15th Annual Andrews University

Celebration of Research & Creative Scholarship

Friday, October 25th, 2024, Buller Hall

PROGRAM AND ABSTRACT BOOK

"Andrews University seeks to engage all our students in research – to enhance problem-solving, to strengthen analytical skills, and to experience the joy of discovery. Research deepens understanding, opens new horizons, and brings hope of change. At Andrews, our students collaborate with their faculty mentors as they experience this vital educational experience that informs our commitment to knowledge, faith, and service."

John Wesley Taylor V, PhD

WELCOME

Welcome to the Fifteenth Annual Celebration of Research & Creative Scholarship, part of Research Week 2024 at Andrews University. This year's Research Week features five conferences over eleven days in October. We began with a Mission Conference on October 17-20, celebrating the 150th Anniversary of the date the first official missionary, J. N. Andrews, was sent by the General Conference to Europe. On Wednesday, October 23, Michael C. Downer spoke on Small Particle Accelerators for Big 21st Century Science at the Robert & Lillis Kingman Lecture Series on Science & Society. The celebration continued Thursday evening, October 24, with the Celebration of Community Engagement, where departments shared their local and international community engagement programs.

The keynote presentation was given by Carlisle Sutton and Mordekai Ongo who updated us on the new initiative of the Global Institute for Research and Community Advancement. This year's events will be capped off on Monday, October 28 by a presentation from Zack Kruse on American Comic Books as Instruments of Political and Philosophical Change in the John O. Waller Lectureship on the Arts.

Plenary presentations at this year's Celebration of Research & Creative Scholarship will be given by the recipients of the 2023-24 Siegfried H. Horn Excellence in Research and Creative Scholarship Award—Felix Cortez in the New Testament department of the Seventh-day Adventist Theological Seminary, and Shannon Trecartin in the Social Work department. 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.

Félix H. Cortez, a Ph.D. graduate from Andrews University, has been a faculty member here since 2013 and has lectured in over 50 countries. He has published extensively, including five books and the 2022 Sabbath School Adult Study Guide on Hebrews. Dr. Cortez has studied Hebrews for 20 years and served in leadership roles within the Society of Biblical Literature and the Adventist Theological Society.

Shannon Trecartin, a Ph.D. graduate in Social Work from the University of Tennessee, has extensive experience in medical social work, public health, and counseling. Since 2005, she has provided case management and therapy for diverse populations and has taught Social Work courses since 2008. Her research focuses on aging, disabilities, and how the social and built environment contribute to well-being.

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. 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.

May these presentations encourage you in your research and creative scholarship endeavors. To learn more, please visit www.andrews.edu/research.

Gary. W. Burdick, PhD
Dean of Research & Professor of Physics

SCHEDULE OF EVENTS

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

Welcome and Introduction – Wagner Kuhn, Chief Academic Officer

Introduction of Speakers – Gary Burdick, Dean of Research

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

PL-1   Felix Cortez, PhD, Professor of New Testament
PL-2   Shannon Trecartin, PhD, Professor of Social Work

2:00–3:00 pm   **Poster Presentations** (Buller Hallways)
See pages 5–23 for poster abstracts. Refreshments served.

ACCOUNTING & BUSINESS PROFESSIONS

P-1 to P-31| Business Administration

HUMANITIES & SOCIAL SCIENCES

P-32 to P-34| Behavioral Sciences

P-35| Music

P-36 to 37| Education

P-38 to P-45| Graduate Psychology

P-46 to P-47| Theology

HEALTH & HUMAN SERVICES

P-48| Speech-Language Pathology

STEM

P49 to P-53| Biology

P-54 to P-55| Chemistry

P-56| Computer Science

P-57| Engineering

P-58 to P-62| Mathematics

3:00–4:15 pm   **Oral Presentations**
See pages 24–27 for oral presentation abstracts

A1 to A5| Science (Buller 149)

B1 to B4| Religion & Theology (Buller 150)

PLENARY PRESENTATIONS

PL-1 *Why Do We Do Research? Hebrews, the Pauline Corpus, and the Modernist Foundations of Biblical Studies*

Felix Cortez, Professor of New Testament

The consensus among biblical scholars is that Hebrews, written perhaps by a collaborator of Paul, circulated alone for a long time before being fortuitously, mistakenly, or misleadingly included in the Pauline corpus. Though Paul's authorship of Hebrews remains a theoretical possibility, most scholars today view the case as closed. Yet, recent research increasingly shows that the evidence against Paul's authorship is surprisingly slim. This paper will explore the philosophical presuppositions that buttress the case against Paul. It will review the earliest evidence, the role of Luther as a turning point in the history of research, and the implications for Adventist biblical theologians.

Bio: Felix Cortez, PhD, joined the Seventh-day Adventist Theological Seminary's Department of New Testament in 2013, quickly establishing himself as a highly respected professor and voluminous writer. He is known for his expertise on the book of Hebrews and Christ's ministry in the heavenly sanctuary. In 1990, Felix began his pastoral ministry in the North Mexican Union's Central Conference. He eventually served as director of the Personal Ministries Department and, later, as director of youth ministries. He began his theological teaching ministry in 2000 at the Universidad de Montemorelos.

PL-2 *The Revelation of Deviation: How a Theology of Patterns can frame Faith in concrete ways*

Shannon Trecartin, Professor of Social Work

The present study examines the main and interaction effects of disability and belonging in a religious setting on depression among a global sample of Seventh-day Adventists. The Global Church Member Survey Wave III is used and includes more than 150,000 cases returned from 15 regions of the world. Sample weights are used to provide estimates of the distribution of responses in the global membership of the Seventh-day Adventist Church. Multiple regression is used to determine whether there are main effects for disability and religious belonging on depression. The interaction between disability and belonging on depression is also tested. Promising interventions may target mental health, leadership support for persons with disabilities, and empowerment of members to build intentional relationships with members with disabilities.

Bio: It is no exaggeration to say that Shannon Trecartin wants to change the world with her research. Whether she's conducting complex analyses for the Adventist Global Church Survey, using data to understand how people with disabilities experience care and belonging in churches, or spotlighting the relationship between Adventist family rejection and LGBTQ+ depression and suicide rates, Shannon has made it her mission to shine a light on overlooked and disenfranchised communities. Shannon believes that data can tell stories and shape policies that improve people's lives. Students in her classes experience her passion for making a difference with data, sometimes expressing surprise when they understand and enjoy research for the first time. Shannon also partners with and mentors colleagues in moving their own research projects forward, often providing advice on research designs, data collection and statistical analyses.

POSTER PRESENTATIONS

ACCOUNTING & BUSINESS PROFESSIONS

BUSINESS ADMINISTRATION

P-1. *Assessing the Impact of COVID-19 on Unemployment and Inflation in North and South America: A Multivariate Analysis Using IMF Data*

Mathias David Carnero[+] and Jerry Chi

This study explores the combined effects of geographical area and the COVID-19 pandemic on key economic indicators, specifically unemployment and inflation rates, across North and South America. Data were obtained from the International Monetary Fund (IMF) International Statistics Database, encompassing both pre- and post-COVID-19 periods. A multivariate analysis of variance (MANOVA) was applied to examine the main effects of region and pandemic period, as well as their interaction, on unemployment and inflation rates.

The results demonstrate significant main effects of both geographical area and the COVID-19 period on the combined dependent variables. The main effect of area was significant, with Wilks' Lambda = 0.915, $F(2, 139) = 6.486$, $p = 0.002$, indicating a difference in unemployment and inflation rates between North and South America. Similarly, the main effect of the COVID-19 period was significant, with Wilks' Lambda = 0.804, $F(2, 139) = 16.919$, $p = 0.000$, reflecting higher unemployment and inflation rates post-COVID-19 across both regions. However, the interaction effect between area and COVID-19 period was not significant (Wilks' Lambda = 1.000, $F(2, 139) = 0.015$, $p = 0.985$), suggesting that the pandemic's impact on these economic indicators did not differ significantly between the two regions.

P-2. *The Effect of Early Career Satisfaction on Work-Life Balance of New College Graduates*

Mathias David Carnero[+] and Jerry Chi

The purpose of this pilot study is to examine the effect of early career satisfaction on the work-life balance of new college graduates. Using a sample of 15 recent graduates, the study explores how satisfaction with compensation, leadership, and organizational culture impacts their ability to balance professional and personal responsibilities. Data were analyzed through correlation and regression techniques to understand the relationships among the variables.

The preliminary results show that compensation has a significant positive effect on work-life balance ($r = 0.616$, $p = 0.007$), explaining 37.9% of the variance in work-life balance. Although organizational culture also demonstrated a moderate correlation with work-life balance ($r = 0.563$, $p = 0.014$), only compensation was found to be a significant predictor in the final regression model. Leadership, while positively correlated with compensation and organizational culture, did not significantly influence work-life balance. The findings suggest that early career satisfaction, particularly in terms of compensation, plays a crucial role in determining the work-life balance of new graduates. Organizations aiming to improve employee retention and well-being should prioritize fair and adequate compensation to enhance graduates' work-life balance. Leadership support and organizational culture may further contribute, but compensation remains the most critical factor in ensuring a successful transition from college to the workforce. This analysis is based on the pilot study, and data collection for the full study will commence following the approval of the Institutional Review Board (IRB).

P-3. *The Impact of International Students Campus Life Satisfaction on Organization Commitment*

Naoki Honda[+] and Jerry Chi

Despite some international students thriving at Andrews University, others face significant challenges impacting their overall experience and satisfaction. This study investigates the impact of intangible support resources, sense of concern, and vital needs on international students' satisfaction and commitment to the university. Hypotheses were tested using crosstab analyses, t-tests, one-way ANOVA, and multiple regression to explore whether factors like residence, gender, hourly wage, and weekly work hours affect these variables. Results indicate that while factors such as gender, hourly wage, and residence did not show significant effects on student satisfaction scores, intangible support resources and sense of concern significantly correlated with overall commitment. These findings suggest that Andrews University should focus on enhancing intangible support and addressing concerns to improve international students' experiences and strengthen their commitment to the institution.

P-4. ***A Multivariate Analysis of the Impact of COVID-19 on the Current Account Balance in the Asia-Pacific Region***

Naoki Honda[+] and Jerry Chi

Despite some international students thriving at Andrews University, others face significant challenges impacting their overall experience and satisfaction. This study investigates the impact of intangible support resources, sense of concern, and vital needs on international students' satisfaction and commitment to the university. Hypotheses were tested using crosstab analyses, t-tests, one-way ANOVA, and multiple regression to explore whether factors like residence, gender, hourly wage, and weekly work hours affect these variables. Results indicate that while factors such as gender, hourly wage, and residence did not show significant effects on student satisfaction scores, intangible support resources and sense of concern significantly correlated with overall commitment. These findings suggest that Andrews University should focus on enhancing intangible support and addressing concerns to improve international students' experiences and strengthen their commitment to the institution."

