply translated from one language and cultural context to another. One recommendation based on the literature is that AWR should harness all available social media platforms.

B - Biblical Studies & Theology (BUL 150)

B-1 *The Fall or The Rise of Humankind? An Analysis of Genesis 3 and Its Echoes throughout the Canon*
Mihai Bijacu, PhD Student, Theology & Christian Philosophy, Seventh-day Adventist Seminary

For centuries, theologians have generally interpreted Genesis 3 as describing the fall of mankind. Recently, however, more and more theologians are interpreting the chapter as displaying the rise of mankind to its full potential and not its fall from a state of perfection. Moreover, some of these theologians even claim that this is the actual intention of the text. This paper will address said claim through a) a narrative analysis of Genesis 3, with emphasis on key markers within the text and b) an analysis of the reverberations of the events in Genesis 3 through the rest of the Canon. The paper will show that the authors of the Bible view the events in Genesis 3 as having an utterly negative effect on humankind with very few (if any) positive aspects. An assessment of the historicity of Genesis 3 will not be attempted in this paper due to lack of space and incongruences in methodology.

B-2 *Philological Problems In Isaiah 6 – An Investigation of the Dead Sea Scroll Evidence*
Rodrigo G. Barbosa, PhD Student, Church History, Seventh-day Adventist Theological Seminary

In this paper, I use Moshe Held-Chaim Cohen's method to try to establish a preferable reading of Isaiah chapter 6 in light of the Dead Sea Scrolls (DSS). The importance of the DSS for biblical textual criticism has not been rightly appreciated on the aspect that very few commentaries or critical studies of particular biblical texts make use of it. So this work tries to make the case of the relevance of the DSS textual evidence in order to establish a preferable variant of the Hebrew Bible.

B-3 *Stephen's Defense Speech*
Paul B. Petersen, Department of Religion & Biblical Languages, College of Arts & Sciences

Stephen is known as the Christian Church's first martyr. His defense speech recorded in Acts 7 is positioned in a pivotal position in the narrative flow of Acts, not only in the thematic structure of the book, but also in the providential, prophetic history of the people of God. The speech itself is not only a homiletic masterpiece, it also emphasizes the role of the heavenly sanctuary service in a way not usually detected by commentators. Taken together with Stephen's function as an imitation of Christ, these perspectives combine to make Stephen's speech one of the most magnificent reads of Scripture.

B-4 *Personality and Function of the Holy Spirit: A Biblical and Theological Investigation*
Christopher R. Mwashinga, PhD Student, Theology & Christian Philosophy, SDA Theological Seminary

This paper discusses the personality and function of the Holy Spirit, paying attention to its biblical understanding. Down through the history of the Christian Church, people have held different views about the Holy Spirit. Some view the Holy Spirit as the personification of holy power in the same sense as they view Satan as personification of evil power. They conclude that both Satan and the Holy Spirit are not personal beings. Others see the Holy Spirit as the energy of God, an impersonal power God uses to activate His will in the universe. Still others maintain that the Holy Spirit was active with the Father and the Son in creation, incarnation, and redemption. This paper argues that the Holy Spirit is a personal being and not some impersonal power or force. The study investigates and analyzes relevant scriptural passages, and it surveys a number of Christian theologies in order to determine the personality and function of the Holy Spirit and demonstrate that He is indeed a personal being. The paper concludes that from the very beginning it was God's will that his people should understand the personality and function of the Holy Spirit and view Him as a comforter and faithful guide in their spiritual journey.

C - Physical Sciences & Engineering (BUL 250)

C-1 *Graphene Kirigami and Its Use in Biocompatible Strain Sensors*

Erik Vyhmeister¹, Mike Wang², Keong Yong², Lauber de Souza Martins¹, Sung Woo Nam², ¹Physics, Andrews University, ²University of Illinois at Urbana-Champaign

Graphene's large fracture strain (>30%), chemical inertness, and piezoresistive nature make it well-suited for use as a biocompatible strain sensor. Due to the limited applicability of freestanding graphene, a multilayer structure with graphene as its operative component was designed. This rectangular structure consists of a bottom layer of SU-8 (a family of photo-patternable polymers), a center layer of graphene, and a top layer of SU-8 and gold, such that the gold contacts the graphene directly on the furthest ends of the structure, acting as electrical contacts. However, as SU-8 is not as stretchable as graphene, kirigami-style patterning is applied via photolithography (SU-8) and oxygen plasma etching (graphene) to the entire structure during fabrication, allowing for a greater fracture strain. Kirigami (a Japanese art form related to cutting patterns into paper) affects the stress concentration in the graphene, affecting its piezoresistive gauge factor. The complete (patterned) structure exhibited a fracture strain of 40%, a 900% increase over unpatterned SU-8 of similar thickness.

C-2 *An Information-Theoretical Approach to Discovering Solar Wind Drivers of the Outer Radiation Belt Environment*

Jay Johnson¹, Simon Wing², ¹Department of Engineering and Computer Science, Andrews University, ²Applied Physics Laboratory, Johns Hopkins University

One of the dramatic discoveries over the last solar cycle was the realization that the radiation belts are highly dynamic, and fluxes of relativistic electrons throughout the belts can suddenly increase or decrease by factors of 100 or more during geomagnetic storms [Reeves, 2007]. Understanding the response of Earth's radiation belts to solar interplanetary structures is challenging because the variability of the radiation belt environment is associated with complex nonlinear processes that occur during storms and substorms. Substorms are highly nonlinear phenomena that involve loading and sudden release of energy. Particle energization in storms involves a complex interplay between particle injections from the magnetotail, excitation of waves, nonlinear growth and saturation of instabilities, and wave-particle interactions. We examine causal control of the radiation belt environment by the solar wind using conditional mutual information and transfer entropy as discriminating statistics. We find that the radiation belt is primarily controlled by solar wind velocity, but the solar wind density plays an important role on shorter time scales—likely associated with magnetopause shadowing. We discuss the physical processes responsible for these causal relationships.

C-3 *Examination of Anodized Aluminum for Surface Defects after Thermal Cycles*

Boon-Chai Ng, Department of Engineering & Computer Science

A major cost in the fabrication of test sockets is the interposer, an interface layer that reroutes one connection to another. The interposer must have high resistivity with low loss, a smooth surface finish, high strength, resistance to chemicals involved in the process, and be extremely thin. Currently, the most common materials used for interposer are plastics, such as Torlon, Semitron, and PEEK. While these satisfy the requirements for test sockets, they do not perform well under higher ambient temperatures. Finding a less expensive, alternative material would be preferable. In this study, anodized aluminum samples were subjected to repeat thermal cycling between 22°C -150°C for over 10,000 cycles. At certain intervals, 2000, 5000, 7500 and 10,000 cycles, the surface of the anodized aluminum samples were examined for tears or cracks that may result due to the differences in the thermal expansion rates between the aluminum matrix and the oxide layers. Results showed no critical defects that would compromise the oxide layer, and therefore reduce resistivity and its viability as an alternative interposer material.

