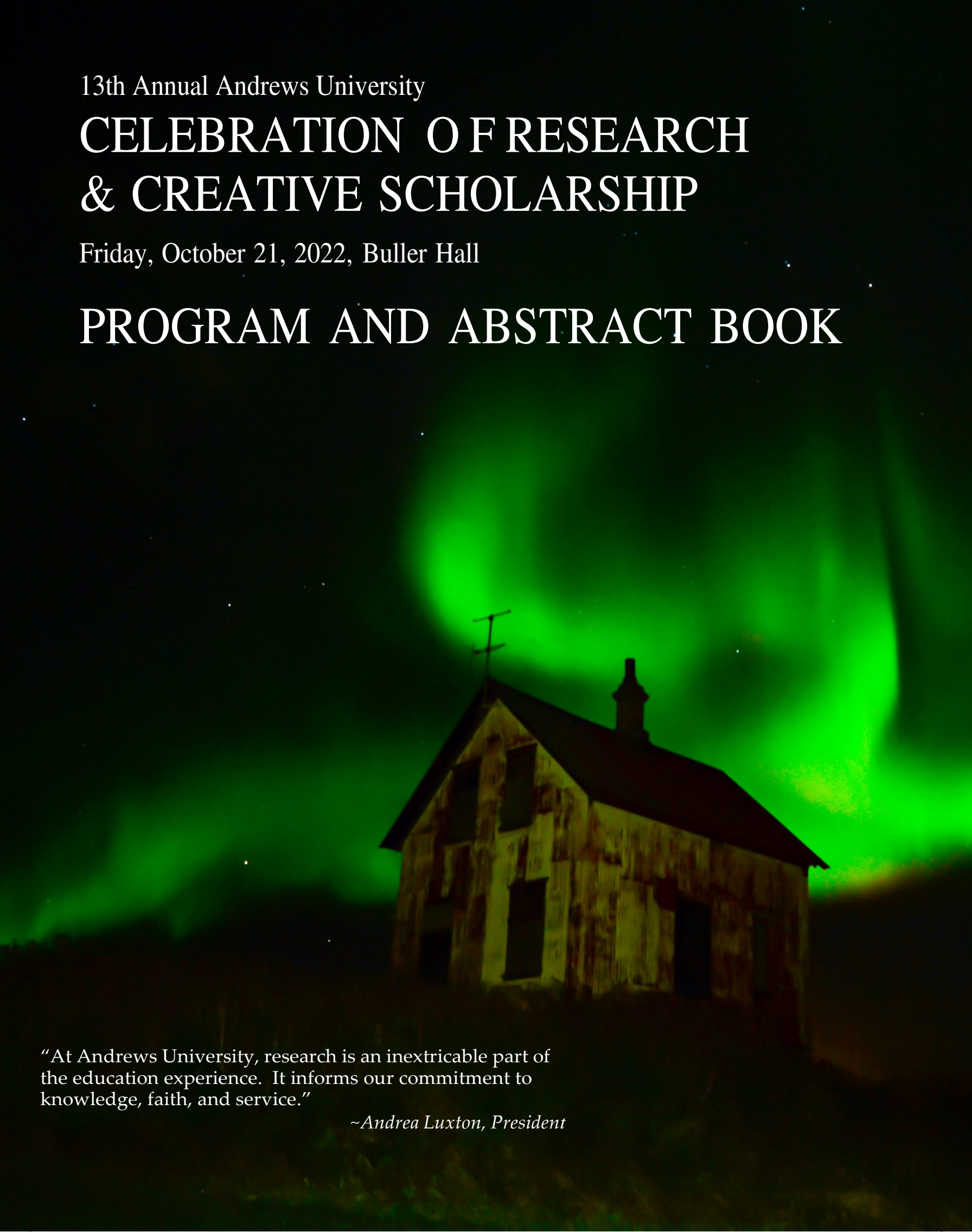


13th Annual Andrews University

CELEBRATION OF RESEARCH & CREATIVE SCHOLARSHIP

Friday, October 21, 2022, 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



It is my distinct pleasure to welcome you to the thirteenth Annual Andrews University Celebration of Research and Creative Scholarship. This year's event caps off the Andrews Research Week 2022. This week of celebrations began on Monday evening with the John O. Waller Lectureship with Louise Geddes, professor of English at Adelphi University. The celebration continued Thursday evening with the Celebration of Community Engagement, where Congressman Fred Upton, and Sung Kwon delivered a keynote address and mission features respectively.

Our Andrews University faculty and students continued to be productive despite the many challenges associated with COVID-19. We are pleased that the number of faculty research protocols is again increasing, as is the number of new Graduate Grant in Aid of Research applications. 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.

Plenary presentations at this year's Celebration of Research will be given by the recipients of the 2022 Siegfried H. Horn Excellence in Research and Creative Scholarship Award— Petr Činčala Petr, and Jay Johnson. 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.

Petr Činčala, PhD, MSW, MDiv, Associate professor in research and missiology, serves as the Director of the Institute of Church Ministry and Doctor of Missiology program at Andrews University's Seventh-day Adventist Theological Seminary. He heads the office of U.S. national partner for NCD (Natural Church Development). As freelance missionary he had developed a model for reaching unreached Czech atheists. His current focus is on research and missiology.

J. R. Johnson received his Ph.D. degree from Massachusetts Institute of Technology in 1992. Since then he has held research positions at University of Alaska, Massachusetts Institute of Technology and Princeton Plasma Physics Laboratory where he served as Principal Research Physicist, Head of Space Physics from 2005-2016, and co-director of the Princeton Center for Heliophysics. He moved to Andrews University in 2016 and currently serves as a Professor of Engineering and Physics. Dr. Johnson's area of expertise is in theoretical plasma physics with emphasis on applications to space plasmas, and he has published more than 100 papers. He has led numerous research projects in solar, magnetospheric, ionospheric, planetary, and stellar physics involving many undergraduate students at Andrews, and this work is currently supported by nine NASA grants and one NSF grant. In his spare time, he enjoys hiking, gardening, woodworking, kayaking, boiling maple syrup, and spending time with his family.

Today, we have invited the winners of 3MT contest, to share their 3-minute dissertation presentations with us. We thank Thaisa Reis and Maureen Raj, Graduate Students, in the College of Education and International Services for sharing their winning performances with us.

After the plenary session, please join us for refreshments during our poster session in the Buller hallways, followed by oral sessions. I hope you enjoy engaging the research and creative scholarship that is available through this celebration. I pray you will be encouraged to continue and expand your research and invest your creative and intellectual energy into research. To learn more about upcoming events, please visit www.andrews.edu/research.

A handwritten signature in cursive script that reads "Gary W. Burdick".

Gary. W. Burdick
Dean of Research

SCHEDULE OF EVENTS

12:30–2:00 pm **Plenary Session** (Buller Hall, Newbold Auditorium)

Welcome and Introduction – Christon Arthur, Provost

Introduction of 3MT Winners – Gary Burdick, Dean of Research

3MT-1 Thaisa Reis, Graduate Student, College of Education and International Services
Corporate Social Responsibility: A case study of sustainable social marketing development in Brazil.