P-5. ***The Correlation of Perceived Barriers on Graduate Education And Work Frustration Among International Students***

Tom Isaac[+] and Jerry Chi

This study investigates the correlation between perceived barriers in graduate education and work frustration among international students. As the number of international students in higher education continues to rise, understanding the unique challenges they face is crucial for enhancing their academic and professional experiences. Utilizing a mixed- methods approach, the researcher surveyed 20 Research Students as pilot research which will be done on international graduate students across various disciplines to assess their perceived barriers, including language difficulties, visa requirement barriers, and financial constraints. Additionally, this research measured impact of frustration with work on the above barriers. The results indicate a significant positive correlation between perceived barriers in education and levels of work frustration, suggesting that students who experience greater obstacles in their academic pursuits are more likely to encounter frustration in their professional environments. These findings highlight the need for targeted support systems within educational institutions and workplaces to mitigate these barriers and improve the overall well-being of international students. By addressing these challenges, stakeholders can foster a more inclusive and supportive environment that enhances both academic success and career satisfaction for this growing demographic.

P-6. ***The impact of the COVID-19 pandemic on the general government net lending and borrowing as a percentage of GDP across countries from 2018 to 2027***

Tom Isaac[+] and Jerry Chi

This study conducts a secondary data analysis to assess the impact of the COVID-19 pandemic on general government net lending and borrowing as a percentage of GDP across countries from 2018 to 2027. The pandemic has significantly influenced global economies, prompting governments to implement various fiscal policies to mitigate its adverse effects. By analyzing data from international financial institutions and national statistical agencies, this research investigates fiscal trends before and after the onset of COVID-19, focusing on net lending and borrowing metrics. Particular attention is given to how different countries responded to the crisis, including the implementation of stimulus packages, welfare programs, and various governmental spending measures. The analysis examines changes in net lending and borrowing rates, revealing how these fiscal responses have affected overall economic health and the sustainability of public finances. The methodology employed for this analysis includes multivariate techniques, and preliminary findings suggest that while some nations successfully maintained positive net lending positions, others faced significant borrowing, leading to increased debt levels. The disparities observed highlight the varying fiscal capacities and responses of countries in the face of a global crisis. This research contributes to the understanding of the pandemic's long-term fiscal implications and provides valuable insights for policymakers aiming to strengthen economic resilience against future shocks."

P-7. ***Impact of CPIA Policy Intervention Stages on Macroeconomic and Social Indicators: A Multivariate Analysis Across 27 Countries***

Rabih Al Khatib[+]

This study explores the impact of different stages of policy interventions on macroeconomic and social indicators using the Country Policy and Institutional Assessment (CPIA) framework. The research evaluates three stages: Pre-CPIA Improvement, CPIA Reform Implementation, and Post-CPIA Reform Consolidation, to determine their

effectiveness in influencing economic and social performance in 27 countries. Utilizing Multivariate Analysis of Variance (MANOVA) and Univariate ANOVAs, the findings reveal no significant overall multivariate effect of policy stages on the combined set of indicators, yet specific countries such as Gambia, Ghana, Guinea, Guinea-Bissau, and Moldova show significant changes. These results suggest that targeted policy interventions are more effective during the critical CPIA Reform Implementation stage, indicating varying responses to policy changes across different countries. The study provides valuable insights for policymakers on when and where interventions yield the most substantial impact.

The multivariate test results revealed no significant overall effect of policy intervention stages on combined macroeconomic and social indicators, Wilks' Lambda = 0.009, $F(54, 4.19) = 1.390$, $p = 0.496$, $\eta^2 = 0.907$. However, univariate tests indicated significant effects for countries such as Gambia ($F(2, 7) = 11.200$, $p = 0.007$, $\eta^2 = 0.762$) and Guinea-Bissau ($F(2, 7) = 18.025$, $p = 0.002$, $\eta^2 = 0.837$), showing that specific nations responded differently to policy stages. Post-hoc analysis revealed that Guinea showed notable improvement between the CPIA Implementation and Post- CPIA Consolidation stages (Mean Difference = 1.000, $p = 0.018$). This suggests that while the overall intervention effect was not significant, individual countries had substantial changes during critical stages.

P-8. ***Evaluating the Influence of Academic Excellence on Organizational Commitment Among Undergraduate Students: A Proposed Primary Research Study***
Rabih Al Khatib[+]

The purpose of this study is to examine the relationship between academic achievement and commitment to the organization among undergraduate students at Andrews University. Throughout the semester, a group of 100 students will be surveyed twice to evaluate academic excellence based on GPA, time management, motivation, and engagement, which will be considered as the independent variables. Organizational commitment, the dependent variable, will be assessed using a validated scale. The research will employ various statistical methods, such as multiple regression and repeated measures ANOVA, to determine how these academic factors impact students' emotional connection and loyalty to their institution. The study proposes that higher levels of academic achievement, along with efficient resource management and motivation, will be positively associated with a stronger commitment to the university. Results are anticipated to offer valuable insights for university staff to create programs that promote student success and institutional retention. Data collection is set to begin next semester, and findings will be disseminated through research presentations and academic publications.

P-9. ***AI Writing Impact on College Writing I Course Performance***
Kevin Lembono[+]

This study investigates the impact of Artificial Intelligence (AI) writing assistance on student engagement and writing performance in undergraduate College Writing I classes. The research focuses on understanding how different features of AI writing tools affect students across various students, aiming to identify which aspects significantly enhance writing proficiency and academic success. Through a quantitative approach, involving a survey, the study assesses the correlation between the use of AI writing tools and improvements in writing skills, student engagement, and interactive learning experiences. Additionally, the study evaluates the usability and ethical considerations of AI tools to determine their influence on student outcomes. Preliminary results suggest that AI writing assistance can significantly improve writing clarity and coherence among students that also may increase their motivation and maintain engagement throughout the learning process of the college writing I Class. The findings are expected to contribute to the development of more effective and inclusive AI writing tools, thereby supporting students in achieving better academic outcomes and equipping them with essential skills for their professional futures. This research underscores the importance of tailoring educational technologies to meet the diverse needs of all students in the college writing I course, which promotes fairness and efficiency in educational opportunities.

P-10. ***The Impact of the 2008 Global Financial Crisis on Interest Rates***
Kevin Lembono[+]

This study investigates the impact of the 2008 Global Financial Crisis on the interest rates of four major economies: the United States (C1), United Kingdom (C2), Japan (C3), and China (C4), across three time periods—before (2004–2007), during (2008–2009), and after (2010–2013) the crisis. Utilizing data extracted from the International Financial Statistics (IFS), we performed a multivariate regression analysis to assess how these indicators responded to the crisis. The results, illustrated in the plot of estimated marginal means for interest rates, reveal distinct patterns across the countries. For the United States (C1) and United Kingdom (C2), there was a significant drop in interest rates during the crisis, which continued

into the post-crisis period, reflecting aggressive monetary easing policies aimed at stimulating economic recovery. Conversely, Japan (C3) exhibited a gradual decline in interest rates, continuing its long-standing deflationary policy stance. In contrast, China (C4) showed a slight increase during the crisis, followed by a stabilization in the post- crisis period, indicative of its less aggressive policy response and relatively insulated financial system. These findings confirm that the 2008 financial crisis had a significant and varying impact on the interest rates of these major economies. The continued low interest rates in the US and UK indicate prolonged recovery processes, whereas China's unique response underscores the diverse impacts and recovery strategies across different economic systems. This study contributes to understanding the differential policy responses during economic crises and their long-term effects on key financial indicators.

P-11. *The Relationship of Three MBA Core Skills on the Understanding of Cultural Diversity Adaptation*
Lingyun Li[+] and Jerry Chi

The capacity to navigate cultural diversity is a critical skill for MBA graduates in today's global business environment. This research paper explores the relationship between three core MBA skills—adaptability, innovation, and technological proficiency—and their influence on graduates' understanding and adaptation to cultural diversity. A survey of 19 MBA graduates from Andrews University was conducted to assess the effectiveness of these skills in multicultural settings. The study found that while MBA programs provide a foundational skill set, there is a pronounced need for graduates to demonstrate ongoing adaptability and a commitment to continuous learning. Contrary to expectations, the research did not find a significant impact of the three core skills on cultural diversity adaptation, indicating a potential shortfall in MBA curriculums' preparation for diverse work environments. The findings underscore the importance of practical experiences, support for lifelong learning, innovation and entrepreneurship focus, and technological integration in MBA education. The research concludes with actionable recommendations for MBA programs to enhance graduates' cross-cultural competencies, ensuring they are well-equipped to lead and succeed in the evolving business landscape. This is a research proposal with some testing results from a pilot study. After the IRB approval, the data will be officially collected.

P-12. *A Multivariate Analysis of the Impact of China's 2018 Tax Cuts on GDP Growth in Selected Asian Countries*
Lingyun Li[+] and Jerry Chi

This study investigates the impact of China's 2018 tax cuts and fee reductions on the GDP growth of several Asian countries from 2014 to 2023. The policy shift, aimed at stimulating China's domestic economy, could potentially have regional spillover effects due to economic interconnectivity. Employing a Multivariate Analysis of Variance (MANOVA) on secondary data, the study assessed the differences in GDP growth across the specified period, comparing the Pre-tax cut and Post-tax cut phases. The analysis also explored the interaction between country and policy periods on GDP growth.

The multivariate tests, including Wilks' Lambda, Pillai's Trace, Hotelling's Trace, and Roy's Largest Root, indicated a significant overall effect of the tax cuts on the GDP growth of the studied countries. Specifically, Wilks' Lambda for the effect of Group was 0.017, $F(8, 1.000) = 7.364$, $p < 0.001$, while for the Intercept, it was 0.013, $F(8, 1.000) = 9.470$, $p < 0.001$. The interaction effect between Country and Pre-tax cut/Post-tax cut was also significant, Wilks' Lambda = 0.983, $F(8, 1.000) = 58.908$, $p < 0.001$. However, the specific impact on individual countries' GDP growth was not statistically significant, possibly due to low statistical power or unaccounted confounding factors. This indicates a need for further research with a larger sample size or additional control variables to more accurately assess the impact.

The findings contribute to the understanding of how economic policies can affect neighboring countries and underscore the importance of regional economic dynamics in policy-making. The study provides a foundation for future research to explore the nuanced effects of China's economic policies on its Asian neighbors.

P-13. *The Effects of Exercise Type and Time of Day on Reaction Times in Adults*
Chaomin Lin[+]

This study investigates the effects of three exercise types (running, cycling, and yoga) and different times of the day (morning, afternoon, and evening) on reaction times. The research aims to determine whether exercise type, time of day, or the interaction between these variables significantly influences participants' reaction times. A within-subject design is

utilized, where participants engage in each exercise type and complete a computer-based reaction test immediately afterward at different times of the day across three weeks. Reaction times are recorded in milliseconds (ms) and averaged for each session. The study involves nine exercise-time combinations, with participants completing three sessions per week. Exercise intensity is maintained at a moderate level for consistency. The findings will provide insights into optimizing exercise schedules for cognitive performance enhancement and may contribute to recommendations for improving daily cognitive functioning through targeted exercise interventions. This research will address gaps in understanding how physical activity timing and type affect adult cognitive performance.