C-4 *Mathematical Modeling and Simulation of Thermal Load of Terrestrial Transport of Refrigerated Systems*

Greg Zdor¹, Lauber de Souza Martins², Diogo Londero da Silva³, ¹Student, Andrews University, ²Physics, Andrews University, ³Universidade Federal de Santa Catarina

The energy analysis of refrigerated cargo transport consists of evaluating the degree of degradation suffered by the transported product and the amount of energy required for cooling and conveying the cargo. This evaluation is complex, as it involves the maximization of the volume of transported cargo, the reduction of energy consumption, and a strict control of temperatures according to the specifications of each product. The high demand for refrigerated transport is related to food products, although chemical products, flowers, vaccines, and even human organs are also transported under refrigerated conditions. The proposed project aims to develop a mathematical model able to estimate the energy consumption associated with the transport of refrigerated cargo. The model will be based on the first law of thermodynamics and consider design parameters and operational conditions such as travel time, average vehicle speed, the average solar radiation incident on the refrigerated compartment, the dimensions and properties of thermal insulation, as well as the absorptivity and emissivity of the paint used on the external surfaces. The results of this study will be useful for identifying how the design features of a refrigerated body and operating conditions affect the fuel consumption associated with transportation of refrigerated cargo, assisting in energy-efficient and less polluting equipment projects.

D - Life Sciences (BUL 251)

D-1 *Soil Sand Content Influences the Weed Suppressive Effects of Mustard Seed Meal*

Warit Chirachevin¹, Robert Zdor², ¹Student, Biology Department, ²Biology Department

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. The hypothesis that soil sand content influences the effect of MSM on velvetleaf growth was tested by adding sand in varying amounts to a silt loam soil where velvetleaf seedlings were grown short-term. The resulting pattern of growth was consistent with the hypothesis that increased sand levels correlated with decreased weed growth. Possible mechanisms of the effect of sand on MSM effectiveness will be discussed.

D-2 *The Victoria Trial: A School-Based Health Education Program to Reduce the Risk of Obesity Among a High-Risk Population*

Maximino Alfredo Mejia¹, Anneris Coria-Navia², Griselda Uriegas-Mejia³, Sherine Brown-Fraser⁴, Sergio E. Uriegas⁵, Maria de Jesus Martinez⁵, Rembrandt Reyes⁵, Armando Ramirez⁶, Maria Elena Acosta⁷, Gregory Morrow⁸, Gretchen Krivak⁸, Yadhira C. Hernandez⁹, Dacia Camacho⁹, Albert Sanchez¹⁰, ¹Department of Public Health, Nutrition and Wellness, Andrews University, ²Teaching, Learning and Curriculum, Andrews University, ³Psychology and Curriculum Development, OptiHealth, PLLC, ⁴Public Health, Nutrition and Wellness, Andrews University, ⁵Prevention Services, Tamaulipas, Mexico, Department of Health, ⁶Physical Education Instructor, Secretary of Education, Tamaulipas, ⁷Nutrition, School of Public Health, Universidad de Morelos, ⁸Public Health, Nutrition and Wellness, Andrews University, ⁹Department of Health, Tamaulipas, ¹⁰Weimar Institute

Background: Childhood obesity is a major global public health problem which disproportionately affects Hispanic children. Therefore, the *Amate, Activate, Cuidate, Comparte* [Love Yourself, Activate Yourself, Take Care of Yourself, and Share] model was tested in two schools that have a high rate of students who are overweight (30%) or obese (26%) in Tamaulipas, Mexico.

Methods: This health education model, which includes physical activity, nutrition education, and a school-lunch, was pilot tested in two schools, with an experimental and control group. The curriculum was based on social cognitive theory, positive psychology, and pedagogical principles. This health and wellness model was developed and implemented through the synergistic work of Andrews University, the Department of Health, the Department of Education of Tamaulipas, local schools, parents, teachers, and children. Body mass index (BMI), eating habits, and physical activity were assessed before and after the intervention.

Results: The trend in body mass index (BMI) of the children in the experimental group was reversed, while BMI in the control group continued climbing. **Conclusion:** The program has been effective at changing the trend in body mass index (BMI) of the children in the experimental group. The model deserves to be tested in additional schools for a longer period of time.

D-3 *Medical Students' Perception of Their Educational Environment in a Medical School in Africa: A Cross-sectional Study Using the Dundee Ready Education Environment Questionnaire (DREEM)*

Bea Ade-Oshifogun¹, Temitope Ade-Oshifogun², ¹Department of Nursing, Andrews University, ²University of Ghana Medical School

Aim: To determine the clinical year students' perceptions of their educational environment at the University of Ghana School of Medicine & Dentistry (UGSMD). **Method:** A cross-sectional study was undertaken using the DREEM questionnaire. 276 clinical year students at UGSMD participated in the study. DREEM has 50 items, each rated using a Likert scale. The items measure five domains: students' perceptions of learning; perceptions of teachers; academic self-perception; perceptions of the atmosphere; and social self-perception. Mean item scores, domain scores, and global scores were computed. The results were analyzed using ANOVA to compare the means of the educational environment and its subscales within clinical year and gender. **Results:** The two highest rated items for all groups were "the teachers are knowledgeable" and "I am confident about my passing this year." The lowest Individual items were "there is a good support system for students who get stressed"; "my enjoyment outweighs the stress of studying medicine"; and "my accommodation is pleasant." There was no significant difference in global scores between clinical years (116 ± 13.9 ; 118 ± 17.4 ; 117 ± 15.3 , $p > 0.05$). The overall educational environment was positive; however, students' perceptions of teachers, and students' perception of the atmosphere subscales were negative. The students' perception of learning, students' academic self-perceptions, and students' social self-perceptions were positive with no gender inequality of the educational environment. **Conclusion:** The overall educational environment was positive; however, improvement is needed with students' perception of the teachers and students' perception of the atmosphere.

POSTER PRESENTATIONS

Nursing

P-01 *How the Ethical Climate Strengthens the Sense of Social Responsibility and Subsequent Organizational Commitment among Christian Healthcare Providers: Test of a Structural Equation Model*

Grace Chi¹, Jerry L. Chi², ¹Department of Nursing, ²School of Business Administration

The purpose of this Structural Equation Model (SEM) analysis is to examine how the Seventh-Day Adventist hospital's internal organizational ethical climates, measured by ECQ, effectively impact employees' shareholder and stakeholder views of corporate social responsibility, as measured by PRESOR, which will then enhance their Organizational Commitment (OCQ) levels with more intrinsic motivation. The current results showed that the full-time employees of the Metroplex Healthcare System and Central Texas Medical Center perceived high levels of Christian hospitals' ethical climates in three dimensions: Benevolent, Principled and Egoistic (mission driven). These dimensions are positively and highly conducive to the broader Stakeholder view of Corporate Social Responsibility and significantly resist the narrower self-centered Shareholder CSR view. The support of the broader Stakeholder view and opposition of the shareholder view are significantly correlated with a high level of organizational commitment. A strong organizational ethical climate has both direct and indirect effects on the high level of organizational commitment among these two Christian hospitals. Some of the most significant demographic variables to determine a perceived ethical climate, social responsibility views, and organizational commitment levels include years of service, income, race, gender, and age.