3MT-2 Maureen Raj, Graduate Student, College of Education and International Services
Shattering the glass ceiling: A case study of Andrea Luxton as the first woman president of Andrews University (2016-2023).

Presentations by recipients of the 2022 Siegfried H. Horn Excellence in Research and Creative Scholarship Award. See page 4 for program abstracts.

PL-1 Petr Činčala, PhD, MSW, MDiv, Associate professor in research and missiology, Director, Institute of Church Ministry
Church Related Research with a Mission

PL-2 Jay Johnson, Professor, PhD, Professor of Engineering
Tilting the Playing Field of the Solar Wind: The role of dipole tilt on solar wind-magnetosphere coupling

2:00–3:00 pm **Poster Presentations** (Buller Hallways)

See pages 5–16 for poster abstracts. Refreshments served.

Accounting & Business Professions

- P-01 Accounting
- P-02 Advertising
- P-03-09 Business Administration

Humanities & Social Sciences

- P-10 Architecture
- P-11-14 Behavioral Science
- P-15 Film & Media
- P-16-21 Graduate Psychology
- P-22 Music
- P-23 Library Science
- P-24 Intensive English

Health & Wellness

- P-25-26 Nursing
- P-27-29 Physical Therapy

STEM

- P-30-32 Biology
- P-33 Engineering
- P-34-38 Mathematics
- P-39 Physics

3:00–4:00 pm **Oral Presentations** (Buller 251)

See page 17 for program abstracts.

PLENARY PRESENTATIONS

PL-1 *Church Related Research with a Mission*



Petr Činčala, PhD, MSW, MDiv, Associate professor in research and missiology, Doctor of Missiology Program, Director, Institute of Church Ministry

A brief look into the personal journey of Petr's involvement with Human Subject Research followed by examples of the research projects the General Conference as well as the North American Division of the Seventh-day Adventist is currently interested in. Space for questions and discussion about the role, scope, and use of human subject denominational research.

Petr Činčala serves as the Director of the Institute of Church Ministry and Doctor of Missiology program at Andrews University's Seventh-day Adventist Theological Seminary. He heads the office of U.S. national partner for NCD (Natural Church Development). As freelance missionary he had developed a model for reaching unreached Czech atheists.

PL-2 *Tilting the Playing Field of the Solar Wind: The role of dipole tilt on solar wind-magnetosphere coupling.*



Jay Johnson, Professor of Physics and Engineering

The solar wind drives the magnetospheric environment of the Earth causing explosive substorms, scintillating auroral displays, and acceleration of radiation belt electrons that can be hazardous for satellites. The Earth's magnetic field carves out a giant cavity in the solar wind and plays a vital role in the dynamics of the magnetosphere. The tilt of the magnetic field toward/away from the sun can significantly affect magnetospheric substorms, viscous transport at the magnetopause boundary, and coupling of solar wind compressions into the inner magnetosphere. This talk will explore recent observations and discuss the underlying physics of how the tilt of the dipole axis causes seasonal and diurnal variations in geomagnetic activity.

J. R. Johnson received his Ph.D. degree from Massachusetts Institute of Technology in 1992. Since then, he has held research positions at the University Alaska, Massachusetts Institute of Technology, and Princeton Plasma Physics Laboratory where he served as Principal Research Physicist, Head of Space Physics from 2005-2016, and co-director of the Princeton Center for Heliophysics. He moved to Andrews University in 2016 and currently serves as a Professor of Engineering and Physics.

Dr. Johnson's area of expertise is in theoretical plasma physics with emphasis on applications to space plasmas, and he has published more than 100 papers. He has led numerous research projects in solar, magnetospheric, ionospheric, planetary, and stellar physics involving many undergraduate students at Andrews, and this work is currently supported by nine NASA grants and one NSF grant. In his spare time, he enjoys hiking, gardening, woodworking, kayaking, boiling maple syrup, and spending time with his family.

POSTER PRESENTATIONS

ACCOUNTING & BUSINESS PROFESSIONS

Accounting

P-01 *Financial reporting fraud: How merger and acquisition complexity provide greater opportunities for CEOs to engage in wrongdoing*

Carmelita Troy, Andrews University; Jong Chool Park, University of South Florida; and Madeline Domino, University of South Florida.

Using mergers and acquisitions (M&As) as a proxy to increase organizational complexity, we build upon Schnatterly et al.'s (2018) framework to address the gap in the management literature relating to how major firm disruptions, such as M&As, provide greater opportunities to entrenched CEOs for financial statement fraud due to higher levels of complexity. We extend the research on complexity-based information asymmetries (Ndofor et al. 2015) by empirically investigating whether accounting fraud is linked to M&As using a diverse set of variables. We propose the complex nature of M&A transactions result in higher information asymmetry, which provides a “veil” for self-interested CEOs who have an information advantage to engage in financial statement fraud. Comparing fraud firms with non-fraud firms during 1991-2016, we find evidence that fraud firms are more likely to be associated with M&As as compared to non-fraud firms using the Entropy Balancing Method (EBM). We show similar results in Propensity Score Matching (PSM) analyses which controls for potential endogeneity to engage in M&As. Further analyses show that positive relationships between financial reporting fraud and M&As are more pronounced in more complex M&A transactions and that the positive relationship between M&As and frauds is more pronounced in M&As of a public target, stock-financed M&As, diversified M&As, larger M&As, multiple M&As, and M&As advised by investment bankers. These results also show that the positive relationship between reporting fraud and M&As is moderated post Sarbanes Oxley (SOX), for acquiring firms that engage Big N auditors and for firms with long tenured CEOs.

Advertising

P-02 *The Secret Influence of Your Behavioral Scripts on Your Everyday Purchases*

Jack W. Proctor, Sheila A. Snyder, and Kimberly S. Pichot

We all have behavioral scripts for every series of actions we take. These subconscious scripts tell us the sequence of expected behaviors we anticipate for anything we do—every step we take from entering a store to exiting, for example. Research indicates that behavioral scripts are individually held and play an active role in our experiences and recollection of said experiences (Bower et al, 1979). Despite there being a plethora of research on behavioral scripts in psychology, there is little research of behavioral scripts within the field of marketing and consumer behavior. We know that behavioral scripts affect human behavior, but the effects on consumer behavior are less known. This research explores the ways in which scripts affect buyer behavior, how marketers' knowledge of scripts can elevate their influence, and whether going with or against a consumer's script is most beneficial to the business.

Business Administration

P-03 *Longitudinal Study- The Impact of the COVID Epidemic on the Asian-Pacific Region in Terms of Balance of Payments, Current account, Total, Net (BPM6), and Percentage of GDP*

Yilei Li

Due to the impact of the COVID epidemic, growth in the world's three largest economies has stagnated, inflation has exceeded expectations, and the global economic outlook is bleak and full of uncertainty. This study aims to analyze the phenomena of economic decline following the COVID outbreak by comparing the effects of the epidemic in 37 nations in the Asia-Pacific area (Korea, the Republic of; Cambodia; Papua New Guinea; Tuvalu, etc.) before and after the outbreak. The approach employed in this study is a longitudinal survey that analyzes the balance of payments, current account, total, net (BPM6), and percentage of GDP for eight years before and after the epidemic for various nations in the Asia-Pacific area. The data are then processed and analyzed in SPSS using the two-way ANOVA repeated measures method. The study's findings indicate that the COVID-19 epidemic had a major economic impact on the Asia-Pacific area. In the Asia-Pacific area, the COVID outbreak did have an impact on the balance of payments, current account, gross, net, etc. It should be emphasized that the Asia-Pacific region has stricter national control requirements than other regions, which may have an impact on the study's findings.