P-14. ***The Impact of MBA Program Satisfaction on Organizational (School) Commitment***
Chaomin Lin[+]

This study examines the factors influencing MBA student satisfaction across three key areas: Course Experience, Career Development, and Academic Support. Using a comprehensive questionnaire based on established frameworks, the research aims to identify strengths and areas for improvement within MBA programs. Course Experience focuses on the relevance of content to real-world business needs and the effectiveness of case studies. Career Development assesses the adequacy of career resources, networking opportunities, and counseling services. Academic Support evaluates the availability of resources and faculty guidance. Additionally, the study explores the organizational commitment of students to their MBA programs. Findings will provide actionable insights to enhance the program's quality and align it with students' expectations and professional goals. Results can also be a benchmark for other institutions seeking to evaluate and refine their MBA offerings to improve student satisfaction and outcomes.

P-15. ***The Impact of Leadership on Organizational Performance***
Byungyul Lee[+]

This study explores the impact of leadership on organizational performance through multivariate analysis, utilizing case studies and surveys. Findings indicate that transformational leadership positively influences organizational innovation and long-term performance. The research highlights the relationship between leadership vision, employee motivation, engagement, and organizational culture. The study suggests effective leadership strategies to enhance organizational performance, aiding executives in decision-making and laying groundwork for future leadership research.

P-16. ***Assessing the Impact of Fiscal Policy on Economic Growth in the United States: A Multivariate Regression Analysis.***
Eliezer Moises[+]

This research examines the association between fiscal policy and economic growth in the United States from 1980 to 2024. The International Monetary Fund's International Financial Statistics database served as the source of data. Consequently, a multivariate regression analysis was performed to evaluate the effect of government revenue and government expenditure on GDP growth rates. In the model, inflation rate and interest rate are both controlled.

The outcomes are positive and showing a meaningful relationship between government expenditure and GDP growth rate (β=0.24, p) According to the findings expansionary fiscal policy, in particular government expenditure, both are detrimental in stimulating economic growth. The research impact includes providing proof, on how fiscal policy techniques can boost economic growth and showcasing the importance of multivariate regression analysis in understanding the intricate connections between fiscal policy factors and economic results. The findings offer guidance to decision makers on the combination of policy tools for fostering lasting economic development.

P-17. ***The Impact of Scholarship Satisfaction on the Perception of Procedural Fairness***
Eliezer Moises[+]

This research investigates the impact of scholarship satisfaction on the perception of procedural fairness among universities collecting data from Andrews University students serving as the sample for the pilot study. A survey questionnaire was framed and distributed to collect data from 100 scholarship beneficiaries at Andrews University. The Scholarship Satisfaction Scale (SSS) and Procedural Fairness Scale (PFS) were applied for the variable's measurement. Results after data collection indicated a significant association between scholarship satisfaction and perception of procedural fairness (r=0.72, $p<0.001$). The regression analysis has shown that scholarship satisfaction predetermined procedural fairness (β=0.68, $p<0.001$), resulting in 47% of the variance. Scholarship recipients who presented advanced scholarship satisfaction indicated to have more perception in relation to the scholarship selection process as fair and just.

According to the mediation analysis confidence in the university's decision-making process mediated the relationship between scholarship satisfaction and procedural fairness (β=0.55, p<0.001). Moreover, demographic data implied that study level and scholarship type facilitated the relationship. The outcomes suggest that higher education institutions may boost procedural fairness by safeguarding scholarship satisfaction for their students. In the process of distribution of scholarship funds, it is fundamental that the process is done in a timely manner as well as transparent communication, unbiased selection criteria should be taken into account. Undoubtedly, this study brings a significant contribution to the literature on scholarship programs for US universities, student satisfaction, and organizational fairness, stressing the crucial role of scholarship satisfaction in guiding students' perceptions on procedural fairness.

P-18. *Student Satisfaction in Campus Cafeteria: A Study on Christian Universities*

Irais Ortiz[+] and Jerry Chi

This study will examine the students' perception of the cafeteria services on Christian university campuses. Three main variables will be evaluated to determine the satisfaction of students with the campus cafeteria services: price fairness, food quality, and service quality. If students go off-campus for breakfast, lunch, or dinner, they may fail to be punctual with their class schedule. Cafeteria services provide a valuable option for students to save time, gather with other students, and be encouraged to pursue their studies goals. The sense of community changes students' attitudes toward participation in different activities on their campus. Different programs, promotions, and advertisements launched by the cafeterias encourage the students to make better dietary selections. It is important to inform the students about the nutritional benefits of the meal on the menu. Providing healthy food is crucial to create a positive impact on the student's physical and mental health, which impacts the improvement of their academic performance. These are positive reasons to add value to the cafeteria services on campuses.

As a result of a pilot study, a survey was conducted on 16 MBA students, and responders as the internal peer reviewers, were encouraged to participate in this research on a voluntary and anonymous basis. The variable with the most impact concerning students' choice of cafeteria food is price fairness, followed by food and service quality. A crosstab analysis indicates that 68.8% of the students prefer to buy lunch at the campus cafeteria. These results are indicators that students' commitment is high if there is a variation in meal prices. This is a research proposal with some testing results from a pilot study. After the IRB approval, the data will be officially collected.

P-19. *A Multivariate Analysis of the Impact of the COVID-19 pandemic on unemployment in the US*

Irais Ortiz[+] and Jerry Chi

This study will investigate the impact of the pandemic on COVID-19 on multiple indicators in 51 states of the US. Using secondary data from the U.S. Bureau of Labor Statistics database, A Multivariate analysis of Variance (MANOVA) was conducted to assess the differences in unemployment before, during, and after the pandemic. The Analysis also explores the interaction between states during the pandemic period. Global unemployment is an economic factor affecting the US nation, companies, and individuals. There are three main reasons for unemployment: structural, frictional, and cyclical. Structural unemployment is caused by a mismatch in skills or a loss of interest in available jobs due to consumer preferences and companies acquiring and adapting technology to their different departments. Frictional unemployment occurs when people look for new jobs. Cyclical unemployment occurs due to new policies in the economy (CRS, 2022). Recently, in 2020, the world suffered a pandemic that caused high unemployment worldwide. Compared with other years, in 2020, many people lost their jobs in the US. The states affected with a higher rate of unemployment were Hawaii, with 14%, and New York, with 12.38%, respectively (Statistics U. B., 2021) . Unemployment affects the government, corporations, and individuals. When individuals and corporations do not have income, the payment of taxes is reduced. Corporations will reduce revenues and consequently lay off employees. The effect on individuals is similar: loss of income and less acquisition. Other effects of unemployment are the increase in crimes and increases in government support through different programs.

The results of the multivariate tests indicated slightly significant main effects for the 51 US States and pre-COVID-19, COVID-19/post-COVID-19 periods. The Wilks' Lambda value of .002 and p-value of .080 show a significant interaction between variables but not the exact interaction between pre-COVID19, COVID-19, and post-COVID-19, which values and p-values are .002 and .275, respectively. To obtain the Greenhouse and Sphericity values, more data needs to be added to the database. The Test of Between-Subjects Effects revealed the pandemic has a slightly significant impact on unemployment. The p-value between states varies from .082 and .766. In summary, the pandemic had a significant effect on unemployment in 2020 compared with the unemployment rates before and after the pandemic.

P-20. ***Multi-Node Drone Logistics for Last-Mile Delivery and Reverse Logistics Optimization***

Armand Poblete, Derek Fietosa*, Cin Thang[+], Guichard Manigat, and Richard Will

AngelWings introduces an innovative solution to the conundrum of last-mile delivery, particularly in rural, remote, and underserved regions where traditional logistics struggle with inefficiencies and high costs. This paper examines the development of an autonomous, hybrid-powered VTOL drone system that utilizes NASA's Autonomous Navigation Systems and HeRO (Heterogeneous Redundant Odometry) technology. By integrating computer vision, the system enhances navigation in GPS-denied environments, enabling real-time obstacle detection and adaptive path planning. AngelWings is designed to optimize delivery operations, reducing costs to $6-7 per flight, positioning it as a highly competitive alternative in sectors such as e-commerce and healthcare. The scalable solution addresses the increasing demand for drone delivery services by offering a cost-effective and reliable option. This paper outlines a two-year technical roadmap, focusing on drone design, computer vision integration, and developing a multi-node logistics infrastructure. By leveraging NASA's IP and advanced technologies, AngelWings aims to resolve the last-mile delivery conundrum and transform logistics in underserved areas.

P-21. ***A Longitudinal Study of the Impact of the COVID-19 Pandemic on the Managerial Effectiveness of the "Magnificent Seven" Stocks Firms: An Economic Value Added Approach.***

Williams K. Preprah, Herimamy Rafaliniony[+], and Patricia Preprah*

This longitudinal study investigated the managerial effectiveness of the "Magnificent Seven" stock firms in enhancing Economic Value Added (EVA) before and after the COVID-19 pandemic. Utilizing a within-subject ANOVA analysis on data spanning from 2016 to 2023, this research aimed to explore how managerial decisions within these firms influenced economic profits over time. The study utilized the Stern-Stewart formula for EVA to calculate the average EVA data from 10-K filings of these technology-oriented firms, representing a significant portion of the S&P 500 index, to determine the impact of the COVID-19 pandemic on their financial performance. Results indicated a large significant effect difference in EVA pre- and post-COVID-19 pandemic, with an increase in both the mean value and variability of EVA. The partial eta squared value indicated that the time period accounted for approximately 26.4% of the variance in EVA. This suggested that the COVID-19 pandemic had a significant impact on these firms' EVA, reflecting positively on their managerial decision-making effectiveness in creating economic value. The conclusion highlighted the importance of management efficiency key decisions included leveraging artificial intelligence, maintaining operational agility to mitigate supply chain disruptions, and fostering a culture of innovation in navigating the complexities introduced by the pandemic. It underscored the significant role of external factors such as consumer behavior changes and government policies in influencing company performance. The study recommended exploring how different sectors responded to the pandemic's challenges, particularly those hit hardest by the crisis. This study contributed to the understanding of EVA as a reliable measure of a company's financial health and managerial effectiveness in uncertain times.

P-22. ***A Multivariate Analysis of the Impact of COVID-19 on the Consumer Price Index by Category in Selected Major Developed Countries***

Herimamy Rafaliniony[+] and Jerry Chi

This study investigates the impact of the COVID-19 pandemic on multiple economic indicators across six countries: Canada, the United States, Germany, Italy, the United Kingdom, and France. Using secondary data from the International Financial Statistics database of the International Monetary Fund (IMF), a Multivariate Analysis of Variance (MANOVA) was conducted to assess differences in expenditures on twelve economic indicators, including Food, Beverage, Clothing, Housing, Health, and others, between the PreCOVID-19 and PostCOVID-19 periods. The analysis also explored the interaction between country and pandemic periods on these indicators.