Physical Therapy

P-02 *Hand Dominance and Posture: A Study of Handedness Patterns in Posture Analysis*

Elizabeth Oakley¹, Natalie Appelhans, Alyson Jamel, Meredith Griffin, Lauryl Murphree-James, ¹Physical Therapy

PURPOSE: The purpose of this study was to identify if hand dominance postural patterns can be identified in a standing posture assessment and if gender influences posture. **METHODS:** Thirty-eight subjects—12 males (32%) and 26 females (68%)—with a mean age of 26 years, participated. Standing posture of each subject was analyzed against a plumb line and posture grid in the lateral and posterior view in addition to photographic assessment. Measurements were taken for the craniocervical angle, shoulder levels, spinal alignment, pelvis and hip levels, knee alignment, and rearfoot pronation. **STATISTICAL ANALYSIS:** Frequencies were used to determine the presence of postural patterns associated with hand dominance and gender. A mix design, repeated measures ANOVA was used to determine if there was a difference in the frequencies of each postural deviation observed for hand dominance and gender. **RESULTS:** No one demonstrated all five postural deviations descriptive of a handedness pattern. Of the possible five postural deviations, 3% (n=1) of right-handed participants and 33% (n=2) of left-handed participants demonstrated three characteristics associated with their hand dominance pattern. There was no consistent posture pattern among the genders. A repeated measure ANOVA found that neither hand dominance nor gender was statistically significant for any of the postural variables. **CONCLUSION:** This study found that hand dominance and gender do not have an effect on a person's posture.

Public Health

P-03 *Inositol Depletion as a Screening Tool for Identifying Potential New Anti-bipolar Drugs*

Marlene Murray, Biology Department

Bipolar disorder (BD) is a debilitating mood disorder characterized by recurring episodes of mania and depression. It affects 1 - 2% of the population and has a lifetime prevalence among adults of 3.9%. Current treatments for BD are ineffective for and not well tolerated by a large number of patients. The goal of this study was to identify potential new treatments for BD. Since depletion of intracellular inositol is one of the mechanisms hypothesized by which several anti-bipolar drugs work, we employed inositol depletion in the yeast *Saccharomyces Cerevisiae* as a screening tool to identify potential new anti-bipolar drugs. Results: (1) Similar to the anti-bipolar drug valproate, the omega-3-fatty acids decosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) inhibit cell growth. (2) Unlike valproate, the omega-3-fatty acids increased intracellular inositol. Conclusions: (1) inositol depletion in yeast is a good screening test for potential new anti-bipolar drugs that affect intracellular inositol levels; and (2) the omega-3-fatty acids DHA and EPA are potential anti-bipolar drugs that may be effective in treating the depressive phase of the disorder.

P-04 *Retrospective Study of the Introduction and Establishment of West Nile Virus in San Bernardino County, California in 2004-2006: Lessons Learned*

Sozina Dora Katuli Dr.¹, Lawrence Beeson Dr.², Ronald Mataya³, Joseph Wakoli Wekesa Dr.⁴, ¹Department of Physical Therapy, Andrews University, ²MPH Epidemiology program, Center for Nutrition, Healthy Lifestyle and Disease Prevention, Loma Linda University, ³Global Health, Center for Nutrition, Healthy Lifestyle and Disease Prevention, Loma Linda University, ⁴Department of Public Health, Div. EHS, San Bernardino County, California

Background: This study evaluates the 2004-2006 WNV outbreak in San Bernardino County, California, in order to identify the best surveillance strategies and outline lessons learned from the outbreak. **Objectives:** To describe the introduction and distribution of West Nile Virus and West Nile Encephalitis in San Bernardino County and the county's preparedness for the outbreak. To determine the association between WNV trends in animal, mosquitoes and birds and humans in order to identify the host that is most appropriate for early detection of a WNV outbreak. **Methods:** This retrospective study was part of the routine surveillance activities of the Vector Control Unit of the San Bernardino County Health department. Surveillance records were obtained from data collected through the surveillance activities for WNV hosts, namely chickens, dead birds, and mosquito pools. Presence of WNV was documented by bleeding chickens and testing for WNV; recording reports of dead birds and collecting and testing for WNV; and the collection of mosquitoes (NJ Traps and Co2 traps), species identification and mosquitoes testing for WNV. Records of human cases from hospital admission and asymptomatic cases from blood tests were also collected. **Data analysis:** Spatial maps for disease distribution were created using ArcGIS 9.2. Maps and charts for trends and time lines of index cases for each host were determined. Associations of disease in various hosts were done using Pearson and Spearman correlations. A 6-week time lag was introduced to verify the relationship through visual inspection. **Results:** West Nile Virus was concentrated in the south west of San Bernardino County. The reports of dead birds were highly associated with human cases of WNV ($r=0.85$). Similarly, temperature and an abundance of mosquitoes were also positively correlated with human cases. ($r=0.7$ and $r=0.75$, respectively). **Conclusion:** WNV was possibly introduced in San Bernardino through migrating birds. Dead birds provide six weeks early warning for infection by WNV to humans. The aggressive and effective surveillance and operation activities in the Vector Control Unit in SBC managed to get the disease under control. WNV is a self-limiting disease, hence immunity might have contributed to the diminishing of the disease. Increasing dead birds, particularly American crow, coupled with positive mosquitoes and temperature changes in a warm season are important early warning indicators for a WNV outbreak.

Agriculture

P-05 *A Multiple Case Study of Three Business Models for Local Healthy Food Delivery Systems in Underprivileged Urban Areas*

Garth Woodruff, Horticulture & Landscape Design

Over 40% of Berrien County Michigan land use is agricultural. Many products are fruits and vegetables. Yet the county has six identified USDA defined Food Deserts. Past research, based on a mobile farmers market, confirmed local trends and deficits. The purpose for this research is to define a sustainable business model that delivers healthy local food options to USDA Food Deserts. A mixed method multiple case study was created to test three business models in one of the local Food Deserts. Results identify a sustainable model that provides local healthy food options. Model One developed lunchtime stops serving robust local businesses and community epicenters, with a goal of creating lunchtime profit, focusing evenings on service stops at a potential loss. Model Two required local farmers to provide produce at no cost to the market. Market locations were service stops imbedded inside the residential community and increased stops to 15 per week. Model Three purchased local produce and focused stops on work and shopping locals, targeting the ALICE poverty segment. Models were tested for two weeks each. Results show a high demand for lunch hour food options. Labor at such stops was an increase over service stops. Model Two proved willingness from local farmers to support neighboring food deserts, yet sales didn't equal market costs. Model Three showed increased demand from ALICE segments. Conclusions are that sustainability could be reached through a hybrid model with limited volunteer intern positions. A three to five-year plan should be built showing funding support ebbing with market growth.