P-04 *The Impact of the Great Recession in 2009 on the exports of goods and services between 2000-2019, by 25 countries in Asia and Africa - Two Way Anova Repeated Measure*

Melusi Shepherd Maseko, Jerry Chi and Grace Chi

Calamities such as the 2007-2009 Great Recession, caused by the collapse of the housing market mainly incited by low interest rates and easy credit, leave a trail of profound and devastating damage in their wake. High rates of unemployment, stock market crashes and reduction in consumption rate etc. are but a few of the effects. There is evidence of certain nations being better equipped to field economic downturns such as recessions or environmental calamities such as floods and storms. The interest area for this research was to ascertain the impact that the 2009 great recession had on exports of goods and services by 25 countries in Asia and Africa between 2000 -2019. Two Way ANOVA Repeat measure data analysis was key to this study and to counteract multiple comparisons problem, Bonferroni method of correction was utilized. Findings revealed a leadership style backed by natural resources is correlated to the level of financial and overall performance of a nation before, during and after a recession calamity. The significant main effects of Test, $F(1, 25) = 30.553$, $p = .001$, Partial Eta Squared = .629 such that Post Test ($M = 56.023$, $SD = 3.717$) had a significant high than Pre-Test ($M = 26.890$, $SD = 3.727$) indicated more economic opportunity for trade after the Great Recession. Countries such as Saudi Arabia and the UAE had even higher significant interaction effects suggesting a boom in economic trade after the recession as compared to years before.

P-05 *Gender Budgeting and Gender Equality in Europe with historical data during 1994-2013*

Jennifer P. Ratulangi

Gender budgeting and gender equality in Europe plays a crucial role in inequality and development to have enjoyed sustained support. Inequalities have risen in some countries in recent decades due to factors such as globalization, technological change, taxation policy, and the economic crisis (Eurofound, 2022). Therefore, when high levels of inequality reduce growth in relatively poor countries but encourage growth in richer countries (Balls, 1999). This paper aims to examine the impact of gender budgeting processes on gender equality and fiscal space in European countries. Using secondary data research with a 45-item survey that measures participant gender budgeting and equality. Data were analyzed using SPSS software version 28. A two-way ANOVA was performed to know how two independent variables, in combinations, affect a dependent variable. The two independent variables (IV) are inequality and development and gender; the variable dependent (DV) is the gender quality measurement score. The IV will show the effect that will happen in DV. The inequity and development (IV1) and gender (IV2) show the changes over the years. The repeated measure shows whether or not there is a statistically significant difference on the main $F(1, 45) = 23.531$, $p = .001$, Partial Eta Squared = .354. This shows that there was a statistically significant difference in the gender budgeting and equity variable between at least two groups. Gender budgeting affects gender equity. This study used secondary data research found in the IMF. Future research should use primary data. There is a significant of main effect between groups, $F(1, 45) = 23.531$, $p = .001$, Partial Eta Squared = .354 such that group effect inequality ($M = .793$, $SD = .074$) had a significantly high than development ($M = .281$, $SD = .075$) indicated there's a difference between inequality and development. For group gender female ($M = .793$, $SD = .074$) had a significantly high than development ($M = .281$, $SD = .075$) indicating there's a difference between female and male.

P-06 *Effectiveness of Exercising with Music*

Geetha Raj Choppala

Several research has been made by many psychologists and health professionals around the world about exercising and listening to music for meditation and relaxation. Everyone regardless of what age group, surely are aware and have knowledge regarding the health benefits associated with exercise and have a general interest in listening to good music while they drive or when they cook in the house just to have some fun twist to what they are doing so they don't feel bored. So here we are trying to see how both exercise and music work together whether they have more health benefits than usual since most people feel excited, joyful, stressless or even motivated with music. And people who have religious belief would feel more empowered when they listen to their spiritual music with meaningful lyrics which will inspire them in different ways. Sometimes exercising silently can make you feel like a burden to workout but with music you can feel encouraged. People often listen to music simply because their work feels lighter and more pleasurable with music than like a tiring duty, but they seldom realize how many benefits are associated to this pairing of music of our choice with exercise. Exercise not only maintains our outward appearance by keeping our physical body fit, toned and slim. It also helps in the physiology of human body where it stimulates almost all the organs inside our body and promotes good metabolism, digestion, excretion and even detoxifies. On the other hand, music plays an excellent role in relaxing our muscles and by activating our brain cells in releasing happy hormones like adrenaline and serotonin that keep us joyful and positive which will obviously improve our overall health. Since health is not defined as not having a disease but it involves a complete well-being of a person physically, psychologically, emotionally, socially, and spiritually as defined by WHO. Our aim here is to bring about a change in the lifestyle of people so they can live a peaceful and harmonious lives regardless of what painful situations they may be going through because life is a gift of God and our body is the temple of God so we have to be happy in ourselves and keep our bodies functioning well just as they have been created so wonderfully by our creator God almighty.

P-07 *COVID-19 Pandemic Impact on Church Cash Inflows in Ghana as Moderated by Location Profile*

Williams Kwasi Pehrah

The coronavirus (COVID-19) pandemic has negatively and positively impacted all sectors of world economies since its inception in the early 2020s. Profit and not-for-profit institutions have had their levels of effects as a result of the worldwide crises. Lockdown measures imposed by governments around the world to curb the spread of the virus had various repercussions on various activities, including churches. Effects of the pandemic on businesses, education, agriculture, and tourism, among others, have received massive highlights in literature. Given this phenomenon, this study sought to ascertain the impact of COVID-19 on church cash inflows. The study used a quantitative research approach. The research instrument consisted of a self-constructed questionnaire with the variable COVID-19 Pandemic Cronbach alpha of 0.710 and secondary data for cash inflows. The study made use of a descriptive correlational design. Data collected from Unions and Conferences of the Seventh-day Adventist Church in Ghana were statistically analyzed. Results showed a positive significant impact of COVID-19 on church cash inflows. There was a significant moderating effect of location profile on church cash inflows during the pandemic. The findings have implications for the diversification of income sources through church projects to achieve stable to moderate cash inflows in the events of unpredictable new normal. This study concludes that the longevity of the pandemic will continually cause church cash inflows to decline.