The results of the multivariate tests revealed significant main effects for the Country and PreCOVID-19/PostCOVID-19 periods on the combined economic indicators, as well as a significant interaction between the two factors. Specifically, Wilks' Lambda for the effect of Country was 0.038, $F(60, 2593.261) = 43.746$, $p < 0.001$, while for the PreCOVID-19/PostCOVID-19 factor, it was 0.559, $F(12, 553) = 36.416$, $p < 0.001$. The interaction effect between Country and PreCOVID-19/PostCOVID-19 was also significant, Wilks' Lambda = 0.400, $F(60, 2593.261) = 9.343$, $p < 0.001$. The Test of Between-Subjects Effects revealed that individual economic indicators such as Food, Beverage, and Health expenditures were significantly impacted by both the country and the pandemic period. In contrast, others, like Transport, showed no significant effect.

P-23. ***The Correlation of Business Student's Individual Financial Behaviors on Perceived Financial Stability***
Herimamy Rafaliniony[+] and Jerry Chi

"This study investigates the relationship between financial behaviors—budgeting, debt management, and saving—and perceived financial stability among business students at Andrews University. Financial stability is crucial for students as they transition to financial independence, yet many struggle to manage their finances effectively. This is a research proposal with some testing results from a pilot study. After the IRB approval, the data will be officially collected. A quantitative approach was employed, with data collected from the pilot study having 17 graduate business students through a structured survey. The survey measured key financial behaviors, such as setting a budget, managing debt, and saving, and their effects on students' financial stability.

The correlation and regression analyses based on the pilot study revealed that saving and debt management are significant predictors of financial stability. The correlation between saving and financial stability was the strongest ($r = 0.904$, $p < 0.001$), while debt management also showed a significant positive relationship ($r = 0.723$, $p = 0.001$). Although moderately correlated with financial stability ($r = 0.641$, $p = 0.006$), budgeting did not emerge as a significant predictor in the regression model when saving and debt management were considered. The final regression model explained 87.1% of the variance in financial stability, highlighting the critical role of effective saving and debt management practices in achieving financial security. These findings suggest that promoting strong saving habits and responsible debt management is essential for improving financial stability among business students.

P-24. ***Navigating Fiscal Resilience in the Asia-Pacific: A Multivariate Exploration of Government Net Lending and Borrowing amidst the COVID-19 Crisis***
Francky Rakotoarimanga[+] and Jerry Chi

COVID-19 challenges the effectiveness of institutional risk mitigation strategies. Disaster risk management and reduction are crucial in influencing a country's development across both micro and macro levels. The Asia and Pacific region, comprising 37 countries, was one of the first areas to encounter the economic repercussions of COVID-19, which initially emerged in this region. Examining the trends in General Government Net Lending/Borrowing (GGnLoB) within this region is essential for comprehending the policies countries implemented to address the financial challenges resulting from the pandemic. This study employs Multivariate ANOVA models to assess GGnLoB across 37 countries during pre-COVID, during-COVID, and post-COVID periods, with an emphasis on policy interventions and the forecasting of fiscal recovery. In Model 1, a Multivariate ANOVA (MANOVA) was utilized to evaluate GGnLoB across the three timeframes, indicating a significant main effect for time (Wilks' Lambda = 0.712, $F(2, 108) = 17.65$, $p < 0.001$). Mauchly's test revealed a violation of the sphericity assumption ($\chi^2(2) = 9.32$, $p < 0.05$), necessitating the use of the Greenhouse-Geisser correction.

Results demonstrated a significant decrease in net lending during the COVID-19 pandemic, accompanied by an average increase in the fiscal deficit of 4.7% of GDP. Post-hoc analyses employing Bonferroni adjustments indicated that merely 16 of the 37 countries are projected to attain pre-pandemic levels by the year 2025. Model 2 utilized a Multivariate Repeated Measures ANOVA to examine the interaction between fiscal policy interventions and GGnLoB.
The analysis revealed a significant interaction effect between time and policy, as indicated by Wilks' Lambda = 0.603, $F(6, 216) = 12.35$, $p < 0.001$. Post-hoc comparisons indicated that nations implementing early and substantial fiscal interventions, exemplified by Japan and South Korea, experienced reduced fiscal deficits averaging 3.2% of GDP. In contrast, countries that delayed their responses recorded deficits surpassing 6.5% of GDP. The results underscore the significance of prompt fiscal interventions and offer essential insights for policymakers focused on developing resilient economies that can endure future crises. The research illustrates the essential relationship between fiscal policies and economic stability within the Asia-Pacific region.

P-25. ***The Impact Of Perceived Inclusion On The Work Commitment At Christian University Case Andrews University (PICSW Survey - OCQ)***
Francky Rakotoarimanga[+] and Jerry Chi

How do student workers perceive their inclusion, and how does it affect their job commitment and satisfaction within a diverse University setting? The Perception of Inclusion of College Student Workers (PICSW Survey) is designed to evaluate and assess how diversity and inclusion impact students' organizational commitment. Andrews University, a Seventh-day

Adventist Institution located in Southwest Michigan, recognized for its commitment to diversity and inclusivity, hosts students from different backgrounds (international and national). Diverse in culture and rich in experience, Andrews University fosters mutual respect and offers countless opportunities for learning, collaboration, and personal growth. Despite the fact of having a diverse community, the scarcity of resources limits Andrews University's ability to provide full-time on-campus employment opportunities for students; besides U.S. regulations, time constraints, experiences, and skills are other factors that challenge students to seek meaningful employment. PICSW Survey and Organizational Commitment Questionnaire (OCQ), the two latent concepts using Confirmatory Factor Analysis (CFA), Application of Validated Survey Instrument Research. The objective of the research is to discover whether inclusion has an impact on organizational commitment and how they are related. The null hypotheses were rejected significantly. Conversely, the study findings demonstrate empirically that inclusion and organizational commitment are related. As a result, the findings target decision makers at Andrews University to improve in policy formulation, updating standards and ethics, and fostering an inclusive and supportive work environment. The results of the PICSW Survey can serve as a benchmark for evaluating the inclusiveness of student workers at any academic institution. Aligning with its vision of creating "World Changers" who are prepared to make a positive impact in a diverse and interconnected world. As a result, Environmental Support (subset 3) is statistically significant impact on student's organization's commitment.

P-26. *The Impact of Satisfaction of University Personnel Health Insurance on Organizational Commitment*
Nathaniel Sitanggang[+]

This research project aims to find the current satisfaction level of Andrews University Personnel concerning their current university health insurance plans. The study helps improve the current understanding of the health insurance plans and their effects on those enrolled in them. This will allow the university to make improvements that benefit both the users and the university itself. The data will be collected through various surveys of current students within the Masters in Business Administration program at Andrews University. These students are in the business research course and enrolled in the university health insurance plan. The data will then be analyzed through various tests using the SPSS software. There were three subsets of satisfaction: cost, coverage, and claim processing. The results showed that there were differing opinions on what could be done to improve the insurance. The tests would also show the reasons and strength of commitment to the current plan. The data showed various findings and dived deeper throughout the study. Findings up to this point suggest that the three subsets of cost, coverage, and claim processing all play a large role in satisfaction. Then a p value less than .05 showed significance between the organizational commitment and cost and coverage. Satisfaction is largely affected by three subsets but loyalty is mainly controlled by only two of the categories. This study found that these subsets all have unique impacts on the users and there are many improvements that can be made.

P-27. *The impact of the COIVD-19 Pandemic on inflation (Consumer Price Index) in underdeveloped nations from the Asia and Pacific Region* Nathaniel Sitanggang[+]

The goal in this research experiment was to find the way how much inflation has affected underdeveloped nations in the Pacific and Asia region as a result of the COVID-19 pandemic. This would take data provided by the International Monetary Fund. They would provide the consumer price index for numerous countries from 2013 to 2024. The goal is to find how much these prices have changed throughout the years. The nations that would be focused upon in this study were found in Asia and other nations that occupy the Pacific Ocean region. By finding how these prices have changed over time, we can establish what nations were able to withstand the effects of the pandemic and which ones were unable to do so. This would also give insight into how nations were able to succeed in rebuilding their economies and if nations with larger populations were able to do so. The study found that larger nations were able to recover much more quickly than others, but all nations still struggled to reach the same levels they had been at before.

P-28. *The impact of Student's Exercise Satisfaction on Andrews University Commitment*
Ziyin Yang[+]

This research aims to explore the satisfaction levels of college students with their exercise routines, environments, and facilities. By examining factors such as exercise variety, frequency, instructor support, and overall enjoyment, the study seeks to identify key elements that influence students' exercise satisfaction. Regular physical activity is a crucial aspect of a healthy lifestyle, yet many college students struggle to maintain consistent exercise routines due to academic pressures, time constraints, and other challenges. While campuses often provide a range of exercise facilities and programs, there is sometimes a gap between what is offered and what students find effective or engaging. Understanding the factors that drive

exercise satisfaction among college students is essential for improving participation rates and ensuring that campus exercise programs meet their needs.

This research is particularly significant as it provides insights into how fitness facilities and programs can be tailored to enhance student engagement. By identifying the factors that contribute to higher satisfaction, institutions like Andrews University's Wellness Center can better align their services to meet students' preferences. Increased exercise satisfaction is linked to greater physical activity, which in turn offers numerous benefits, including improved physical health, enhanced mental well-being, and stress reduction. This study highlights the importance of catering to students' unique exercise needs and preferences to foster a healthier campus community. This is a research proposal with some testing results from a pilot study. After the IRB approval, the data will be officially collected.

P-29. ***Impact of Consumer Price Index Fluctuations on Household Spending Behavior Across Income Groups***
Ziyin Yang[+]

This study explores the relationship between fluctuations in the Consumer Price Index and the behavior of household expenditures across income groups. The CPI is an important indicator of inflation, reflecting the average change in prices paid by consumers for goods and services. Knowing how these price changes affect consumer behavior is important for firms, and economists. Using the dataset from the International Monetary Fund covering the past years, this study employs multivariate analysis to examine how different levels of the CPI affect household spending patterns across income groups. The results are supposed to provide evidence of a significant correlation between CPI fluctuations and changes in consumption habits, and to show how income disparities affect consumers' responses to inflationary pressures. The study aims to provide valuable insights into the impact of economic indicators on consumer behavior and highlights the need to develop targeted economic strategies to address the different needs of different income groups in times of economic change. In the end, the findings of this study will provide a clearer understanding of consumer dynamics and contribute to the development of effective economic management strategies in different social and economic settings.

The results of the multivariate tests revealed significant main effects for both country size and the Consumer Price Index (CPI) on the combined economic indicators, though no significant interaction between these two factors was observed. Specifically, Pillai's Trace for the effect of country size was 0.249, $F(4, 150) = 4.150$, $p = 0.028$, indicating that country size plays a significant role in shaping economic behaviors such as household savings rates and CPI. However, for the country classification factor, the analysis showed no significant effect, $F(4, 150) = 0.588$, $p = 0.563$, suggesting that country classification does not significantly impact these economic outcomes. The interaction effect between country classification and country size was also not significant.