Community & International Development Program

P-06 *Hungry for Attention: The Right to Food in Madagascar*

Alexandra Raney¹, Azra Totobesola¹, Joel Raveloharimisy², ¹Graduate Student, Community and International Development, ²Community and International Development Program

Surprisingly and unfortunately, in spite of the fertile, arable land and a favorable climate, Madagascar is one of the most chronically food insecure countries in the world. In southern regions, where droughts are most frequent, food insecurity affects 68 percent of households. The "right to food" is a fundamental human right, and its realization is essential to the fulfillment of other human rights. To realize people's right to food means to both empower people and hold governments accountable. The degree of food insecurity in Madagascar can be used as a proxy for the degree to which the right to food has been realized. In light of this, the state of Madagascar has failed in its obligation to respect its citizens' right to food, and this failure should lead to questions about the sovereignty rights of Madagascar at the very least, and even the legitimacy of the state itself. Not only has Madagascar failed in its obligation to respect its citizens' right to food, it has also failed to both protect and fulfill the right to food within its borders. Our research attempts to answer the question: "What are the perceptions of the Malagasy people towards the right to adequate food?" We explore similarities and differences in perceptions between citizens, civil society members, and government.

Archaeology & Anthropology

P-07 *Hisban in Global History: An Update*

Øystein LaBianca, Anthropology, Institute of Archaeology

The aim of this presentation is to update on progress toward identifying the forces and mechanisms that account for cultural production in the Southern Levant over La Longue Durée. The project is part of a larger effort to produce a final volume (Hesban 14), explaining the forces that account for multi-millennial cultural changes at Tall Hisban in Jordan. These include changing regional climatic conditions, devastating earthquakes, epidemics and droughts, episodic and extreme pulsations of a steadily expanding global trade and commerce networks, and last but not least over five millennia of imperial influence and domination. The poster will provide an overview of the methodology developed for tracing such global history forces on particular localities, in this case Tall Hisban.

P-08 *Discoveries of a Paleo-Christian Community in Sicily: Moving from Paganism to Christianity at San Miceli*

Randall Younker, Archaeology and History of Antiquity

Since 2013 the Institute of Archaeology at Andrews University has been excavating a Paleo-Christian site in western Sicily (Trapani Province) at San Miceli, near the town of Salemi. The project has been uncovering a Roman village that was settled some 300 years BC and continued to be occupied until it was destroyed—probably by a Muslim raid—in the mid-7th century AD. Its occupation thus includes the period of the shift from paganism to Christianity. The excavations have uncovered what is arguably the first Christian basilica in Sicily, which was rebuilt some three times between the 4th and 7th centuries. The remains included three phases of mosaic floors in the church along with numerous tombs, many of which indicate the relative wealth of the community, evident in the gold and silver jewelry found in the tombs. Women also seemed to play a prominent role in the church community. A large “villa” was found south of the church, also pointing to wealthy and important citizens living in the town. The poster will illustrate the work and finds of our excavations at San Miceli, 2013-2016.

Visual Art, Communication & Design

P-09 *Model Shrines and Cults Stands of the Madaba Plains*

Stefanie Elkins, Art & Art History

The purpose of this research has been to explore the interdisciplinary and symbiotic relationship between art history and archaeology through the art historical analysis of ceramic architectural models, known as model shrines and/or cult stands, originating in Transjordan during the Iron Ages, specifically, the Madaba Plains region located in central Jordan. Due to the overall lack of knowledge or ability to recognize these artifacts, very little has been published on architectural models originating from the country of Jordan. By comparing links to the larger corpus of architectural models from surrounding regions, important data for classifying and analyzing the lesser-known architectural models from Transjordan will be possible. The resulting findings will better inform scholars about the cultic role these artifacts played in the lives of the artisans, the patrons, and the culture in which they were created. Furthermore, this research will provide deeper insight into the ancient concept of aesthetics symbolism and how these design elements made their way into Moabite and Ammonite territory during the Iron Age. The iconographic elements also have implications for our understanding of the religious practices of the greater Transjordan region as well as providing us with information that will help create an artistic canon tying certain motifs and symbols to particular people groups. This research has three goals: (1) analysis of selected architectural models, (2) conservation of selected architectural models, and (3) publication of findings. This will set the stage to continue research in Transjordan by expanding the corpus to include other regions.

P-10 *Painting Horizons*

Kari Friestad, Painting & Drawing

My current work investigates the limitations of paint and mark-making that carries the potential to be read as various aspects in various types of oil painting, such as the particular tenants of landscape painting that evoke surface or atmosphere. These material explorations look at how the various types of marks and texture indicate recognizable forms or space that can be attributed to various qualities of the textures of nature, such as the surface of water or the fog of a hazy morning. Simplification allows stroke, texture, and value, or the inherent nature of the paint, to be isolated and thus examined. My primary inspirations derive from the landscape. I am originally from Orlando, Florida, and I find many of my ideas for painting inspired by the skies of Michigan and Florida. I am influenced by painters such as Georgia O’Keefe, both for her paint handling and in composition and drawing, as well as John Evans for simplified form and use of color. I find that skyscapes provide a great opportunity to explore the nature of oil painting, or the act of working with layering paint, with a subject that is inherently layered as well, or atmosphere. The act of painting atmosphere is also a large part of painting representationally, where there are specific methods used in order to indicate the appearance of air or the effects of moisture in air on color and visibility. My intentions with these paintings is to explore the space between representational painting and abstraction, where this abstraction explores simplification and the limits of paint.

P-11 *Evolution of a Painting*
Greg Constantine, Art Department

I have been working on a series of landscape paintings inspired by a stratified red rock mountain observed while on the Chief Joseph Scenic Trail west of Cody Wyoming and east of Yellowstone National Park. I began with a small painting, using the personal mark-making technique I have developed in many works since 1968. This and several other paintings suggest visual experiences, such as pods of dolphins jumping out of and into the water as they follow a ship. The moment you put down two or three marks on a piece of paper, you get relationships. They start to look like something. If you draw two little lines they might look like two figures or two trees. One was made first; one second. We read all kinds of things into marks. You can suggest landscape, people, and faces with extremely little. It all depends on the human ability to see a mark as a depiction. Renaissance European perspective has a vanishing point, but it does not exist in Japanese and Chinese painting. And a view from sitting still, from a stationary point, is not the way you usually see landscape; you are always moving through it.