P-08 *Longitudinal Study: the interventional effects of Policy Treatments on Government Revenues among Various Countries*

Abel Siamubi and Jerri Chi

The present pandemic poses the biggest threat to the international economy after the great recession in 2008-2009. The effects of COVID-19 on the global economy are increasing. The effects of both the recession and the COVID-19 pandemic are reflected in economic indicators which include macroeconomic performance (GDP, consumption, investment and international trade) and stability (central government budgets, prices, the money supply) (The World Bank). The purpose of this study is to examine whether the policy treatments on government revenues among various countries reduced the effects of COVID-19 on the global economy. A repeated measure ANOVA was conducted to analyze the secondary data from the IMF. An analysis was conducted on 28 countries over a period of 17 years which are categorized as pre-pandemics, recession, and during-covid. The results show that Policy treatments various governments implemented have a significant effect, $F(2, 15) = 34.886$, $p < 0.001$, Partial Eta Squared = 0.823 such that during COVID ($M=6.108E+11$, $SD=2.675E+10$) had a significantly higher mean than during the recession ($M=3.957E+11$, $SD=2.317E+10$) indicating that the policy treatments on government revenues among various countries reduced the effects of COVID-19 on the global economy.

P-09 *Longitudinal Study: The Interventional Effects of COVID Pandemic on the Consumer Price Index (CPI) Among Southeast Asian Countries*

Arnelly Miechel and Jerry L. Chi

The purpose of this paper is to ensure the impact of coronavirus (Covid-19) on the Consumer Price Index (CPI) in Southeast Asian Countries. As one of the measurements for inflation, CPI should be maintained at a manageable level even, when necessary, policies are to be implemented to sustain households and organizations. Thus, this paper also tries to provide a clearer understanding to recommend a better policy in the future if a similar worldwide emergency arises. The study used a comprehensive analytical assessment of each Southeast Asia country's yearly CPI, based on data collected from the International Monetary Fund database. Our findings testify that Southeast Asian countries' CPI is significantly correlated with the Covid Pandemic, with Greenhouse-Geisser $p = .039$ ($F=4.474$, Partial Eta Squared=.157). Malaysia experienced the biggest decline in mean CPI after the Pandemic, whereas Myanmar experienced the biggest increase in mean CPI. This suggests that it is possible to maintain same level of CPI, or even lower, even during global emergencies. Southeast Asian countries can learn about the policies and preparations from countries such as Malaysia and Thailand.

HUMANITIES & SOCIAL SCIENCES

Architecture

P-10 *A Center of Influence in Majdal Anjar, Lebanon*

Andrew Von Maur and Zayda Steinke

The 2022 graduate Urban Design Studio recently conducted a two-week visit to Lebanon as part of an effort to prepare plans for a new Center of Influence in Majdal Anjar, Lebanon. The center, to be operated by the NGO Winners, aims to uplift Syrian refugees and local people through various educational programs and soccer training. Led by Professors Andrew von Maur and Zayda Steinke, the team of ten architecture students engaged Winners, the children and families it serves, and local municipal leaders through participatory design workshops. The visit was also used to document the site, understand existing conditions, and observe local architectural and development patterns. This presentation provides a visual summary of the ongoing project and its process.

Behavioral Science

P-11 *Transitions in Hisban: Gender, Kinship, and Care in Jordanian Archaeology*

Stacie Hatfield

This qualitative ethnographic study examines transitions in gender, kinship, and care at the Tall Hisban Archaeological Park in Jordan. Tall Hisban as a geospatial and socially constructed place can be conceptualized through a theoretical lens of care by which is meant care for archaeological sites and artifacts themselves, but also care for particular narratives, relationships, and social political identities including those of local workers and organizations, community members, and archaeologists excavating at the site. Drawing from an extensive history of archaeological work conducted by Andrews University in Jordan, from one month of participant observation with the Andrews University Archaeology Field School, and from interviews conducted with individuals working in archaeology and conservation at Tall Hisban, multiple intersecting transitions were found. Initial findings included transitions from archaeological excavation to site conservation and transitions in site responsibility from foreign research institutions including Andrews University, to the Department of Antiquities and local communities in Jordan. Additional transitions included generational continuities and shifts among local and foreign workers connected with the site. While archaeology has seen an increase in women across the discipline, an unexpected finding was that Jordanian women are increasingly engaged in archaeological excavation and conservation work in Jordan and at Tall Hisban. Together, these findings present rich opportunities for further research and make significant contributions to understandings of Middle East archaeology in that they trace transitions in archaeological theory and practice as well as innovative cultural changes in archaeology in Jordan and at Tall Hisban.

P-12 *A Latitudinal Analysis of Adventist Beliefs, Behaviors, and Spiritual Well-Being*

Crystal Collins, Karl Bailey, and Duane McBride

In this study, we examined cultural influences on religious beliefs within a global sample of Seventh-day Adventists. The Seventh-day Adventist Church is a strict church, meaning that the Church represents a distinct and consistent social group within many different cultural ecosystems around the globe (Wilson et al., 2016). Strict churches attempt to insulate members from other groups in the cultural ecosystem. Because cultural ecosystems of interacting and overlapping social groups vary by latitude—societies differ pole to equator far more consistently than East to West (Van de Vliert & Van Lange, 2020)—we analyzed whether Adventist belief and behavior vary by latitude. Accordingly, we examined associations between measures of belief and behavior in the Global Church Member Survey II (2017-2018; Bailey et al., 2018) aggregated by country or region, measures of cultural context, and population-weighted latitude. Measures of cultural context correlated moderately to strongly with latitude, replicating previous work. Spiritual well-being, core Adventist beliefs, and personal devotional practices varied weakly or not at all by latitude. However, spiritual struggle, legalism, spiritualism, and social religious behaviors (all decreasing toward poles) did show large associations with latitude. These patterns reflect pressures within cultural ecosystems that build intuitive beliefs and compel high-cost practices.

P-13 *El laberinto del fauno: A Child's Imagination and Coping with the Trauma of War, Psychology and Spanish*

Hannah Cruse, J. N. Andrews Honors Scholar

Abstract of “El laberinto del fauno: A Child’s Imagination and Coping with the Trauma of War”. Guillermo del Toro’s film *El laberinto del fauno*, known as Pan’s Labyrinth to English speaking audiences, opens up a fantastical world that is just a touch away from reality, but everyone believes this to be the imagination of one child, Ofelia. She tries to complete tasks and learns the truth of the land of post-Civil War Spain that she currently resides in while she yearns for another. A child’s imagination can be transported by a simple story; there seems to be a special connection between fairytales and There are methods of psychotherapy for children such as rational emotive imagery, or REI, to create pathways to subdue stress and anxiety that come from difficult situations. Through the medium of imagery in psychotherapy, a child can cope with their traumatic experiences and learn solutions to the problems that they face in their reality every day, as Ofelia did in her own situation. Ofelia, in her fantasy world, ends up experiencing situations that are simultaneously happening in her reality, much like using REI. One could think that the director took a pessimistic approach by killing her in the end, after all psychotherapy is supposed to have a positive impact on a person’s life, but he tells a story of fantasy being reality, solidifying the importance of an active mind and storytelling, especially during tough times. A person’s imagination can teach them how to live in the real world.