P-30. ***Perceived Christian Cultural Diversity***
YangYue[+]

This study investigates how students perceive Christian cultural diversity and its impact on their social life, academic performance, and campus involvement at Andrews University, a Christian institution. Despite extensive research on cultural diversity in general educational contexts, the specific effects of Christian cultural diversity within Christian schools remain underexplored. The research aims to fill this gap by examining students' experiences and perceptions related to cultural diversity in their academic environment. Using a convenience sampling method, data were collected through an online survey administered to current students, ensuring anonymity and ethical participation. The "Perceived Christian Cultural Diversity Questionnaire" was developed and validated to assess students' views on cultural diversity. The study hypothesizes that social experiences, academic success, and campus engagement positively correlate with school commitment. Preliminary findings reveal that students generally perceive their social interactions, academic achievement, and campus participation positively. However, a concerning trend emerged regarding school commitment, indicating potential areas for improvement. Cross-tabulation and comparative analyses highlight variations in perceptions among different racial and academic groups. These insights contribute to the understanding of how embracing cultural diversity within Christian educational settings can enhance student experiences and promote an inclusive community. The findings hold significance for educators, school leaders, and policymakers in fostering environments that value diverse cultural perspectives, ultimately enriching the educational experience for all students.

P-31. *Analyzing Consumer Price Index Trends: The Impact of COVID-19 Across Global Markets*
Yang Yue[+]

Consumer Price Indexes (CPIs) serve as essential indicators of the average price changes paid by consumers for goods and services over time. This study investigates the fluctuations in CPIs across various countries from 2014 to 2023, specifically focusing on the periods before, during, and after the COVID-19 pandemic. Using repeated measures ANOVA in SPSS, we analyzed the impact of the pandemic on consumer prices, revealing significant shifts in consumer behavior and economic conditions. Descriptive statistics highlighted substantial variations in CPIs across different categories. For instance, the mean CPI for essential goods (C1) dropped from 5.8871 before the pandemic to 5.5500 during it, while luxury items (C8) surged from 18.9843 to 43.3900, indicating a drastic shift in consumer spending patterns. Multivariate tests showed that the time periods had a significant effect on consumer prices, though not uniformly across all categories. Notably, categories C12, C15, and C19 exhibited significant price changes during the pandemic, suggesting targeted economic interventions are needed. Overall, the findings emphasize the necessity of continuous monitoring of CPIs to understand economic trends and inform effective monetary policy in response to such unprecedented events.

HUMANITIES & SOCIAL SCIENCES

BEHAVIORAL SCIENCES

P-32. *The Challenge of Accessing Water, Sanitation, and Hygiene in Schools in Madagascar*
Joel Raveloharimisy

Since the rise of women's empowerment, girls' education has been on the agenda of all development forums 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 to promote girls' education. An analysis of data collected in Madagascar in 2022 showed that although many WASH programs and efforts have been carried out, many girls dropped out of school because they perceived that these programs missed the concept of humanity (Raveloharimisy, 2022). This research will determine the causes of the lack of humanity in the WASH programs in Madagascar. I will use the participant observation method to conduct the study when visiting schools with WASH facilities in Ambatondrazaka, Madagascar.

MUSIC

P-33. *The Uniform Triadic Transformation and Claude Debussy's Music*
Davielle Smith[+] (with Max Keller), *Honors Thesis*, *Undergraduate Research Scholar*

UTTs, or Uniform Triadic Transformations, were developed by Julian Hook who described them as the set of all pitch classes with an operation that defines a group. Currently, the UTT contains only the composition of functions operation that changes minor triads to major triads or vice versa (mode-reversal), or keeps triads the same (mode-preservation). To expand UTTs applicability to analyzing a larger scope of musical works, the permutation group S4 is introduced to include the four basic triads: major, minor, augmented, and diminished. This research analyzes two pieces by 18th century Romantic composer Claude Debussy, Berceuse Heroique and Clair de Lune, to show S4's extension of the general UTT. The use of the Uniform Triadic Transformation provides a mathematical description to auditory and visual patterns occurring in Debussy's music.

EDUCATION

P-34 *Non-traditional Student Persistence* Glynis
Bradfield, Davielle Smith[+]

This poster will present preliminary findings exploring the retention and persistence of students completing undergraduate degrees online at Andrews University. It will also share the comparative research and collaborative development of data reports to better understand the demographic profile and choices of non-traditional students extending their learning.

P-35.   ***A Study of Integrating Faith and Learning from Ellen G. White's Perspective***
Jinseop Kim[+]

This dissertation explores the integration of faith and learning from Ellen G. White's perspective, focusing on her educational philosophy within the context of the Seventh-day Adventist Church. While the concept of integrating faith and learning gained prominence in the 20th century through the works of scholars like Arthur Holmes, this study aims to demonstrate that Ellen G. White's educational principles, though not explicitly labeled as such, inherently reflect this integration. Through an analysis of her writings, particularly her worldview and curricular concerns, the research will compare and contrast White's educational concepts with modern scholarly frameworks of faith and learning integration.

The study will employ a comprehensive literature review and an evaluative analysis to examine the philosophical, biblical, and historical contexts of White's worldview. The findings will highlight the unique aspects of her educational approach, emphasizing the importance of a holistic Christian education that intertwines academic, spiritual, and moral development. This dissertation will also investigate the application of White's educational principles in the Adventist educational system, particularly at Battle Creek and Avondale Colleges, and evaluate their relevance to contemporary discussions on faith and learning integration. Ultimately, this research aims to contribute to the broader discourse on Christian education by providing an Adventist perspective on integrating faith and learning, offering insights into the practical implications of White's educational philosophy for modern educational practices.

GRADUATE PSYCHOLOGY

P-36.   ***An Examination of the Attitudes of Elementary School Teachers Towards Trauma-Informed Literacy Practices***
Caddabra Bernard-Brown[+], Nadia Nosworthy, Charline Barnes Rowland, and Karla Basurto-Gutierrez

This study aims to examine the attitudes of elementary school teachers towards trauma-informed literacy practices. A quantitative, non-experimental, correlational, and cross-sectional design will be employed. It is hypothesized that teacher attitudes towards trauma-informed literacy practices is influenced by teacher training in trauma informed approaches, training in social-emotional learning and Adverse Childhood Experiences (ACEs) among teachers. A questionnaire will be used to gather data on these variables as well as demographic information. A minimum sample of approximately 385 teacher participants will be targeted. For this ongoing research the null hypothesis will be rejected.

P-37.   ***A Comparison of Perceptions on Problematic Sexual Behaviors between Religious and Non-Religious Sexual Recovery Groups***
Joshua Campbell[+]

This study aims to compare perceptions of problematic sexual behaviors (or sex addiction) between religious and nonreligious participants. In a sample of 200 participants in religious and secular sexual recovery groups, ages 18 to 70, the participants completed self-report measures assessing problematic sexual behaviors, beliefs about addiction, and religiosity. The data will be collected from online and in person support groups for problematic sexual behaviors. This is a quantitative study and utilizes a correlational design. The results of this study may demonstrate that those that identify as religious are more likely to perceive themselves as struggling with problematic sexual behaviors. This study provides insight into who is most likely to report engaging in behaviors that are consistent with problematic sexual behaviors. These findings have implications for mental health practitioners working with those who report struggling with "sex addiction", as it provides an opportunity to identify the differences between perceived and actual addictions.

P-38.   ***Attachment, Cultural Dissonance, and Emotion Regulation's Impact on Relationship Satisfaction in Caribbean, Black American, and Caribbean-Black American Interethnic Couples***
Ellecia Cousins, Carole Woolford-Hunt, and Rebecca Katovsich

The current study explores the intersection of attachment styles, cultural dissonance, and emotion regulation in their influence on relationship satisfaction among Caribbean, Black American, and Caribbean-Black interethnic couples.

Despite the extensive research on these factors individually, there is a significant gap in understanding their combined impact on relationship dynamics in these specific cultural groups. Black couples, in particular, report the lowest levels of relationship satisfaction compared to other racial groups in America (Bryant et al., 2008). As well, interethnic couples face unique challenges due to differing values and cultural dissonance (Gaines & Agnew, 2003). This crosssectional quantitative study employs path analysis to assess the relationships between secure, anxious, and avoidant attachment styles, cultural dissonance, emotion regulation, and relationship satisfaction in Black American, Caribbean, and Caribbean-Black interethnic couples. Data will be collected from approximately 300 individuals through online surveys, including the Couples Satisfaction Index (Funk & Rogge, 2007), the Emotion Regulation Questionnaire (Gross & John, 2003), and the Experiences in Close Relationships Scale-Revised (Fraley et al., 2000). This study's findings will contribute to more effective relationship counseling by addressing the unique challenges faced by these underrepresented populations, with potential implications for enhancing relationship satisfaction and well-being in these communities.

P-39. ***Perceptions of Child Sexual Abuse in Jamaica: Effects of Gender Norms and Rape Myth Acceptance***

Camille Graham[+], Elvin Gabriel, Karla Sarai, and Carole Woolford-Hunt

This study explores child sexual abuse (CSA) in Jamaica, where numerous official reports are made annually and show a disturbing trend of girls under 16 being disproportionately affected. Despite its prevalence, CSA receives limited public and research attention, often overshadowed by other forms of violence in the country. Existing Caribbean studies suggest that patriarchal gender norms (PGN) and child rape myth acceptance (CRMA) perpetuate CSA, but no model has examined how these cultural factors influence perceptions of child sexual abuse (PCSA), including the ability to identify an act as CSA, assess its severity, and determine culpability. This quantitative study will use correlation analysis to explore the relationships between PGN, CRMA, and PCSA. MANOVA will be employed to assess interaction effects of age, sex, education, and trauma history on these variables, while path analysis will be conducted to test the proposed model predicting PCSA. This is an ongoing study that aims to clarify how PGN and CRMA shape PCSA, offering insights for culturally informed interventions to address CSA.

P-40. ***The Traumatic Impact of Community Violence Exposure on Children: Perceptions and Experiences of School Mental Health Workers in Trinidad***

Nadine Isaac-Dennis, Michael Milmine, Alyssa Sussdorf[+], and Camille Graham[+]

This qualitative study explores the perceptions and experiences of school mental health personnel who support children living 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. Eight school mental health workers (five school social workers and three guidance counselors/officers) were interviewed via Zoom using semi-structured interviews. The audio-recorded interviews were transcribed and are now being analyzed using reflexive thematic analysis for this phenomenological study. Researchers will report preliminary findings from the familiarization stage of analysis. Findings from this study will contribute to the body of knowledge available to inform intervention, practice, and policy.