English

P-12 *Woke Shakespeare: Othello and Appropriation*
Vanessa Corredera, English Department

Scholar Peter Erickson has called *Othello* Shakespeare's emissary to the world; narrowing in focus, Francesca Royster asserts that Americans use *Othello* as a means of understanding race and Otherness. Though differing in scope, these statements present a similar view of the play and its eponymous protagonist: due to its depiction of a black Other in white society, Shakespeare's famous tragedy has both an enduring international and nationally specific appeal. The tacit idea underlying these statements is the understanding that *Othello* remains relevant for contemporary culture because its exploration of the creation of self and Other through the blackamoor of Venice speaks to ongoing discussions about race, identity, and alterity so prevalent in our modern world. Precisely how and why *Othello* continues to appeal to modernity is my project's focus. My book examines contemporary Western, and predominantly American, appropriations of *Othello* in order to explore the racial discourses and representations that we attempt to privilege through Shakespeare's authorizing imprimatur. By turning to a wide range of "texts" that either adapt the play or which make reference to the play and/or its characters—plays, novels, film, graphic novels, podcasts, etc.—I consider how modern conceptions of race and gender have shaped depictions and deployments of *Othello*. An important part of this consideration is attention to the importance of the choices made in the process of adaptation and/or appropriation. Ultimately, this project seeks to interrogate the use of Shakespeare, via *Othello*, to reify or push back against particular racial discourses and representations.

Leadership

P-13 *Practice What You Preach: A Case Study of Priorities in Adventist Education*
Randy J. Siebold¹, Gilbert Wari², ¹Leadership Department, ²Post Doc Student, Leadership Department

After centuries of what has been termed the "Dark Ages," God has been granting special light to His people. In her deeply revealing book about this great awakening, White (1858) reveals the lives of many who sensed the responsibility of breaking barriers of misunderstood concepts, such as John Wycliffe (14th century, pp 79-96), John Hus and Jerome (15th century, pp 97-119), Martin Luther and John Calvin (16th century, pp 120-170 and pp 219-236 respectively), Isaac Newton, René Descartes, and Blaise Pascal (17th century), William Miller and the Advent Movement (19th century, pp 268-374), as well as scholars studying the Dead Sea Scrolls (20th century). A special point worth noting is that many of the above were university campus-based. The authors wonder, for the 21st-century generation, can Adventist Education continue this tradition of bringing new light? If so, they must live up to light already given and grow upon the past truths. The Seventh-day Adventist Church has had much clarity given about how Adventist education should be conducted—what should take priority. The purpose of this paper is to analyze the revealed, expected and lived priorities of one institution of higher education—Andrews University. Using this university as a case study, the results are expected to provide additional understanding as to the potential gaps in Adventist education. The questions guiding the research are: What are the revealed, expected, and lived priorities at Andrews University? If there are gaps in these priorities, what is the nature of these gaps?

P-14 *Exploring Student Perceptions of Creativity & Innovation: Developing a Survey of Students*
Randy J. Siebold¹, David C. Cady II², ¹Leadership Department, ²Pre-med Student

Creativity and innovation are popular topics on college campuses and are becoming sought after traits in today's rapidly developing society (Garcia). It appears that opportunities to cultivate skills in creativity and innovation in higher education will soon become a necessity in order to meet these emerging demands. Yet, from our preliminary research, we have found no Seventh-day Adventist college or university that currently has, or is developing, any type of intentional innovation space or significant program aimed at innovation, except for one—Andrews University. In order to develop relevant programming, students' perspective must be understood. The purpose of this study is to better understand the thoughts and attitudes of current students towards creativity and innovation. The research question is, How do undergraduate students at Andrews University think about innovation and creativity? Do they see it as important or useful? In what ways would they envision Andrews University supporting their growth in this area? Using a concept map of the construct to be studied, the authors developed and piloted a survey and will report their initial results and improvements to the survey instrument.

Business Administration

- P-15** *The Changing Role And Skills Needed For Chief School Business Officials (CSBOs) to Impact Student Achievement*
Olawale O. Ade-Oshifogun¹, Jochebed Ade-Oshifogun¹, ¹Department of Nursing

Aim: To collect information on the changes that have taken place over the years in the roles of CSBOs and the levels of awareness that CSBOs have about how their roles impact student achievement. **Method:** A qualitative study was undertaken using open-ended personal interview questions. Five CSBOs overseeing Chicago area public schools were interviewed and tape-recorded for 30-45 minutes. Inclusion criteria are 5 years working in the position, working in Illinois, and being older than 35 years of age. Purposive sampling method was utilized. Data was transcribed and analyzed using the thematic open coding method. **Results:** One of the important changing roles stressed was that of managing dwindling resources from state and federal sources and also from local sources. All respondents believe they indirectly impact students' achievement through their competence in nearly all of the ASBO Professional Standards. The most important professional standard to all respondents was financial resource management. This standard has the most number of competency indicators of 45 out of the 188. They all agreed that the hiring of qualified teachers is an integral part of the CSBO success. **Conclusion:** The study established that CSBO roles have a significant influence on student achievement. The results have indicated that the main roles of CSBOs are mainly operational and financial.

- P-16** *A Conceptual Framework for Sustainable Growth of Medium-Size Businesses*
Kimberly S. Pichot, Department of Management, Marketing & Information Systems

Medium-size businesses account for over one-third of private-sector output and employ over one-third of employees across industries. However, current literature describing entrepreneurship and growth does not address the unique needs of medium-size businesses. This article aims to conceptually synthesize the literature on entrepreneurship, founder's vision, and sustainable growth pertaining to medium-size businesses. It proposes a conceptual framework for understanding sustainable growth and its complexities as it relates to different sizes of businesses. It sheds insights on the relationship and intersection of these three areas of study, offering propositions, questions, as well as issues worth pursuing in empirical investigations in the future.

Library

- P-17** *An Evaluation of Ellen G. White's Library*
Felipe E. Tan¹, Jim Ford², ¹Senior Cataloger, James White Library, ²Center for Adventist Research

When Ellen G. White died on July 16, 1915, she left behind nearly 2,000 books in her library. From the inventory made of her library after her death, *A Bibliography of Ellen G. White's Private and Office Libraries* was compiled. Using this publication, this research project is an evaluation of Ellen G. White's library with emphasis on subject analysis. It provides a descriptive study of the library collection, and investigates the subject coverage of the collection. Data shows that the subject of religion and things related to it make up the bulk of the collection. This is not surprising given the subject matter of much of Mrs. White's writings. Religion is followed at a distance by history and then books on language and use of words. The researchers provide their observations and an analysis of the data.

- P-18** *University Libraries Leading the Way through Choppy Waters: The Library's Role in Student Retention*
Silas Bruscajin Marques Dr., Database/Off-Campus Services Librarian, James White Library

Student retention becomes a priority to university administrators in times of economic recession like the one we face today in many parts of the globe. This study focuses on how academic libraries can be leaders in their institutions by adopting a user-centered philosophy and offering services that promote life-long learning, enhance students' academic experience, and promote engagement, which the literature and pertinent research identify as key elements for student retention. The paper presents reports of earlier researches, which correlated educational initiatives considered as high-impact practices with higher education student persistence. The paper also addresses findings of studies which, in a more specific way, correlated library initiatives and services with student retention and proposed practical actions that academic library administrators can take to enhance student persistence. The paper proposes that the following areas have an impact in higher education quality and thus, student engagement and retention: library as a partner rather than a mere collaborator to the educational endeavor; information literacy for undergraduate research; enhancement of students' first year experience; the role of strategic planning and assessment; libraries and institutional analytics; aligning the library with student's learning styles; and identifying and creating learning spaces. These are areas where the library can excel and lead the way to academic quality and improved student retention rates.