P-14 *Promoting Women's Education through Humanity Madagascar*

Joel Raveloharimisy and Francky Rakotoarimanga

Since the rise of women’s empowerment, girls’ education has been on the agenda of all development forums in an effort to ensure equality and state development. Additionally, the Water Sanitation and Hygiene (WASH) sector is one of the most integral units of both the humanitarian and development field. Through an analysis of preliminary data collected in Madagascar, however, we noticed that though there are many WASH programs and efforts that have been carried out, girls are not using the latrines provided, transmittable diseases spread in school, and altogether, girls are dropping out of school. This research explores the relationship between WASH and the attendance and retention of girls in school and provides the possible ‘missing link’ that explains the lack of efficacy of WASH in alleviating female school dropouts. I use a cross-sectional study of WASH facilities in Ambatondrazaka, Madagascar, using a combination of quantitative and qualitative methods to conduct the study. female school dropouts. I use a cross-sectional study of WASH facilities in Ambatondrazaka, Madagascar, using a combination of quantitative and qualitative methods to conduct the study.

Film & Media

P-15 *The “essential” in Mark Osborne’s The Little Prince. A Buberian reading.*

Sonia Badenas

What if the essential was invisible to the eye just because you were not looking in the right direction? What if the only thing you needed was a telescope? What if the essential was not the immediately useful? What if leisure and meaningful relationships were essential for human fulfillment? Mark Osborne’s animated version of “The Little Prince” offers a fresh look on Saint-Exupéry’s bestseller. Far from being a spoiler to the content of the book, Osborne’s movie articulates and develops different perspectives on the crucial issues of friendship, adulthood, and work, taking the famous book as his privileged starting point.

Graduate Psychology

P-16 *Predictors of Bullying Behaviors Among Adolescents in Saudi Arabia: The Role of Self-Esteem, Emotional Intelligence, and Moral Disengagement*

Ayat Hamzah, Nadia Nosworthy, Jimmy Kijai, and Luana Greulich

Over the last years, there is a growing recognition of the bullying phenomena and its influence on students' social, emotional, and academic lives. In Saudi Arabia, researchers conducted an exploratory study in bullying in high school and found various forms of bullying (verbal, physical, sexual, psychological/social, and cyberbullying) were reported among Saudi students (AlBuhairan et al., 2016). Among 12- to 18- year-old students who attend school in Saudi Arabia, bullying victimization was reported at 26% (AlBuhairan et al., 2017). Another study in Saudi Arabia found that bullying behavior was ranked as the first and most common aggressive behavior among school students in Riyadh, the capital city, at 31.5% (Al-Qahtani, 2009). This study aimed to investigate how adolescents' self-esteem, emotional intelligence, and moral disengagement may influence bullying behavior among adolescents in Saudi Arabia. A total of 735 participants (378 male and 357 female) were obtained from high schools ages between 14 and 18 years old who attended public high schools in Saudi Arabia during the 2022 academic year. Participants completed a survey consisting of demographic questions such as gender and grade level, The Bullying and Cyberbullying Scale (BCS-A), Rosenberg's Self-Esteem Scale (RSES), Wong and Law Emotional Intelligence Scale (WLEIS), and Bandura's Moral Disengagement Scale (MDS). The statistical analyses utilized will involve descriptive statistics, One-Way MANOVA, and Structural Equation Modeling (SEM) analysis. The findings will underline the importance of extending our understanding of the bullying phenomenon among adolescents.

P-17 *Predictors of Statistics Anxiety Among Graduate Students in Saudi Arabia*

Rabab Abdulghani, Nadia Nosworthy, Jimmy Kijai, and Elvin Gabriel

This quantitative study will examine the levels of statistics anxiety among 356 graduate students in Saudi Arabia. The study will also assess a theoretical model which proposes that anxiety toward statistics, statistics self-efficacy and previous statistics experience predict statistics anxiety. Results will indicate statistics anxiety level and shows its predictors.

P-18 *Analyzing Child Maltreatment, Executive Function, and Trauma appraisal using Structural Equation modeling*

Myshira Oliver

This quantitative study will examine the levels of statistics anxiety among 356 graduate students in Saudi Arabia. The study will also assess a theoretical model which proposes that anxiety toward statistics, statistics self-efficacy and previous statistics experience predict statistics anxiety. Results will indicate statistics anxiety level and shows its predictors.

P-19 *Assessing the Mental Health Needs of Medical Students in Rwanda*

Andrew Cooper and Carol Woolford-Hunt

The Adventist School of Medicine of East-Central Africa (ASOME) was opened in September of 2019 in Rwanda and serves the 11 African countries of the East-Central Africa division of the Adventist church. The purpose of this study is to assess the mental health status of medical students at ASOME which will provide the basis for recommending mental health services.

P-20 *Basic Psychological Needs Satisfaction, Autonomy Support, and Growth Mindset as Predictors of Self-Regulation in University Online Learners*

Christine Jin, Nadia Nosworthy, Jimmy Kijai, and Janine Lim

This study used structural equation modeling (SEM) to explore how autonomy support, basic psychological needs satisfaction (autonomy, competence, and relatedness), and mindsets predict self-regulation among university online learners in the United States. The number of complete and valid online survey data in use was 404. Mediation effect and moderation effect were also examined for this study.

P-21 The Traumatic Impact of Community Violence Exposure on Children: Perceptions and Experiences of School Mental Health workers in Trinidad

Nadine Isaac-Dennis and Michael Milmine

This qualitative study will explore the perceptions and experiences of school mental health personnel who provide support for children who live in communities with high levels of community violence in Trinidad. This study aims to gain insight into the type/s and frequency of community violence children are exposed to, the possible trauma symptoms observed, and the interventions used to respond to these children through the experiences of these school mental health workers. Three to six school mental health workers will be interviewed face to face, or via Zoom, using semi-structured interviews. Thematic analysis will be used for this phenomenological study. The findings will inform future interventions, and provide more information to inform intervention, practice, and policy.

Music

P-22 The Invitation: A Creative Project in Composition and Performance

Grant Steinweg, J. N. Andrews Honors Scholar

In the fall semester of 2021, I wrote an original composition for cello and orchestra and competed with it in the annual Young Artist Competition. After having been selected as one of the soloists, I premiered my composition Invitation with the Andrews University Symphony Orchestra as cellist and composer in the spring semester of 2022. This project reflects upon my creative journey and assesses the effectiveness of my composition in communicating a desired felt experience to listeners. In addition to my own assessment, I also evaluate written feedback from Andrews students who attended the composition's premiere.

Library Science

P-23 2 Peter, Information Literacy, and Theological Discourse.

Terry Dwain Robertson

The pedagogical mission of academic librarianship embraces information literacy. "Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning." (<https://www.ala.org/acrl/standards/ilframework>) The Association of College and Research Libraries proposes a Framework for teaching information literacy, including knowledge, practices, and dispositions--addressing both the consumption and production of information. In 2 Peter, the knowledge, practices, and dispositions of the faith community (2 Pet 1), contrasted with those of the false teachers (2 Pet 2), are applied to a truth warfare issue (2 Pet 3). Using this Biblically informed and faith integrated application of the Framework, the theme developed in 2 Peter of "growing in knowledge" as relational, performative, and consequential equips the Christian disciple to "be not deceived" and to "grow in the grace and knowledge of our Lord and Savior Jesus Christ." (2 Pet 3:17-18)--both in the discernment and proclamation of truth. I propose the Framework speaks to how those members of the learning community who pursue Biblical Theology engage one another as they seek to grow in knowledge and communicate with each other. The Framework does not attempt to define truth. Instead, it guides how we, together as a community of faith, as fellow seekers for truth, can effectively engage one another as we pursue the truth. The Framework tacitly exposes unhealthy communication practices, many of which challenge the faith community, by fostering healthy communication practices.