P-41. ***Math Anxiety, Working Memory, and Analogical Reasoning as predictors of Math ability in adults***

Mgontsa Kamvazaana+, Nadia Nosworthy, Karla Basurto-Gutierrez, and Michael Milmine

This study aims to examine the relationships between math anxiety, working memory, and analogical reasoning, and their predictive power for math ability in adult college students at Andrews University. The research follows a quantitative, non-experimental, correlational, and cross-sectional design. Data will be collected using standardized assessments for math anxiety (abbreviated math anxiety scale AMAS), working memory (Baddeley's measure of working memory), and analogical reasoning measured by the (Criteria Cognitive Aptitude test CCAT verbal reasoning subtests), alongside measures of math ability (WAIS-IV mathematics portion for the Digit Span and arithmetic subtests). A series of statistical tests, including path analysis and regression, will be used to analyze the relationships between these variables. Previous studies have shown that both math anxiety and working memory are significant predictors of math ability. This study aims to build on that foundation by testing the hypothesis that analogical reasoning also has predictive power, while rejecting the null hypothesis. The significance of this research lies in identifying key

factors that influence math ability, which could inform the development of targeted educational interventions for adult learners in higher education.

P-42. ***Social Connectedness, Cultural Engagement, and Intergenerational Relationships as Predictors of Well-Being of Older Adults in the United States Within the Framework of Ageism***
Clarissa Keller[+], Elvin Gabriel, Carol Woolford-Hunt, and Michael Milmine

This research seeks to investigate how social connectedness, cultural engagement, and intergenerational relationships, predict the psychological well-being of older adults in the United States, within the framework of ageism. According to the US census bureau, older adults (ages 65 and older) will be the largest demographic in the United States by 2034. As the US population ages, understanding these relationships is paramount for broadening our understanding of the psychological health of older adults and reducing age-related stigma. Through an in-depth analysis of existing literature and ongoing research, the study will examine how these variables contribute to or impede the psychological well-being of older adults. The study is on-going, and the results are not yet available. This research is a quantitative, non-experimental, correlational, and cross-sectional study. Data will be collected from the following instruments: (1) The Social Connectedness Scale; (2) Cultural Participation Survey; (3) Intergenerational Contact Scale, and (4) Ryff Scales of Psychological Well-Being. This study is designed to test the null hypothesis that these research variables do not significantly impact the psychological well-being of older adults.

P-43. ***Investigating Magnitude Comparison, Processing Speed and Mathematics Anxiety in Grades 1-3***
Nadia Nosworthy, Mgongtsa Kamvazaana[+], Christina Stowell[+], and Jocelyn Willis

This study investigated the relationship between magnitude comparison, mathematical skills, processing speed and math anxiety as it emerges across development in K-3. Results provide insights in characterizing what abilities are predictive of mathematical skills and their dysfunction and will aid in the development of interventions.

P-44. ***Exploring the Relationship Between Big Five Personality Traits, Treatment Satisfaction, and Working Alliance in U.S. Emerging Adults: An Analysis of Teletherapy versus Face-to-Face Therapy***
Israel Ostrander[+], Ronald Coffen, Karla Basurto-Gutierrez, and Rebecca Katovsich

This study aims to assess to what event specific personality traits moderate treatment satisfaction and working alliance in telehealth versus face-to-face psychotherapy. A sample of 300 U.S. residents, ages 18-25, who have terminated therapy services following the COVID-19 pandemic will be examined. Data will be collected using selfreport questionnaires and personality inventory analysis to achieve the aims of the study. Variables will be measured using the NEO Personality Inventory - Third Edition (NEO PI-3), Client Satisfaction Questionnaire (CSQ), and Working Alliance Inventory (WAI). This research is ongoing, and we aim to reject the null hypothesis.

P-45. ***Sexual Minority and Religious Identity Integration, Social Support and Parental Support as Predictors for Mental Health Wellbeing Among LGBTQ Christian Individuals***
Carlos Tavarez[+], Bradly Hinman, Karla Basurto-Gutierrez, and Rebecca Katovsich

LGBTQ Christian individuals often experience significant mental health challenges due to the conflict between their religious beliefs and sexual/gender identities. This study explores the impact of sexual minority and religious identity integration, social support, and parental support on the mental health of LGBTQ Christian individuals. This study used a quantitative research design, specifically, a regression analysis. The data will be collected from 500 American LGBTQ individuals aged 18-65 years through self-report questionnaires. The Sexual Minority and Religious Identity Integration (SMRII) scale, Multidimensional Scale of Perceived Social Support (MSPSS), and Parental Acceptance-Rejection Questionnaire (PARQ) will be used to measure the independent variables. The dependent variable, mental health wellbeing, will be measured using the General Health Questionnaire (GHQ). Note: This is an ongoing research study, and the authors aim at rejecting the null hypothesis.

THEOLOGY

P-46. ***God with Them: The Active Godhead in the Theologies of Hut, Denck and Schlaffer***
Jonathan Gomide[+] (with Davide Sciarabba), *Undergraduate Research Scholar*

This project aims to illuminate the conception of the Godhead in Anabaptist theology, focusing specifically on the writings of Hans Hut, Hans Denck, and Hans Schlaffer regarding the Trinity. Existing scholarship, including modern reinterpretations by Thomas N. Finger, J. D. Rempel, and P. Travis Kroeker, has largely overlooked the central role of "mercy" in Anabaptist thought. While many studies adopt a systematic approach to Anabaptist Trinitarianism, this research posits that understanding the Godhead requires a fresh, comprehensive framework centered on the actionoriented nature of God. Hut, Denck, and Schlaffer perceive the Godhead as characterized by justice and tempered by free will, emphasizing the importance of mercy. Hut, for instance, notes that the "bonds of love" and mercy are imparted to believers through the Holy Spirit, necessitating a human response. This study contends that the concept of the 'radical Trinity' is best understood through their hermeneutical approach to biblical narratology, revealing an active Godhead where divine actions are paramount. The core question driving this research is: What interpersonal divine actions, according to Hut, Denck, and Schlaffer, most reveal the essence of the divine Trinity? Through primary-source analysis, this study highlights attributes such as mercy, justice, love, and free will as foundational to Anabaptist understandings of the Godhead, ultimately enriching contemporary discussions on Trinitarian theology within a radical faith context.

P-47. ***Expanding the Hisban Interactive Archive: Digitization and Integration of Visual Materials*** Terry
Robertson, Paul J. Ray, and Oystein LaBianca

Phase II of the Hisban Interactive Archive Project (HIAP) builds upon the successes of Phase I, which digitized all published reports from the Heshbon Expedition (1968–1976) and the Hisban Cultural Heritage Project (1996– 2022), as well as the additional sites of Tall al-Umayri and Tall Jalul. Phase II focuses on the digitization of visual materials, including photographs, maps, drawings, and other illustrations associated with Tall Hisban. These materials will be integrated into the existing ""data lake,"" which archives all scanned content for use with advanced text analytics tools. This phase is more complex, as it involves identifying, categorizing, and adding captions to each of the more than 2,000 images in the archive. To achieve this, $10,000 has been requested to support two archaeology graduate students who will conduct the labor-intensive work of labeling and organizing the images. Additionally, Phase II will continue to employ the two outstanding graduate students from Phase I.

The project ensures the preservation and accessibility of visual data for researchers and the general public through the Digital Commons @ Andrews University. By enhancing the digital archive with detailed metadata, captions, and searchability, this phase will make valuable visual resources more accessible, further contributing to the global academic community and fostering new research opportunities. This work represents a crucial step in preserving the legacy of archaeological research at Tall Hisban and will pave the way for future digital initiatives in archaeology.

HEALTH & HUMAN SERVICES

SPEECH-LANGUAGE PATHOLOGY

P-48. ***Lingual strength and endurance score in Individuals with Parkinson's Disease before and after completing the SPEAKOUT!® Program***
Vernisha Hodge[+], Elianna Fisher[+], and Marielda Cattelan Tomé

The questions presented in this study proposed a difference in anterior lingual strength and endurance between people with Parkinson's disease (PwPD) before and after they completed the SPEAKOUT!® program and their healthy age and sex-matched pairs. This non-experimental between-subject design study compares two groups, Group 1: PwPD and Group 2: Age/gender match individuals without Parkinson's Disease (PD). Data will be compared to investigate the impact of SPEAKOUT!® training exercises on lingual strength and endurance scores in PwPD (Group 1) before

and after they complete the SPEAKOUT!® program. The proposed study uses a handheld device called the Iowa Oral Performance Instrument (IOPI) to generate lingual strength and endurance. Results from this study will serve the speech-language pathology community and The Parkinson Voice Project by providing insight into better recommendations for PwPD specifically

STEM

BIOLOGY

P-49.   ***Selective Induction of Apoptosis in BxPC-3 and PANC-1 Pancreatic Cancer Cells via Chinese Medicinal Herbs: A Comparative Study with Normal HPDE Cells***
Abby Shim[+] (with Brian Wong), *Honors Thesis*

Chinese medicinal herbs Scutellaria barbata (SB), Oldenlandia diffusa (OD), and Bryophyllum pinnatum (BP) are known to contain phytochemicals with anti-cancer properties. While previous studies have demonstrated their efficacy against various cancer cell lines, their potential to selectively induce apoptosis, or programmed cell death, remains unexplored. This study examines the ability of these herbs to selectively trigger apoptosis in pancreatic cancer cells (BxPC-3, PANC1) while sparing normal human pancreatic ductal epithelial cells (HPDE). Via fluorescent microscopy and assessment of the modulation of pro- and anti-apoptotic proteins in all three cell lines following treatment with aqueous extracts, the differential effects of the herbs are elucidated.

P-50.   ***The effect of DHA on myo-inositol levels in lymphoblasts derived from patients with bipolar disorder***
Katherine Pierre[+] (with Marlene Murray), *Honors Thesis*, *Undergraduate Research Scholar*

Current treatments for bipolar disorder are hypothesized to exert their therapeutic effects by lowering intracellular myoinositol levels, but they can cause harmful side effects. Seeking safer options, previous research investigated the omega3 fatty acid docosahexaenoic acid (DHA), which increased myo-inositol in yeast cells, suggesting the potential for reducing depression. This study explores DHA's effect on myo-inositol levels in lymphoblasts derived from patients with I, bipolar II, and a neurotypical cell line.

P-51.   ***Modulation of syllable period-selective phonotaxis in female cricket Acheta domesticus***
Benjamin Navia, David Mbungu, Haelyn Park[+], Lauren Kim[+], and Maya Sakumaran[+]

Selective phonotaxis exhibited by female cricket 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 conspecific male, other females respond phonotactically to calls with a wider range of syllable periods. Nanoinjections of H7 (a protein kinase inhibitor) into the prothoracic ganglion of previously selective females, resulted in the females' inability to discriminate between attractive and unattractive calls and were overall less responsive. However, nano-injection of membrane permeable cGMP into the prothoracic ganglion caused females to become more syllable period-selective than in the pre-tests. Nano-injection of saline into the prothoracic ganglion did not change the overall selectivity of the female's phonotaxis when compared to the pre-tests. These results suggest that circuits in the prothoracic ganglion can modulate syllable period-selectivity of phonotactically responsive females. Additionally, exposing virgin females to males ,without permitting physical contact, caused a change in the number of syllable periods females typically respond to, when compared to the control virgin females. Females previously exposed to males were more likely to respond phonotactically to a single syllable period, while control virgin females responded to as many as five syllables periods. The effect of male exposure on the underlying circuits controlling female phonotaxis remains to be investigated as an additional modulators of female phonotaxis. Whether H7 and cGMP mediate their modulatory role by targeting similar or different targets remains to be investigated.