Music

- P-19** *Musical Composition Fostering and Efficiency Project*
Kenneth Logan, Department of Music

In June and July 2016, I travelled to a rural area of British Columbia, Canada, to create music within its profoundly conducive environment, an aspect of my AU FRG-sponsored activity. I composed mostly sitting in a pasture with three horses and other animals. I emphasized and cultivated consciousness of inspiring environmental elements as a potential aid for creativity. During slightly longer than five weeks, I spent approximately 215 hours composing music. This time, in this environment, was remarkably productive, although I mostly avoided the available computer with music notation software in favor of an often less-efficient handwriting process. Overall, I created written drafts of more than two dozen new musical works. I have started the editing process, and as of October 2016 I have submitted one of these edited works for publication consideration.

Religion

P-20 *Johannine Comma: Seventh-day Adventist Usage and a Little History*

Rodrigo Barbosa¹, John W. Reeve², ¹PhD Student, Church History, Seminary, ²Church History, Seminary

This project (1) reviews the usage of the Johannine Comma in Adventist publications in English, (2) briefly reviews how the Johannine Comma has been used in recent commentaries and theological works on the Trinity, and (3) offers a preliminary early history of transmission of this textual variant. This last part we still need to work on in order to publish in AUSS next year.

P-21 *Sermons and Speeches in Acts*

Paul B. Petersen¹, Colby Meier, ¹Department of Religion & Biblical Languages

Acts alternates between narrative and speeches. Several of the sermons are the most famous of the Bible, such as Peter's speech on Pentecost, Stephen's to the Sanhedrin, and Paul's on Areopagos in Athens. But all of them are significant for the development of the themes of the book. And viewed together, taking note of the communicative situation like speaker, context, audience, and response, they open the reader's eyes also for some central literary perspectives of the book, including both its horizontal and its vertical movements. Additionally, the sermons also provide practical, valuable lessons for preachers today.

P-22 *The Holy Spirit Speaks*

Lincoln Nogueira, PhD Student, New Testament, Seminary

The third person of the Godhead has always been a mystery and open to discussion. Unfortunately, the debate is mostly driven by dogmatic theology instead of allowing the biblical data to stand on its own. There are many interpretations concerning the nature and place of the Spirit among the Father and the Son. Anti-Trinitarian efforts, for example, have indicated (and fixated on) biblical texts that might put in check Christian beliefs of the personality of the Holy Spirit. This poster intends to quantify the characteristics (statistic of occurrences, including names and symbolic language) and divine attributes of the person of the Holy Spirit. Surely Biblical revelation has created a reasonable amount of data that can lead toward an understanding of this belief—one that is not based on a proof-text approach, but an understanding based on quantifiable data provided by the New Testament authors (and one might say the Holy Spirit himself) on the issue of the Spirit. Such a biblical-theological approach will reveal that the main activity of the Spirit is to speak to humankind in order to reveal the will of God.

P-23 *Epistemological Limitations for the Study of Origins*

Mihai Bijacu, PhD Student, Theology & Christian Philosophy, Seminary

This poster will present some of the epistemological limitations of studying origins both in the theistic and the atheistic model. It will show that there exists a fine (sometimes unperceived) distinction between the data and the interpretation of the data and caution against the confusion of the two (as often happens). It will also point to the fact that, in both models, data will only take the scientist so far. As the scientist goes more and more back in time, closer to the time of origins, the scientist will need to resort to philosophy (which, in turn, will depend on the initial presuppositions made) as the data becomes more and more beyond reach (as, for example, in Weinberg's "The first three minutes of the Universe" theory). Whatever model of origins is accepted, the scientist needs to be aware that it will have a degree of uncertainty. Ultimately, faith will need to play a larger role than expected in the acceptance of the veracity of the model.

Psychology

P-24 *Implicit Bias and Neighborhood Segregation*

Karl G. D. Bailey, Behavioral Sciences Department

Implicit bias is a tendency to show a preference for one group of people relative to another. A common way to measure implicit bias is to look for interference when individuals perform a dual sorting task—sorting two groups with good/bad concepts simultaneously. As a measure of an underlying cognitive network of associations, implicit bias differs from prejudice (overt statements and actions that demonstrate negative attitudes toward another group). Because implicit biases are built into the basic cognitive framework that we use for navigating the world on a daily basis, if unexamined, these biases can amplify dehumanizing and unjust structures, actions, and habits. We use existing data sets released through the Open Science Framework and United States Census data to examine whether there is a relationship between individual measures of implicit bias, explicit prejudice, and metropolitan segregation in the United States. We argue that implicit bias, while a phenomenon at the individual level, nevertheless is related to phenomena at the level of metropolitan policy and economic decisions and thus requires a multi-pronged approach.

Chemistry and Biochemistry

P-25 *Stabilization of Aqueous Ascorbic Acid Solutions Using PAMAM Dendrimers*

Ryan T. Hayes, Chemistry

Ascorbic acid, also known as vitamin C, is an effective antioxidant and an essential human enzymatic cofactor. Ascorbic acid is unstable in aqueous solution and degrades readily upon exposure to air and UV light. PAMAM (polyamidoamine) dendrimers were evaluated to stabilize dilute aqueous ascorbic acid solutions. UV-Vis absorbance spectroscopy was used to measure ascorbic acid degradation over a period of four hours, with and without the dendrimer and at varying pH values. Our data shows that PAMAM G2-Amine dendrimers significantly slow ascorbic acid degradation especially near physiological pH which demonstrates these nanoparticles as an effective platform for vitamin C stabilization.

P-26 *Detection of Counterfeit Antimalarial Drugs by SERS*

Getahun Merga¹, P. Shepard², M. Trujillo³, J. Camden³, ¹Department of Chemistry, Andrews University, ² Department of Chemical Engineering, Rose-Hulman Institute of Technology, ³Department of Chemistry, University of Notre Dame

Substandard antimalarial drugs are a major problem for the health of citizens in developing countries, and it is likely that the problem persists due to the lack of means to detect substandard drugs. Various colorimetric techniques have been implemented to determine if a drug contains the stated active ingredient or not, but vibrational spectroscopies such as NIR and Raman can be used to more reliably quantify the amount of active ingredient. The use of Raman, however, has been limited by the presence of significant sample fluorescence that interfere with detection of the SERS signals of the active ingredients. Thus, we have started testing the ability of Surface-Enhanced Raman Spectroscopy (SERS) to detect and quantify ten common antimalarial drugs. We found that unique spectra for each of the compounds were able to be taken, and therefore SERS can be used to determine the active ingredient of many antimalarial drugs. To determine the quantification ability of SERS, two Partial Least Squares (PLS) based quantifiers were developed for drugs containing both of the active ingredients Artemether and Lumefantrine, the first of which attempted to predict the relative amounts of the two active ingredients at a concentration near the standard value, and the second, which attempted to predict the absolute amount of active ingredient given that the ratio between the two active ingredients was very close to the standard amount. The main objective of this research is to find out and show the possibility of using SERS in detecting and quantifying the amount of expected active ingredients in the antimalarial drugs that are available in markets of some developed and developing countries.