Intensive English

P-24 Rethinking Diversity in a Hybrid Foreign Language Class

Daniela Ortiz

This poster session represents an ethnographic study of a hybrid foreign language class, focusing on the challenges created by students' multiliteracy practices. Students range from high schoolers enrolled in dual programs, to heritage speakers, to adults who look for a career change. Reaching such a diverse group of students can be challenging but challenges create Third Spaces where learning is expanded and literacies improved (Smagorinsky, 2021; Gutierrez, 2011; Hulme et al., 2009; Lynch, 2008). These Third Spaces are created by using diversity and even conflict as a source of students' multivocal discovery of self. Heritage speakers often feel in limbo, not fully belonging to the culture they function in or in their family's native culture. High schoolers may feel dominated by the adults in the class and can be shy in expressing opinions. The hybrid environment of a language class allows students to feel less threatened in expressing their identity and exploring their literacy skills. Instructional approaches such as Discussion Boards, Zoom conferences, collaborative work in a mixed group, and storytelling can empower all students and help them learn from each other's strengths. This poster will offer a view of the language class diversity (chart). It will start by offering an explanation of the third space (printed 5 X 7 card). It will also offer tips on how to create personalized versions of assignments allowing students the freedom to explore according to their voice, and literacy level (printed samples of such assignments). It will also show how to use heritage learners as tutors and cultural resources (printed tips). It continues with examples of collaborative projects to expand students' literacies, to embed reflection and reinventing of self as they learn a new language and culture (printed sample of the collaborative project).

HEALTH & WELLNESS

Nursing

P-25 Perceived Faculty Barriers to the Use Active Learning Methods for Planning, Delivery, and Assessment of Learning

Jochebed Ade-Oshifogun, Michelle Allyn, Anneris Coria-Navia, Jenica Joseph, Kimberly S. Pichot, Tammy Shilling, and Letrisha Stallard,

Higher education has grown the awareness of the importance of using active learning methods in the classroom. However, faculty find the consistent implementation of active learning methods challenging to maintain or fail to understand the methodologies in redesigning a course for active learning. Institutions and accrediting agencies encourage faculty to demonstrate various teaching methods that reach students' varied learning needs. Peer networks and in-house expertise must be included as strong components of sustainable programs. Faculty receive limited or no formal training on how to teach. The literature supports the importance of pedagogical training, faculty collaboration, and hands-on professional development opportunities. Very few studies identify the faculty barriers and motivations for using active learning pedagogies in their classrooms. This cross-sectional quantitative study design uses a 23-question survey on perceived barriers to using active learning in the classroom. The target population is faculty members in higher educational facilities in the United States of America. An online survey company will target a convenience sample of at least 1,000 faculty members to complete the electronic survey. Data will be analyzed using descriptive statistics to categorize the identified barriers and motivations. We will correlate the barriers and motivations with the demographic data to observe significant relationships. All data analysis will be completed using SPSS data analysis software version 27.

P-26 Causes of marital dissatisfaction among Nigerians living in North America - Perception of Nigerian Immigrants: A qualitative Study

Jochebed Ade-Oshifogun, Andrews University, Jean Cadet, Andrews University, and Angusta Olaore. Babcock University

This is a follow up of the research presentation at the last NANNNA conference. Nigerians are the largest African Immigrants in the rapidly increasing immigrant populations in the United States of America. The process of acculturation is laden with challenges, including marital dissatisfactions. Nigerian immigrants are best suited to identify the causes of marital dissatisfaction among this population.

Methods: We conducted fifteen in-depth interviews via zoom from July to December 2021. Recorded interviews were transcribed by three research assistants and transferred to NVIVO 12 Plus for thematic analysis. Results: Several themes related to marriage dissatisfaction were identified, including 1) physical, mental and financial abuse, 2) Acculturation, 3) Controlling husband, 4) Lack of care and attention, 5) Lack of communication, 6) Lack of time for intimacy, 7) Lack of trust, and 8) in-laws' interferences. Discussion: The identified themes will be used to refine or affirm IMDQ. KMS will help to validate IMDQ. Factor analysis will reveal moderate to high Cronbach's alpha for the refined IMDQ.

Physical Therapy

P-27 Developing an Operational Model for Mission Trips. The Kihurio-Tanzania Case study.

Sozina Katuli, Andrews University; Roy Mendizabal; Amos Kihedu, Northeast Tanzania Conference NETC; Alex Kiondo, Kihurio Mission SDA Church; Hudson Mngumi, Kihurio Uzambara SDA Church; Nummenye Mwandambo, Private; and Zoe Msangi Dr., Mawenzi Hospital Moshi Tanzania

Background. Mission trips have been conducted by many health workers and missionaries in developing countries. These trips have benefitted many communities; however, these benefits might have been short lived and not sustainable. Once the mission team leaves, the communities are left unattended with little or no support. This mission-research project strives to develop an operation model to address this anomaly. **Method.** Our model follows a three-part strategy; - initial assessment visit, an in-depth research investigation trip combined with health care services and a follow up visit to address health problems identified. A grass root approach was initially used through participatory research that assessed health needs in Kihurio village in December 2017. Focus group discussions and key informant interviews were used for gathering data. In the second and third visits, 2021 and 2022, we focused on investigating the actual prevalence of lifestyle conditions identified in the first visit, mainly hypertension and diabetes. We additionally provided health care to 957 patients who came with optical, cataract, knee, back pain, and several other conditions. Physical therapy interventions and seminars were also done during the first and third visits. **Results and Conclusion.** This problem-oriented approach, using local health workers assured sustainability of the project. Since evangelism was an integral part of the program, it provided the best opportunity to witness for Christ. We are planning a follow up research to collect prospective data and evaluate the cataract problem. An IRB modification will be done in due time.

P-28 The prevalence of lifestyle diseases among adult males and females in Kihurio Village Same Tanzania. A Community Health Assessment.

Nigel Essix, Bakari Thomas, Denoi Black, Kenneth Carcelen, Matthew Masangcay, and Sozina Katuli

Background: Adults under the age of 70 in Sub-Saharan Africa face a higher probability of death from non-communicable diseases than adults of the same age in the Established Market Economies. A team from Andrews university in collaboration with the health unit of the Northeast Tanzania Conference (NETC), collaboratively conducted a community needs assessment and on lifestyle diseases in Kihurio village in December 2017, over half of the attendee had hypertension. Focus group discussions with the community also listed hypertension and diabetes as one of the major health problems. **Objectives:** To determine the prevalence of lifestyle conditions, namely hypertension and diabetes, and identify risk factors. **Methods:** Blood pressure and glucose of 200 participants aged 20 years and above was evaluated using a survey method, in this exploratory study. Measures of body mass index, physical activity, systolic and diastolic blood pressure, blood glucose and risk factors including diet, smoking, drinking alcohol, was collected through face-to-face interviews administered to participants who were randomly selected. The cutoff point of 120mmhg for elevated SBP and 120mg/dl glucose was used to distinguish those with and without a condition. Descriptive statistics, Pearson and Spearman correlations were obtained, and Multiple linear regression used to analyze the data in SPSS 26. **Results:** Prevalence of 55 % for hypertension and 12% for diabetes was found. Continued data analysis is still underway, and complete results will be available during presentation. **Public Health significance:** The findings will be used for developing a lifestyle health program for the NETC.