P-52. ***Exploring protein folding in the metallocarboxypeptidase family***

Peter Lyons, Erica Shin[+], Masy Domecillo[+], Donn Latour[+], and Gitty Barfi[+].

A protein arrives at the proper three-dimensional shape through a complicated series of folding steps facilitated by chaperones. Defects in folding can lead to a variety of diseases; for example, folding defects in pancreatic carboxypeptidases have been linked to pancreatic cancer and pancreatitis. Although it is unknown exactly how pancreatic carboxypeptidases fold, it is thought that they require a prodomain as an intramolecular chaperone. To understand the requirements for folding, we created mutations in a number of carboxypeptidases, including human CPA1, CPA2, CPA3, CPA6 and CPO, zebrafish CPA1, and Xenopus CPO. Our preliminary results suggest that pancreatic carboxypeptidases do not require a prodomain for expression in HEK293T cells. Future experiments will examine the consequences of prodomain deletion on the stability and enzymatic activity of these carboxypeptidases.

P-53. ***Expression of RASGRP1 in Bipolar-Derived Lymphoblastoid cell lines***

Marlene Murray

Bipolar disorder (BD) serves as a significant public health challenge. Recurrent episodes of mania and depression characterise it. BD is broadly categorised into four subtypes Bipolar I (BD I), Bipolar II (BD II), Cyclothymic disorder and BD Non-Specified. BD's complex etiology involves genetic predisposition and environmental factors, however, the understanding of the molecular mechanisms underlying BD remains incomplete. Recent breakthroughs in genetic studies have identified RASGRP1, a gene involved in immune function and inflammatory responses as a candidate gene which might play a role in the development of BD. However, gaps in knowledge persist regarding the expression patterns of RASGRP1 in BD cell lines and its response to mood-related stimuli, such as the stress hormone cortisol since stress is known to trigger episodes in BD patients.

To address this gap, the research aims to highlight the connection between RASGRP1 and BD using Lymphoblastoid cell lines (LCLs) derived from BD and healthy individuals. RASGRP1 gene and protein expression patterns between BD I, BD II, and healthy control LCLs will be determine by quantitative reverse transcription polymerase chain reaction (RT-qPCR) and immunoblot assays respectively. Additionally, to gain insight on the possible connection between bipolar disorder and the inflammatory response, the effect of cortisol on RASGRP1 expression in the three cell lines will be determined measuring the expression of RASGRP1 gene and protein in cells grown in the presence of cortisol. Investigating RASGRP1 expression and its response to stress hormones may provide valuable insights into the molecular mechanisms influencing BD development and may contribute to improved diagnostic and treatment strategies."

CHEMISTRY

P-54. ***PAMAM Dendrimer in Acne Vulgaris Treatment***

Melissa Pousa, Ryan Hayes, and Anneliese Tessalee[+]

Dendrimers are nano-sized synthetic polymers of repeated branching chains extending radially from the core. The outermost surface is often characterized by functional groups or reactive molecules that can chemically interact with other molecules of interest. Because of their unique properties, dendrimers are used and studied for a variety of applications. The G2 polyamidoamine dendrimer (PAMAM) possesses the ability to chemically interact with bacterial membranes and has shown potential for targeted specificity as an antimicrobial. Our research aims to study the PAMAM dendrimer as a potential antimicrobial in the treatment of the chronic skin disorder Acne vulgaris. This project aims to better elucidate the nature of the PAMAM dendrimer regarding its antimicrobial activity, the dose dependency of its efficacy, its target specificity, its relationship with antibiotic resistance, and its interaction with collective skin commensals. This project studies the antimicrobial effect of the G2-Hex-NH2 PAMAM dendrimer on the bacterial species Cutibacterium acnes and Staphylococcus epidermidis.

P-55. ***Risk Assessment of Heavy Metal Exposure from Betel Quid Chewing***

John Roosenberg[+] (with Ryan T, Hayes), *Honors Thesis*

Betel quid or betel nut is a potentially harmful chewing blend consisting of a betel piper leaf, areca nut, and slacked lime, and it's been reported as the fourth most common psychoactive substance in the world. Although primarily used in

specific Asian countries, it has been available in specialty grocery stores in the US since before 1998. The toxicity of betel quid component samples, purchased in the US but grown in various countries, was assessed by their concentration of heavy metals (Cr, Pb, As, etc.) determined by ICP-OES and the estimated daily intake (EDI) and hazardous index (HI).

COMPUTER SCIENCE

P-56. ***Improving Accented Speech Recognition: A Study of Feature Engineering with Convolutional Neural Networks (CNN)***

Anastasia Pasechnik[+] (with Ackley Will), *Honors Thesis*

Speech recognition systems often struggle to accurately transcribe speech for people of diverse linguistic backgrounds since these systems can only recognize accents they've been trained to understand. This research project aims to study how accented speech recognition can be improved using the convolutional neural network (CNN), a type of neural network that is used in analyzing image data and recognizing patterns within them. By extracting the Mel-Frequency Cepstral Coefficient (MFCC) features from the speech samples, which visually represent the key characteristics of the audio, these images are then trained by the neural network for accent classification. The study also addresses dataset imbalance through data augmentation techniques such as pitch shifting and speed modification to generate additional training samples. The main goal of this research project is to study if the CNN approach to accent recognition is beneficial and if it is possible to improve general speech recognition using accent classification. This research project focuses on only a few categories of accents, but if proved useful, could be broadened into a finer-tuned classification system for more accents and dialects in the English language."

ENGINEERING

P-57. ***Time series data generation using VAE for soft sensor for bioethanol production***

Hyun Kwon, Joseph Shiu[+], and Elmer Rivera

This work presents a recently published work regarding soft sensor and synthetic data generation. Soft sensors based on deep learning regression models are promising approaches to predict real-time fermentation process quality measurements. However, experimental datasets are generally sparse and may contain outliers or corrupted data. This leads to insufficient model prediction performance. Therefore, datasets with a fully distributed solution space are required that enable effective exploration during model training. In this study, the robustness and predictive capability of the underlying model of a soft sensor was improved by generating synthetic datasets for training. The monitoring of intensified ethanol fermentation is used as a case study. Variational autoencoders (VAE) were used to create synthetic datasets, which were then combined with original datasets to train neural network regression models. These models were tested on original versus augmented datasets to assess prediction improvements. Using the augmented datasets, the soft sensor predictive capability improved by 34%, and variability was reduced by 82%, based on R2 scores. The proposed method offers significant time and cost savings for dataset generation for the deep learning modeling of ethanol fermentation and can be easily adapted to other fermentation processes.

MATHEMATICS

P-58. ***A predator-prey biological model with combined birth rates, self-limitation and competition terms***

Joon Hyuk Kang

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

P-59. ***Analysis of the Snake Cube Puzzle and Adjacency Criteria***
Trey Matus[+] (with Anthony Bosman), *Honors Thesis*

The snake cube is a puzzle comprising straight and turn pieces that folds into an nxnxn cube. Finding solutions for large cubes is difficult, so finding necessary conditions for solutions is crucial. Using computational algorithms and mathematical proofs, I find improved bounds for the maximum number of straight pieces in a given puzzle size. In particular, I introduce and apply the adjacency criterion to identify groups of puzzles that are unsolvable. Additionally, I find a connections between the number of puzzles that adhere to the adjacency criterion and generalized Fibonacci sequences.

P-60. ***A note on Gradient Ricci Solitons***
Yun Myung Oh

Let M be a smooth manifold, g a Riemannian metric, X a smooth vector field on M, and λ a real constant. The system (M, g, X, λ) is said to define a Ricci soliton if it satisfies the Ricci equation:

$$L_X g + 2 \operatorname{Ric} = 2 \lambda g$$

where L is the Lie derivative and Ric is the Ricci tensor of g. In particular, if $X = f$ for a smooth function f on M, then (M, g, f, λ) is called the Gradient Ricci soliton. By Perelman, it is known that a compact Ricci soliton is gradient. Some recent results will be provided along with the problem in the process.

P-61 ***Maximizing Full Length Runs of a Hamiltonian Path in a Cubic Lattice Graph***
Juan Camillo Alvarez[+] (with Anthony Bosman)

The snake cube puzzle comprises n^3 pieces connected by a string with the goal of folding the pieces into a cube. In some pieces, the string passes straight (S) through whereas in others it turns (T). It can be modeled by finding a Hamiltonian path in a cubic lattice graph. Previous work has studied the maximum number of S pieces in a solvable snake puzzle. The maximum number of straight pieces in a row is n-2, called a (full length) run. It is known that the maximum number of runs in a solvable cube when n=3 is 11. We show that for n=4, the maximum number of runs is 18 and in general the maximum achievable is given by n^2+2. This contributes to the problem of determining the maximum number of S pieces in a solvable snake cube puzzle.

P-62. ***Bent Hamiltonian Paths in Toroidal Grid Graphs and Applications to the Snake Cube Puzzle***
Jamie Shepard[+] (with Anthony Bosman)

The snake cube is a puzzle comprising straight and turn pieces that folds into an nxnxn cube. Finding solutions for large cubes is difficult, so finding necessary conditions for solutions is crucial. Using computational algorithms and mathematical proofs, I find improved bounds for the maximum number of straight pieces in a given puzzle size. In particular, I introduce and apply the adjacency criterion to identify groups of puzzles that are unsolvable. Additionally, I find a connections between the number of puzzles that adhere to the adjacency criterion and generalized Fibonacci sequences.

Key: [+] Student

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ORAL PRESENTATIONS

SESSION I: HEALTH & SCIENCE

A-1   ***Interdisciplinary Applications of Differential Equations and Statistical Modeling in Engineering, Biomedicine and Agriculture***

Said Kas-Danouche

Differential Equations and Statistical Modeling cover a major area of Math modeling. Fluid dynamics is a fascinating field with numerous real-world applications, from industrial processes to environmental systems which delves into the nonlinear interfacial stability of these flows, especially in the presence of surfactants, which are substances that can significantly alter fluid behavior. One intriguing area of study is the stability of fluid interfaces, particularly in coreannular flows which drives us into the fractals' world. The fields of biomedicine and agriculture are rapidly evolving, driven by innovative research that leverages advanced mathematical techniques. In this opportunity, I will present the different topics of research I am involved and willing to be involved with. My research area explores the application of differential equations and/or statistical modeling to solve complex problems in these domains. By integrating these approaches, we aim to provide new insights and practical solutions that can significantly impact the fields.