Biology

P-27 *A Possible Role for Carboxypeptidase O in the Regulation of Secretion through Cleavage of C-terminal ER Retention Signals*

Peter Lyons¹, Christian Bardan², Linnea C. Burke², ¹Biology Department, ²Student, Biology Department

Proteins containing C-terminal ER retention signals are sometimes secreted, possibly following proteolytic cleavage of the KDEL retention sequence. However, this cleavage has rarely been seen and only one responsible protease has previously been identified. Carboxypeptidase O (CPO) is a GPI-anchored proteolytic enzyme that cleaves acidic C-terminal amino acids from substrate proteins and peptides, with some ability to cleave hydrophobic amino acids. CPO lacks a prodomain and exhibits activity across a broad pH range, and thus is likely to have activity throughout its transit through the secretory system. To investigate a possible role in the cleavage of C-terminal ER retention signals, CPO expression, subcellular distribution, and function were examined. Western blotting analysis of *T. striatus* tissue lysates showed immunoreactive bands of the correct size in liver, kidney, and small intestine tissues. Immunofluorescence microscopy of transfected MDCK cells indicated membrane attached CPO was commonly found aggregated within the endomembrane system, particularly under cholesterol-depleted conditions. This distribution changed upon cholesterol enrichment, when CPO became more diffused throughout the endomembrane system. Cholesterol enrichment reduced the enzymatic activity of CPO, as measured with a chromogenic substrate containing C-terminal glutamate; no change in activity was observed with a substrate containing a C-terminal alanine. Depletion of cholesterol had the opposite effect, an increase in the enzymatic activity of CPO. To investigate the role of CPO within the secretory pathway, Gaussia Luciferase (GLuc) and variants with ER retention signals (GLuc-KDEL, GLuc-RTDL) were expressed in MDCK cells along with CPO. Increased secretion of GLuc-KDEL and GLuc-RTDL was observed from CPO-expressing cells, particularly when cholesterol-enriched. These results suggest secretion of some proteins may be regulated by cleavage of ER retention sequences by CPO, particularly when CPO is associated with cholesterol rich membrane domains.

P-28 *The Effect of PTX in the Phonotactic Behavior of Female Cricket *Gryllus Bimaculatus**

Benjamin Navia, John Stout, Biology Department

Nano-injection of picrotoxin (PTX) into the prothoracic ganglion of female *Gryllus bimaculatus* narrows and sharpens significantly the range of model calling song (CS) syllable periods (SPs) that the female responds to phonotactically. This sharpened range includes the SPs produced in the CSs of conspecific males and emphasizes the most characteristic SPs of 35 and 40 ms. Following application of either juvenile hormone III (JHIII) or PTX to the ganglion, SP-selective responses by the prothoracic AN2 auditory interneurone are also significantly sharpened to a range that parallels the range of phonotactically attractive SPs and centers on SPs of 35 and 40 ms. These results support a phonotactically significant role for CS processing in the prothoracic ganglion involving the AN2 neurone and associated circuitry.

P-29 *A Multi-year Study of the Biology and Paleobiology of Ground Squirrels*

H. Thomas Goodwin, Biology Department

Ongoing support from the Office of Scholarly Research & Creative Scholarship, both with faculty grants and Undergraduate Research Scholarships, has helped me maintain an active lab with multiple opportunities for student research during the past decade. Students and I have investigated a range of questions that emerge at the nexus of a study of living and fossil ground-dwelling squirrels, often in collaboration with external colleagues, thus informing our understanding of the biology—and paleobiology—of this species-rich group. Among other things, our studies have a) supported informed inference of body mass (and, by extension, mass-related biology) of extinct giant ground squirrels (genus *Paenemarmota*); b) investigated hibernation in modern and fossil ground squirrels; c) explored short-term dietary variation and inferred seasonality preserved in the carbon isotope record of ground squirrel incisors, both modern and fossil; and d) elucidated the complex history of ground squirrels in the Meade Basin, southwestern KS, providing further evidence for a link between climate change and community composition (including a potential impact of short-term climate change caused by catastrophic Pleistocene volcanism). These results demonstrate the value of support from the Office of Scholarly Research & Creative Scholarship in maintaining a dynamic research environment—particularly one that engages students—on the Andrews University campus.

P-30 *Screening of Hybrid Arylidene Heterocyclic Boronic Acids as Potential Anticancer Agents in AU565 HER2/neu Breast Cancer Cell Line*

Jemma McLeish¹, Denise L. Smith², ¹Student, Biology Department, ²Biology Department

Cancers are a group of diseases that are characterized by uncontrollable cellular growth and can occur in any tissue or organ system. Breast cancer is one of the most frequently occurring cancers and the second leading cause of cancer-related deaths in women. With the increased incidence of cancers, a lot of research has been done to determine the cellular factors and pathways that are involved in their occurrence. This has resulted in developing treatment options that can be better targets and a rationale for synthesizing novel drugs that have the potential to produce anticancer effects. The hybrid arylidene heterocyclic boronic acids synthesized for this project were so done with the concept that combining two or more pharmacophores into a single unit may prove to be more effective than a single drug or multiple combined drug therapies. These hybrid drugs contain boronic acids and heterocycles such as rhodanine and its derivatives. Both of these components on their own have shown a range of biological activities such as anticancer, antiviral, and antibacterial. Our research goal is focused on screening these hybrid compounds for anticancer activities in overexpressing HER2/neu positive breast cancer cell line AU565.

Mathematics

P-31 *El Nino, The Blob, and Egg Cannibalism in Glaucous-Winged Gulls*

James Hayward¹, Shandelle M. Henson², ¹Research Professor Emeritus, Biology, ²Mathematics Department

We studied egg cannibalism in Glaucous-winged Gulls breeding at Protection Island, Washington, between 2006 and 2014 for 7 field seasons. Four of these seasons were preceded by relatively high local sea surface temperatures (SST) associated with El Niño events. During each such season, egg cannibalism was relatively high. By contrast, during the three years of “normal” sea surface temperatures, egg cannibalism was relatively low. Typically, high SSTs are associated with low marine productivity. Thus we hypothesized that high levels of egg cannibalism during years of high sea surface temperatures were due to low food availability. The 2015 and 2016 field seasons were preceded by the highest sea surface temperatures during our 9-year study, yet egg cannibalism was relatively low in 2015 and very low in 2016. Both 2015 and 2016 were accompanied by the existence of “The Blob”, an enormous mass of warm water located in the northeast Pacific Ocean which precipitated significant regional weather and ecosystem perturbations. Although gulls nesting on Protection Island seemed to thrive during these years, other marine birds such as auklets experienced high mortality. Currently we cannot offer a mechanistic explanation for these differences, except to note that feeder fish populations appeared surprisingly robust around Protection Island despite (or because of?) The Blob.

P-32 *Rectifying Submanifolds in Pseudo-Euclidean Spaces*

Yun Oh, Mathematics Department

The idea of rectifying curves in R^3 was introduced by B. Y. Chen in 2003 and many characterization results were found with applications in kinematics and mechanics. Furthermore, we can consider rectifying curves in Minkowski spaces by extending the idea of rectifying curves in R^3 , and some results have been obtained. Recently, rectifying submanifolds in Euclidean spaces R^n were developed, and it can be extended to the rectifying submanifolds in Pseudo-Euclidean spaces.

P-33 *Positive Solutions to a General Non-linear Second Order System with Homogeneous Boundary Conditions*

Joon Hyuk Kang¹, Timothy Robertson², ¹Mathematics Department, ²Student, Mathematics Department

We study mathematical conditions to guarantee the existence of positive solutions to a general non-linear second order system of partial differential equations with homogeneous boundary conditions. This result may apply to illustrate biological conditions under which species of animals residing in the same environment can peacefully coexist forever.

Physics

P-34 *The New Era of Gravitational Wave Astronomy* Tiffany Summerscales, Physics Department

On September 14, 2016, the LIGO detectors measured gravitational waves for the first time. With this and subsequent detections, the era of gravitational wave astronomy has begun. Gravitational wave detections have already given us new information about black holes.

P-35 *A Diffusion Activity for Students* Mickey Kutzner¹, Bryan Pearson², ¹Physics Department, ²Alumnus, Physics Department

Diffusion is a truly interdisciplinary topic bridging all areas of STEM. Through statistical notions of the random walk, physics brings a unique, stochastic perspective to diffusive processes as first shown by Einstein's Nobel-Prize-winning work on Brownian motion. We present a hands-on educational activity for introductory physics students illustrating diffusion as a random walk. The random-walk activity, data collection and analysis techniques will be presented. Pre- and Post-testing demonstrates that the activity and analysis improve student understanding of the mechanisms underlying diffusion.

Engineering and Computer Science

P-36 *Economic Viability Study of the Installation of Fuel Cell for Combined Heat and Power (CHP) System for Stationary Applications* Daniel Marsh¹, Lauber de Souza Martins², Evandro Cardoso³, Sommer Watzko³, ¹Engineering & Computer Science, ²Physics Department, ³Universidade Federal de Santa Catarina

This research has the objectives of identifying successful cases where fuel cell combined heat and power systems (CHP) are used around the world and verifying the economic viability of the installation of fuel cell systems for cogeneration in stationary applications, as for example hospitals, schools, and police and fire stations in southwest Michigan. Japan is an example where CHPs are largely used; however, due to the abundance of other primary sources of energy—such as oil in the US—fuel cells are yet to be more present in the energy generation scenario even though its efficiency is improved when the generation of heat and electricity are combined. An investigation will be done to determine the electrical and thermal needs of the unit under study (hospital, schools as mentioned before). In order to supply the unit's needs, different fuel cell systems will be analyzed, and the energy generated by the hypothetical systems will be priced considering the capital investment in each of these systems as well as its operating costs, based only on their fuel demand. The cost per kWh obtained from each of the proposed systems will then be compared with the kWh currently paid by the unit to the distributor (municipality). From that comparison, we intend to find out how competitive fuel cell systems are in the face of the potent increase in the cost of energy supplied by the distributor.

P-37 *Bioinstrumentation of Electrochemiluminescent Sensor Using Cell Phones* Hyun J. Kwon¹, Zach Verhelle², Daniel Marsh², Ester Carrasco², ¹Engineering & Computer Science, ²Student, Engineering & Computer Science

An escalating need for emergency or point-of-care diagnostics drives the biosensor to be simple to make, portable, and affordable while still providing reliability and sensitivity of high-end equipment. A multipurpose electrochemiluminescence (ECL) based biosensor is being developed, utilizing mobile technologies. Mobile technology's ubiquity and connectivity plays a pivotal role in simplifying biosensor instrumentation and bringing it closer to end users. ECL biosensor is a great platform to satisfy the need for ultrasensitive immunoassay development and ultra-compact instrumentation. ECL reagent of Ru(bpy)₃²⁺ complex was used, and its inherently low signal was overcome by co-reactants such as DBAE. Screen printed electrodes and paper based fluid channels enabled pumpless flow cells. A full waver DC circuit to rectify the AC voltage from the audiojack of the mobile phone and amplify it up to 6V was developed. The ECL reaction was triggered by the cell phone-powered voltage, and the ECL signal was detected by the cell phone camera. The signal generated by mM levels of Ru(bpy)₃²⁺ complex and DBAE were strong enough to be detected by the naked eye. The signal intensity correlated with the reactant concentration linearly. The project is currently seeking external funding.

Post-Deadline Abstract

P-38 *The Influence of Worldvoice, Worldview and Worldvenue on an Education System: How the Dynamic Questions of Who, How and What Impact Critical Thinking in Societies?* Protas A. Makimu, PhD Student, Department of Leadership

Societies operate depending on worldvoice, worldview, and worldvenue, which can be considered as a culture tree. This cultural matrix of wv3 is simply a luminary mentor of adoration (worldvoice), lens mindsets of analysis (worldview), and lifestyle avenue of attitude-actions (worldvenue). Wolf (2016) proposed that a culture tree is an interrelated social system of worldvoice (roots), worldview (shoots), and worldvenue (fruits). People function on the basis of their worldview more consistently than even they themselves may realize. The problem is not outward; the problem is having and then acting upon the right worldview, which gives men and women the truth of what is (Schaeffer, 2005). This paper will answer the three questions of who? how? and what?

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Upcoming Research Events:

Fall Honors Thesis Symposium

November 17, 2016, Buller Hall

<https://www.andrews.edu/services/honors/>

Seminary Scholarship Symposium

February 7, 9-10, 2017, Seminary

<http://digitalcommons.andrews.edu/sss/>

Honors Scholars and Undergraduate Research Poster Symposium

March 3, 2017, Buller Hall

<http://digitalcommons.andrews.edu/honors-undergraduate-poster-symposium/>

Michigan Academy of Science, Arts and Letters

March 10, 2017, Western Michigan University

<https://www.alma.edu/offices/michigan-academy/>

AU Teaching and Learning Conference

March 30, 2017, Bell Hall, Campus Center, Buller Hall

<http://digitalcommons.andrews.edu/autlc/>

Summit on Social Consciousness

April 6-8, 2017

Honor Thesis Symposium

April 14, 2017, Buller Hall

Michigan High School Math & Science Symposium

April 28, 2017, Buller Hall

<http://www.berrienresa.org/cms/One.aspx?portalId=148604&pageId=414230>

Andrews Research Conference: Early Career Researchers in STEM

May 17-21, 2017, Buller Hall

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