P-29 Assessment of Nutritional Status of Children Under the Age of five Years in Kihurio Village in Tanzania.

Sozina Katuli, Letrisha Stallard, Olivia Shinrock, Elyssia King, Valerie Eaton, Dawilda Lorenzo, and Itumeleng Gabasiane.

Introduction. Nutritional status of children under the age of five years has been associated with their general health. People from Kihurio depend on intensive farming and tend to farm all year round. In December 2017, the department of health of the Northeast Tanzania SDA Conference (NETC), in collaboration with Salama health - a mission group conducted a participatory health assessment. The results found that women felt overworked with farm activities that could take away time for childcare. The extent of child undernutrition and its factors are not documented. Our objectives are to assess nutritional status and evaluate factors contributing to the state of nutrition of the children. Methods. We conducted a cross sectional household survey on 210 children under the age of five years. We plan to evaluate anthropometric indicators of nutrition, namely underweight, wasting and stunting using Z scores calculated based on the NCHS: CDC: WHO reference populations. The Z scores will be classified as; Normal-2.0 Z-score or greater; Moderately malnourished - Between -3.0 and -2.0 Z-score; and severely malnourished - Z-score less than -3. Descriptive statistics and the relationship between nutritional status and possible factors will be explored using Logistic regression analysis. Results: Analysis of data in this study is still underway since it is part of the student's capstone research project. We plan to extend the grant to another year to complete the study. Public health significance: Results of this study will enable the NETC, and other stakeholders to develop viable health programs for this community.

STEM

Biology

P-30 Exploring enzymes: catalytic mechanism and biological function

Peter Lyons

Enzymes are critical for the biochemistry of life, as they make chemical reactions happen that could not otherwise occur. The Proteolysis Lab studies a family of enzymes that trims individual amino acids from the carboxy-terminal ends of peptides and proteins. This can be for the purpose of digestion, but is often to regulate the activity of important peptides and proteins. Currently we are exploring the mechanism and function of two such enzymes. Ecm14L is derived from the mushroom *Agaricus bisporus*. Its function is unknown, but it appears to function through a unique mechanism, in which a tyrosine plays the catalytic role of general base. Carboxypeptidase O (CPO) is an enzyme found in most vertebrates. Several lines of evidence suggest that CPO may be a folate hydrolase, including expression in immune cells, ability to cleave glutamate-extended folate, and activation by glutamate-extended folates. Results from these two lines of inquiry will lead to a deeper understanding of proteolytic function and diversity.

P-31 Induction of Apoptosis in Pancreatic Ductal Carcinoma PANC-1 Cells by Chinese Medicinal Herbs *Scutellaria barbata*, *Oldenlandia diffusa*, and *Brylphyllum pinnatum*

Brian YY Wong, Rekha Isaac, Sarah Wolf, Min Seo Kang, Elim Choi, Jessica Yi, Jasmine Cha, Christine Choi, and Allana Benjamin

Apoptosis is a controlled program cell death process that the body uses to combat cancer development. Pancreatic cancer is a devastating disease with a poor prognosis. It is usually symptom-free during development and is advanced by the time of diagnosis. PANC-1 is a pancreatic ductal carcinoma cell derived from a 56-year-old male with adenocarcinoma in the head of the pancreas and metastasized to the duodenal wall. *Scutellaria barbata* (SB) has been used in traditional Chinese medicine for treating liver, lung, and rectal cancers. SB and *Oldenlandia diffusa* (OD) are included in most of the herbal cancer treatment formulas in Taiwan hospitals. *Brylphyllum pinnatum* (BP) is reported to have antioxidant, immunomodulatory, anti-inflammatory, and antitumor-promoting activities. We previously showed that aqueous extracts of SB, OD, and BP selectively induced apoptosis in colon HCT 116 cancer cells but not in colon CCD 841 CoN normal epithelial cells by modulating the pro-apoptotic and anti-apoptotic proteins while not affecting normal colon epithelial cells. This study used the green/red/blue fluorescent Apoptosis/Necrosis Detection Kit (Abcam). Our data demonstrated that a 2-hour treatment with 1mg aqueous extract of SB, OD, and BP induced a statistically significant percentage of apoptosis in PANC-1 cells respectively. Similar results were obtained with the 4-hour incubation period. These results suggest that SB, OD, and BP contain phytochemicals that induce apoptosis in pancreatic ductal carcinoma PANC-1 cells. Further study of their specific modulation effects of apoptosis is warranted to reveal their potential chemopreventive and therapeutic properties against pancreatic cancer.

P-32 Evaluating phonotaxis variability and selective processing of its underlying neural elements in an insect model

Benjamin Navia, Gordon Atkins, Jessica Rim, Lillyanna Widdicombe, and David Mbungu

Selective phonotaxis exhibited by female *Acheta domesticus* and *Gryllus bimaculatus* has been documented in multiple studies. While some females are finely tuned and attracted to calling songs with syllable periods matching those of the natural calls of the male, other females respond phonotactically to calls with a wider range of syllable periods. Multiple studies have also provided evidence supporting the importance of prothoracic auditory neurons such as L3/AN2 in the selective phonotaxis of female crickets. We have developed a neuronal model, which includes the contralateral omega 1 neuron inhibiting a source of delayed inhibition as well as a source of selective excitation onto the L3. The inhibition by ON1 is downregulated by Juvenile Hormone III and PTX, which increases selectivity to syllable period, and is upregulated by histamine, which leads to decreased selectivity. Testing this model has included prothoracic injections of JHIII, histamine and PTX followed by an assessment of phonotaxis and L3's selective responses using electrophysiology. The model so far remains valid as we continue to test it. Preliminary data shows the effect of H-7 (a kinase inhibitor) on phonotaxis before and after injection parallels the effect of L3's response. Additionally, exposure to males, decreases selectivity in females. Electrophysiology of L3's response in exposed females is currently being evaluated.

Engineering

P-33 Machine Learning Analysis of Multimodal Data from a Smartphone-Based Electrochemiluminescence Sensor

Hyun J. Kwon, Elmer Rivera, and Rodney Summerscales

A Machine learning based data analysis was performed for the data analysis obtained from a low-cost alternative, smartphone based, portable electrochemiluminescence (ECL) sensor for phenolic compounds. While the phenolic compounds, vanillic acid and p-coumaric acid, effectively quench the ECL reaction, the light intensity and electric current were simultaneously recorded by the smartphone apps. Due to common problems present in sensor data such as non-linearity, multimodality, sensor-to-sensor variations, presence of anomalies, and ambiguity in key features, several machine learning strategies were explored. In contrast to the traditional calibration approach of extracting predetermined key features, the ML methods such as tri-layer neural net or boosted trees carried out effective regression tasks by learning higher patterns without processing the key features. Combined multimodal characteristics made 80% enhanced performance with multilayer neural net algorithms than the traditional approaches. The results demonstrated that the ML methods could provide robust analysis framework for sensor data with noises and variability without preprocessing to extract features or examine ambiguous anomaly.

Mathematics

P-34 The Existence and Uniqueness of a Nash Equilibrium in Mean Field Game Theory

Moises Reyes Rivas, Andrews University; Daniel Block, Duke University; and Wilfrid Gangbo, University of California.

In recent and past works, convexity is usually assumed on each individual part of the action functional in order to demonstrate the existence and uniqueness of a Nash equilibrium on some interval $[0, T]$ (this meant that each hessian was assumed to be nonnegative). Particularly, a certain assumption was imposed in order to quantify the smallness of T . The contribution of this project is to expand on this with the key insight being that one does not need the convexity of each part of the action, but rather just an appropriate combination of them, which will essentially "compensate" for the other two terms to yield convexity in the action. This is meaningful in both the pure and applied settings as it generalizes the existence and uniqueness of a Nash equilibrium slightly more, but maybe more importantly matches real-world application slightly closer, as in reality there are many settings in which not each part of the action have convexity. Thus, it is more accurate for modern application of Mean Field Game Theory.

P-35 Modeling Supply and Demand in Public Transportation Systems

Noe Reyes Rivas, Andrews University; Miranda Bihler, Stetson University; Anna White, East Tennessee State University; and Erin Okey, McMaster University.

The Harrisonburg Department of Public Transportation (HDPT) aims to leverage their data to improve the efficiency and effectiveness of their operations. We construct two supply and demand models that help the department identify gaps in their service. The models take many variables into account, including the way that the HDPT reports to the federal government and the areas with the most vulnerable populations in Harrisonburg City. We employ data analysis and machine learning techniques to make our predictions.

P-36 The Delta-Crossing Number for Links

Zachary Duah

An m -component link is an embedding of m circles into 3-dimensional space; a 1-component link is called a knot. The diagram for a link may be drawn so that all crossings occur within delta tangles, collections of three crossings as appear in a delta move. The delta crossing number is defined to be the minimal number of delta tangles in such a diagram. The delta crossing number has been well-studied for knots but not for links with multiple components. Using bounds we determine the delta crossing number for several 2-component links with up to 8 crossings as well as for Tait's infinite family of 3-component links with unknotted components. Moreover, we prove that the difference between the delta crossing number and the delta unlinking number can be arbitrarily large.

P-37 Self and Mixed Delta Moves on Algebraically Split Links

Justyce Goode, Davielle Smith, Yamil Kas-Danouche, Devin Garcia, and Anthony Bosman

A link is an embedding of circles into 3-dimensional space. A Delta-move is a local move on a link diagram. The Delta-Gordian distance between links measures the minimum number of Delta-moves needed to move between link diagrams. We place restrictions on the Delta-move by either requiring the move to only involve a single component of the link, called a self Delta-move, or multiple components of the link, called a mixed Delta-move. We prove a number of results on how (mixed/self) Delta-moves relate to classical link invariants including the Arf invariant and crossing number. This allows us to produce a graph showing links related by a self Delta-move for algebraically split links with up to 9-crossings. For these links we also determine the Delta-splitting number and mixed Delta-splitting number, that is, the minimum number of Delta-moves needed to separate the components of the link.

P-38 Some Characterizations of Involute Curves in Euclidean and Minkowski 3-Space

Devin Garcia and Yun Myung Oh

The involute of a space curve is a curve whose tangent vector is orthogonal to the tangent vector of another curve. In this work, we are interested in constructing a framework to further study the involute of curves in Euclidean and Minkowski three-space. Our framework relies on the curvature and ratio of torsion-to-curvature of a curve to study the involute. In classical differential geometry, a space curve is described by its curvature and torsion, and the ratio of torsion-to-curvature is an approach to classify curves. Using the ratio of torsion-to-curvature instead of the torsion is a more intuitive approach because it shows the dependence of the involute's Frenet-Serret apparatus on the nature of the original curve. We provide new insights on the involute of slant helices through our framework and provide future directions for our work.

Physics

P-39 Interdisciplinary diffusion lab

Sable Canales, Chloe Gaban, and Mickey Kutzner

Diffusion is a principle in Physics, Chemistry, and Biology. The rate of diffusion is affected by temperature, particle size, concentration, and material type. Students can model the rate of diffusion based on particle size by contrasting blue and yellow dyes. Two petri dishes containing agar-agar receive a drop of dye at the center. The radius of expansion is recorded over time. The variance of the distribution grows as $\sigma^2=4Dt$, where σ^2 is the variance, D is the diffusion constant, and t is time. Graphing variance versus time gives a slope of $4D$. Diffusion constants vary by particle size, allowing for a size ratio comparison between blue and yellow dyes. Relating this to cells, students predict that smaller molecules diffuse into living cells, whereas larger molecules need some assistance from protein channels as in facilitated

diffusion. In Physics and Chemistry, the data can be related to thermal energy.

ORAL PRESENTATIONS

3:00 – 4:00 pm

Religion & Biblical Languages (Buller Hall, Room 251)

O-01 The King of Babel: Nebuchadnezzar's Characterization in Daniel 1-4

Kenny Gomes Ebinger, Seventh-day Adventist Theological Seminary

This is a study on Nebuchadnezzar's narrative in the book of Daniel done through the Narrative Criticism method. It aimed to analyze the characterization of Nebuchadnezzar, king of Babel, in the first four chapters of the book. In order to do so, I first describe the functioning of a biblical narrative, its nature, elements and how those relate to each other; After that I analyze the form and content of the first four chapters of the book; to then analyze the way Nebuchadnezzar is characterized along his journey. After a close reading of the text, it is concluded that the king is characterized as a profound character in his journey of acknowledging the Most High. He is blessed with power over men by the Most High, who keeps sabotaging him to prevent his power to be fully acting. In order to keep his authoritative appearance, the king is constantly taking over of Divine acts to legitimate his own power. But when he's transformed into an animal, the desired image of full control is totally subverted, and he becomes unconscious of his own story. Ironically, the moment of Nebuchadnezzar's greatest humbling coincide with God's delivery from the deadly sentence pronounced by the king to himself. His characterization is enigmatic and delivers no precise closure. Therefore, the character of Nebuchadnezzar is an enigma for his speech and attitude empower the reader to both believe or question the legitimacy of the king's exaltation of God in chapter four.

O-02 Preaching to Generation Z

Rodney Palmer, Religion & Biblical Studies

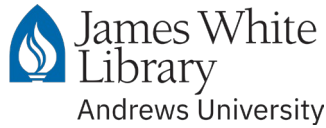
Generation Z (Gen Z) is the second largest living generation in the United States, totaling about 69 million. According to recently released research by the Barna Group, this generation includes individuals born between 1999 and 2015, whose worldview is shaped by six major trends. These include: (1) they are "screenagers;" (2) their worldview is post-Christian; (3) "safe spaces" are normal; (4) real safety is a myth; (5) they are diverse; and (6) their parents are double-minded. Considering these six core trends, how can we effectively preach to Generation Z? Drawing on data from a recent survey, this paper will provide an overview of effective preaching techniques that will not only connect with Gen Z but will also assist them in living as faithful and committed disciples in a post-Christian culture.

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