A-2   ***Expression of RASGRP1 in Bipolar-Derived Lymphoblastoid cell lines***

Serena Sarsah[+]

Bipolar disorder (BD) serves as a significant public health challenge. Recurrent episodes of mania and depression characterise it. BD is broadly categorised into four subtypes Bipolar I (BD I), Bipolar II (BD II), Cyclothymic disorder and BD Non-Specified. BD's complex etiology involves genetic predisposition and environmental factors, however, the understanding of the molecular mechanisms underlying BD remains incomplete. Recent breakthroughs in genetic studies have identified RASGRP1, a gene involved in immune function and inflammatory responses as a candidate gene which might play a role in the development of BD. However, gaps in knowledge persist regarding the expression patterns of RASGRP1 in BD cell lines and its response to mood- related stimuli, such as the stress hormone cortisol since stress is known to trigger episodes in BD patients.

To address this gap, the research aims to highlight the connection between RASGRP1 and BD using Lymphoblastoid cell lines (LCLs) derived from BD and healthy individuals. RASGRP1 gene and protein expression patterns between BD I, BD II, and healthy control LCLs will be determine by quantitative reverse transcription polymerase chain reaction (RT-qPCR) and immunoblot assays respectively. Additionally, to gain insight on the possible connection between bipolar disorder and the inflammatory response, the effect of cortisol on RASGRP1 expression in the three cell lines will be determined measuring the expression of RASGRP1 gene and protein in cells grown in the presence of cortisol. Investigating RASGRP1 expression and its response to stress hormones may provide valuable insights into the molecular mechanisms influencing BD development and may contribute to improved diagnostic and treatment strategies.

A-3 ***A Model of the Relationship between ACEs and Psychological Well-Being: The Role of Cognitive Flexibility and the Subjective Impact of ACEs.***

Amante Gonzalez[+]

A current problem is that while literature has explored correlations between Adverse Childhood Experiences and Psychological Well-Being, there is not an established model within the literature that includes mediating and moderating factors (Cognitive Flexibility and Subjective Impact of ACEs) that elaborates on this relationship. Furthermore, no literature has evaluated differential scoring methods of a subjective impact of ACEs instrument.

This research project will explore how individuals' subjective experience of their childhood trauma is correlated with their current psychological well-being and how cognitive flexibility may impact this relationship. This research project will also pilot an alternative scoring method of a trauma evaluation instrument that may provide a more clinical applicable operationalization of trauma impact.

A-4   ***Lived Experiences of Adventist Humanitarian Service Providers in the Ukraine-Russia Crisis: A Hermeneutic Phenomenological Study.***

Pavel Zubkov, Arceli H. Rosario*, Gracel Ann Saban*, David Lumowa*, and Jasmin Tuapin*

Humanity has been beset with catastrophes brought about by natural and man-made disasters such as earthquakes, typhoons, tsunamis; human error such as nuclear leaks; and international conflicts such as wars. During catastrophic events, one most urgent action that must be done is to address humanitarian needs. Humanitarian service providers have responded to such needs. This response, which has come in different forms, has been most evident in the recent Ukraine-Russia conflict. It aims to describe the lived experiences of Adventist humanitarian service providers who served during the Ukraine-Russia crisis and interpret the meanings that the participants ascribe to their experiences. Eight humanitarian service providers in the media, medical, food, transportation, and home shelter services were chosen through purposive and snowball sampling. Data sources are the phenomenological interviews and aesthetic portrayal. The data was analyzed using the data analysis framework of van Manen (1990, 2016) and the themes were presented following the essential lifeworld elements (van Manen, 1990, 2016), which are spatiality, temporality, corporeality, materiality, and relationality. Findings in this study contribute to the understanding of what it is like to be a humanitarian service provider to victims of an armed conflict and why they render such services.

A-5   ***PFAS evaluation in Berrien Springs Waters***

Jean Cadet, Dixon Anjejo, Padma Uppala

According to the Environmental Protection Agency (EPA), exposure to certain Per- and polyfluoroalkyl substances (PFAS) may lead to adverse health outcomes, including infertility, high blood pressure, developmental delays in children, increased risk of prostate, kidney, and testicular cancers, and increased risk of obesity. Lake Michigan, which is a source of drinking water for many communities in the region, receives water from the Saint Joseph River. The purpose of this study was to assess the presence of PFAS in the St Joseph River and a few drinking water sources in Berrien Springs.

We collected nine water samples from various locations of the Saint Joseph River and three drinking water samples in Berrien Springs in May 2024. The Samples were analyzed by Pace Labs in Minnesota for 36 various PFAS compounds. About 58% of the collected samples – six of the nine river samples and one of the three drinking water samples – were positive for Perfluorobutanoic acid (PFBA). The other PFAS compounds were not detected in any of the samples. Saint Joseph River feeds Berrien Springs groundwater and Lake Michigan. Due to the known adverse hepatic, thyroid, reproductive, and developmental effects of the PFBA compound in animals, further studies with larger sample sizes are needed to evaluate PFBA's impact in humans and to evaluate the presence of other PFAS compounds in drinking waters in Berrien Springs, MI.

SESSION II – RELIGION & THEOLOGY

B-1   ***Coding the Greek New Testament in an Open Source Environment***

Saulo De Oliveira Cantanhêde[+]

Over the centuries, the Bible has been reproduced in various forms, from the scrolls to the codex, from the handwritten codex to the printed books, and more recently to the digital Bible, as described in this article. We report the final implementation of a data conversion project to convert an existing open source Nestle 1904 Greek New Testament encoded in XML format through Text-Fabric software. The data was converted using Python packages, and was made available in a GitHub repository for programmers and non-programmers. The resulting annotated text can be used for morphological and syntactical linguistic research. Also, we developed over 60 Text-Fabric features that can be grouped into warp, sectional, orthographic, lexical, text-critical markers, morphological, syntactic, semantic, and relational features. In addition, a syntactic view side-by-side of the encoded data display, calculated parent and sibling features, features for critical text, and variants in the word lemma and its characters. These features can be manipulated offline using Text-Fabric browser or a Jupyter Notebook. Further, this article demonstrated how one can use an open source code and data that targets the general user rather than only the specific needs of linguistic research, developing an end-user comprehensive documentation, how linguistic concepts should have the end user in mind, and the importance of a participative project in the humanities.

B-2   *Toward Effectively Measuring Seven **Core Qualities For Pastor Competence***
       Petr Cincala, Injae Son, and Rene Drumm

Church leaders at the North American Division (NAD) have identified seven core qualities for pastor leadership excellence. These qualities focus on character, evangelism, leadership, worship, management, scholarship, and relationships. As ideal concepts, these qualities appear to be appropriate ways of noting pastoral competence. However, when working to assist pastors in identifying their strengths and challenges and moving their ministry forward with excellence, little is known about how to measure these qualities in empirically valid ways. Research has started to develop an instrument to measure these qualities. This presentation highlights the process of developing a beta version of the survey measuring 7 core qualities for pastors' competence and shows examples of the results and how they are utilized in the field.

B-3   ***God of the Victims: Rene Girard and Adventist Political Theology***
       Mckeruzaa Paugari[+]

Rene Girard's mimetic theory has significantly impacted current understandings of human nature, violence, religion, culture, and Christianity, with its portrayal of the triangle structure of desire (mimetic) indicating the rivalrous and transcendent orientation of human interactions. It developed through three main stages: 1) mimetic desire, 2) scapegoating mechanism, and 3) biblical revelation dismantling the scapegoating mechanism. This thesis focuses mainly on the third aspect of mimetic theory and its tracing of the development of Western science, legal and political systems, and ethics to the Crucifixion. This singular historical event inverts archaic pagan sacrificial value systems (scapegoating mechanism),invoking sympathy for victims by presenting God as the penultimate victim of human violence.

The thesis aims to accomplish two things by drawing from mimetic theory and incorporating it into Adventist theo-politcal discourse. Firstly, it seeks to clarify mimetic theory by explaining scapegoating, its preservation in myth, the emergent sacrificial religions and cultures, and Biblical revelations in opposition to sacrificial culture generating Western civilization. Understanding the reasoning and insights that mimetic theory contributes to broader theological conversations naturally allows for achieving the second objective of this thesis. This objective is to integrate mimetic theory's insights into the dialogue on Adventist political theology, focusing on three aspects: religious liberty, pacifism, and world missions. The thesis contributes to Adventist theological discourse and Girardian scholarship, expanding both by allowing mimetic theory to clarify some aspects of Adventist theo-politcal conversations and vice versa.

B-4   ***Is Repentance Impossible?*** Erhard
       Gallos

In Hebrews 6:4-6, the climatic center of the five-warning passages of Hebrews (2:1-4; 3:7-4:13; 5:11-6:12; 10:19-39; 12:1429), auctor ad Hebraeos makes a highly emotive statement that "it is impossible to restore again to repentance those who have once been enlightened, . . . and then have fallen away, since on their own they are crucifying again the Son of God and are holding him up to contempt" (Heb. 6:4-6 NRSV). The absoluteness with which the author describes the impossibility of being restored to repentance has caused much consternation among interpreters of the book. The consequence of the audience's retrogression has thus been coined by Hebrews scholars as "the impossibility of repentance." Throughout the centuries, this scintillating passage has caused not only intellectual perturbation but also practical disquietude. The church father Tertullian, for example, held that no second repentance existed for serious sins (such as adultery and apostasy) after baptism. For that reason, some Christians postponed baptism until immediately before death. The Novatians used Heb 6:6 to deny spiritual restoration to those who lapsed under persecution. John Chrysostom asserted that this passage teaches the impossibility of re-baptism. John Calvin argued that this warning applied to the "unpardonable sin" committed by the unbeliever against the Holy Spirit (Matt 12:31-32). Arminius concurred with Calvin, while Wesley applied the warning to those who willfully and totally apostatize from their faith. Along with the other warning passages in the book, Hebrews 6:46 has received scrutiny from the Arminian perspective (Grant R. Osborne), the classical reformed perspective (Buist M. Fanning), the Wesleyan Arminian perspective (Garth Lee Cockerill), and the moderate reformed perspective (Randall C. Gleason). However, the question still remains whether the solution to the underlying problem lies in any of these views (Four Views of the Warning Passages in Hebrews) or elsewhere. Rather than relying on individual religious persuasions to resolve the pivotal issue at hand, I suggest that it could be resolved by employing the sheer text.

This endeavor can be executed by 1) engaging with the immediate context of the passage; 2) utilizing the complex yet captivating syntax of the text (the predicate adjective combined with a complementary infinitive; adjectival vs adverbial participles; Granville Sharp Rule; Aktionsart, etc.), despite Kenneth Schenck's allegation that none of these interpretive "coping strategies" arising from the context/syntax/theology do "really seem to work" against the "seriousness of this warning" (Understanding the Book of Hebrews: The Story behind the Sermon, 63); and 3) by resorting to the intertextuality of this warning passage within Hebrews. Considering the above-mentioned steps, an amelioration of the rigid and absolute impossibility of repentance seems to emerge.

Key: [+] Student

[*] External Collaborator

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Acknowledgements: