

# Fourth Annual Faculty and Graduate Student Celebration of Research



November 8, 2012 | Buller Hall

## Program and Abstract Book

*“Research and creative scholarship permeate our academic life, inform our teaching and strengthen our emphasis on generous service.”*

*Niels-Erik Andreasen, President*

# Welcome

Welcome to the **Fourth Annual Andrews University Celebration of Research**. Niels-Erik Andreasen, President of Andrews University, recently wrote the following:

*The University is composed of inquisitive spirits and investigative minds. Therefore, a distinguishing attribute of Andrews University is the infusion of research and creative scholarship into its academic fabric. Research and creative scholarship permeate our academic life, inform our teaching and strengthen our emphasis on generous service. Research is always a collaborative endeavor. Faculty members participate in interdisciplinary collaborations, and students are mentored by their teachers in the intricacies of conducting research.*<sup>1</sup>

The Celebration of Research is a campus-wide event that showcases the culture of research and creative scholarship at Andrews. This year, Graduate Students join the Andrews University Faculty in presenting their research at this Celebration. We are excited about this opportunity to highlight the great work our Graduate Students are doing in collaboration with our Faculty. Undergraduate students also are very active in research at Andrews. Their work is presented at the annual **Honors and Undergraduate Research Scholarship Symposium**, which will be held this year on March 8, 2013.

The evening Plenary Presentations are given by the 2012 winners of the **Siegfried H. Horn Excellence in Research and Creative Scholarship Award**. The 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 and his impact upon the world church and the wider community of scholars. Siegfried H. Horn was the premier biblical archaeology professor, with many of the projects begun under his leadership still continuing to produce fruitful results today.

The **Siegfried H. Horn Excellence in Research and Creative Scholarship Award** recognizes lifetime achievement in research and creative scholarship for faculty members of Andrews University, and is given annually to one individual in each of four areas. This evening's plenary presentations are given by Duane McBride (Sciences and Mathematics), Curtis VanderWaal (Professions) and Steven Hansen (Arts and Humanities). The Religion and Theology award winner, Jiri Moskala, unfortunately is unable to be with us this evening.

Thank you for joining us for this celebration of research,



Gary W. Burdick  
Associate Dean for Research

<sup>1</sup>**Research and Creative Scholarship at Andrews University**, Volume 2 (Summer 2011), p. 2. Available for download at <http://www.andrews.edu/services/research/documents/researchbrochure2011.pdf>.

# Schedule of Events

3:00 - 5:00 pm **Poster Presentations** (Buller Hallways)

*See pages 11 – 22 for program abstracts.*

*Refreshments served in the central atrium*

P-01 – 05 Seminary and Archaeology

P-06 – 07 Agriculture

P-08 Business

P-09 – 11 Education

P-12 – 15 Library

P-16 – 18 Behavioral Sciences

P-19 – 35 Science, Technology, Engineering and Mathematics

P-36 – 39 Health Professions

5:00 - 6:00 pm **Oral Breakout Sessions** (Buller Classrooms)

*See pages 5 – 10 for program abstracts.*

Session 1 Theology and Religion (BH108)

Session 2 Social Work, Mission, and Discipleship (BH149)

Session 3 Biblical Studies and Historical Theology (BH150)

Session 4 Education, Communication, Music, Art (BH208)

Session 5 Community & International Development (BH250)

Session 6 English, Nutrition (BH251)

6:00 - 7:30 pm **Plenary Presentations** (Newbold Auditorium)

*See page 4 for program abstracts.*

Welcome, **Andrea Luxton**, Provost

Introduction of Speakers, **Gary Burdick**, Associate Dean for Research

Presentations by recipients of the **2012 Siegfried H. Horn Excellence in Research and Creative Scholarship Award:**

PL-1 **Duane McBride, Professor of Sociology**

*Reflections on Forty Years of Research Discovery*

PL-2 **Curtis VanderWaal, Professor of Social Work**

*Getting from There to Here: Collaborations, Motivations and Mistakes at Mid-Career*

PL-3 **Steven Hansen, Professor of Art**

*Creative Discovery*

Closing, **Niels-Erik Andreasen**, President

# Plenary Presentations

**PL-1:** *Reflections on Forty Years of Research Discovery*

**Duane McBride**, Department of Behavioral Sciences and Institute for Prevention of Addictions

My research career began in the summer of 1972 as a doctoral student at the University of Kentucky with a project applying role theory to becoming a “street drug addict”. I have had an active research project every year since that time with publications each year since 1975 (American Journal of Psychiatry) to 2012 (Journal of Substance Abuse Treatment) with at least two more in line for 2013. At this reflective moment, I want to reflect on some existential questions of why, what it has meant, why I still do it (and why all should think about doing it). Such issues as the role of expectations of mentors, the thrill of discovery, the meaning of impact, the joy of mentoring, the satisfaction of being a part of the discussion at the edges of one’s field, and confronting the tyranny of the daily will be discussed. Finally, the research environment at Andrews will be examined in terms of how it facilitates research, the barriers that exist here and perhaps how and why we should overcome them and contribute to Andrews being a part of the life of the mind and discovery and impact.

**PL-2:** *Getting from There to Here: Collaborations, Motivations and Mistakes at Mid-Career*

**Curtis VanderWaal**, Department of Social Work and Institute for Prevention of Addictions

The mid-point in a career is a good time to reflect on one’s successes and challenges in research. This presentation will focus on the importance of strong mentoring, collaborative networks, and the role (and sometimes lack of) of release time in providing space for productivity. In addition, the presentation will discuss how resources can motivate and shape projects, providing leverage to follow interests but also opening up new interest areas. Finally, the role of mistakes, false leads, and phantom opportunities will be considered as learning stages along the research path. Three key projects – ImpacTeen; DeVos Urban Leadership Initiative; and United Way – will be used to illustrate the joys and frustrations of the research process.

**PL-3:** *Creative Discovery*

**Steven Hansen**, Department of Visual Art and Design

Successful scholarship is frequently defined by discovery. In the sciences it might be the discovery of new chemical reactions, therapies, or parasites. In the behavioral sciences it might be the discovery of connections between behavioral outcomes and the environment. In the fine arts it is the discovery of a new way to express ideas visually. The language of art is comprised of a wide array of signs. These signs can be images, marks, or even words. It is the goal of most artists to construe a way to combine the aspects of visual language into a new form, the “undiscovered country”. Creating “the new” is not easy. Humans have been making marks and sculptures since before there was written language. Artists have been realists, expressionists, abstractionists, and conceptualists in every imaginable combination of media. Confronting the monumental task of adding a fresh body of work to the encyclopedia of art is a daunting and seemingly impossible task. In my work, I stumbled on “the new” by focusing on being true to myself. Instead of focusing on the “undiscovered country”, I concentrated on creating work that was true to my nature and nurture. I craft works that are formally in harmony with my mid-Western experience and intellectually driven by my interest in history and culture. In the process of making work that expressed my own unique life experience and interest, I created a signature style that is recognized nationally and internationally.

# Oral Presentations

## Session 1: Theology and Religion (BH108)

5:00 pm    **O1-1**    *Evolution and Theodicy: A Study on Models of Evolutionary Theodicy*  
**Adriani Milli Rodrigues**, PhD student in Theological Studies

Although the best theodicean arguments are usually based on eschatology, a legitimate theodicy needs to draw connections between God's purposes as creator and God's purposes as redeemer. However, it seems difficult to see the divine purpose in creation from an evolutionary perspective, since the very process that produces life is characterized by pain, suffering, and death. Based on a description of specific models of evolutionary theodicy, this study argues that the consistency of this theodicy is challenged by the incompatibility of its conception of God as creator and God as redeemer.

5:12 pm    **O1-2**    *An Analysis of the Relationship between God's Benevolence and Animal Pain in Theistic Evolution*  
**C. Adelina Alexe**, PhD Student in Theology

Theistic evolution suggests that God created animal and human beings through a long process of evolution. An evolutionary creation, however, implies that pain and death are inherent in the process, since creatures fight each other in their struggle for survival and new species arise through adaptations involving extinctions. This raises a stringent question: How does the presence of animal death before the appearance of human beings reflect on the character of God? In this paper I seek to explore, analyze, and critique the justification of God's benevolence evolutionary theologians offer corollary of their view of origins.

5:24 pm    **O1-3**    *Creation in the Twentieth-First Century: An Introduction to Protological Hermeneutic*  
**Sergio L. Silva**, PhD student in Religion

For the most part of the twenty and twenty-first centuries, the categorization of creationists in the Western world has been limited to two major groups: Old Earth Creationism (OEC) and Young Earth Creationism (YEC). In *Creation in the Twentieth-First Century: An Introduction to Protological Hermeneutic*, I suggest that to limit creation studies to these two categories is inconsistent with developments in both science and theology. That is because it ultimately classifies believers in creation either as theistic evolutionists (OEC—i.e., believers in an old earth, old universe, deep time geology), or scientific creationists as proposed by the Institute for Creation Research (YEC—i.e., believers in a young earth, young universe, no gap, fundamentalist point of view). For these reasons, I argue a new category that includes creationists who sense that a more biblically balanced approach to protology is necessary. Therefore, I am suggesting in agreement with other scholars, that this new category be called Undated Earth Creationist Movement (UEC), which I suggest is to be represented by the Special Creation Science model; the latter is open to the possibility of a biblical creation in two stages (Gen 1:1-2, then Gen 1:3ff), allowing for the possibility of creation ex-nihilo and an old universe/old earth/young life on earth.

5:36 pm    **O1-4**    *Indications and Environmental Implications of a Seventh Day in Psalm 104*  
**Rahel Schafer**, Department of Religion and Biblical Languages

Although some contend that Psalm 104 is governed by various Hebrew verbs rather than the six-day creation order, the striking lexical parallels and similar basic structures seem to form a foundation around which these other verbal patterns are situated. However, the relationship between creation and Psalm 104, which highlights God's care and provision for all his creatures, is not limited to the first six days of creation. In this paper, I analyze the relationship between Ps 104:27-35 and the Sabbath in Gen 2:1-4. In addition, I examine the parallels between other Sabbath passages and Psalm 104, and the resulting implications for environmental ethics. I contend that Psalm 104, as a poetic reenactment of the creation narratives, affirms the important aspects of Sabbath rest, and provides further support for the environmental implications of the links between Sabbath and creation.

## **Session 2: Social Work, Mission and Discipleship (BH149)**

5:00 pm    **O2-1**    *Do Adventists Care about Their Communities? An Exploration of Personal Religious Practices and Community Service Involvement among SDA Faculty and Staff*

**Curtis J. VanderWaal<sup>1</sup>, Alissa R. Mayer<sup>1\*</sup>, and John T. Gavin<sup>2</sup>**

<sup>1</sup>Department of Social Work, Andrews University, <sup>2</sup>Department of Social Work, Washington Adventist University, \*MSW Student in Social Work

Do Seventh-day Adventist (SDA) faculty and staff with more personal religious practices have more or less involvement in community service? Are there differences between faculty and staff in levels of church and community volunteerism? Researchers collected survey data from 530 SDA faculty and staff at nine Adventist colleges and universities across the United States in the summer of 2012. Primary survey findings show that 59.7% of faculty and staff worked on a community service project in the past year. Further, 100% of respondents say they volunteer for church work at least several times a year. While such findings indicate that SDA faculty and staff are highly active in their communities and churches, the relationships between their personal religious practices and community service involvement remains to be explored in this presentation.

5:12 pm    **O2-2**    *Tentmaking in the 21st Century: Theological and Missiological Implications for the Adventist Church*

**Kelvin Onongha**, PhD Student in World Mission

Christianity, like other world religions, owes a great deal of its spread to itinerant trades- and craftsmen who shared their religion wherever they went. In the twenty-first century the same holds true as a new breed of missionaries carry along their tentmaking, professional skills, as the Apostle Paul did centuries ago. Although the ministry of tentmakers in the Adventist Church is still at its nascent stage, its presence and success bear theological and missiological implications worthy of consideration. This paper will explore the nature and significance of tentmaking, and examine how it poses a challenge to missiological and theological paradigms in the church, and offer recommendations for its success.

5:24 pm    **O2-3**    *Current Trends in Pastoral Family Stress*

**David Sedlacek**, Department of Discipleship

Pastors, their spouses and their children each experience stress of various types. This presentation will share the results of an ongoing study being conducted by the SDA Theological Seminary, the Departments of Behavioral Science and Social Work in conjunction with Southern Adventist University and the North American Division of Seventh-day Adventists. The study will focus on the highlights of major concern revealed in the study results to date.

5:36 pm    **O2-4**    *Locus of Authority in Hans Küng's paradigm*

**Arlyn Drew**, PhD Student in Systematic Theology

Authority defines an institution's self-identity. But what happens when contemporary society no longer accepts traditional definitions of authority? It was a shock in the theological world when one world-renowned Roman Catholic theologian, Hans Küng, was stripped of his teaching authority because he asserted that the original gospel and historical Jesus Christ was the highest norm for the church. All Christian communities claim that same norm, yet a careful study of what that really means and the hermeneutical implications for access to that locus explains why the different denominations continue to exist and why Küng's assertion was dangerous for the Roman Catholic Church and is unacceptable for the Seventh-day Adventist church as well.

### **Session 3: Biblical Studies and Historical Theology (BH150)**

5:00 pm    **O3-1**    *Solomon on Monogamy: Is Song 6:8-9 really talking about Solomon's harem?*  
**Erick Mendieta**, PhD student in Old Testament

Philip Turtley states that “Solomon is more notorious for his prolific harem than any other Hebrew monarchs”. It is difficult to hear about the biblical Solomon and not connect his name with the idea of polygamy. And while this association of terms in most cases is true when dealing with the later part of Solomon's reign, is misleading if we are discussing events connected with his early rule. In interpreting the Song of Songs we will see that notions related to the issues of authorship and especially the assumed historical context of the book will make a big difference on how Song 6:8-9 is interpreted. But a careful look at the literary features of Song of Songs 6:8-9 can help us to discover a neglected perspective on the study of Solomon's life and literary contribution to the Old Testament canon.

5:12 pm    **O3-2**    *The Impossibility of Repentance in Heb. 6:4-6*  
**Erhard Gallos**, Department of Religion and Biblical Languages

The Epistle to the Hebrews states: “For it is impossible to restore again to repentance those who have once been enlightened, and have tasted the heavenly gift, and have shared in the Holy Spirit, and have tasted the goodness of the word of God and the powers of the age to come, 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. This passage has driven many Christian through centuries of church history to despair. At first look, the passage seems to indicate that an apostate can never be restored to salvation. The church father Tertullian (c. 160 – c. 225 AD), for example, held that no second repentance existed for serious sins (such as adultery and apostasy) after baptism. For that reason some Christians delayed their baptisms until immediately before their death. The author's perspective seems far away from that of present-day readers, for whom the very concept of “apostasy” appears strange, and who consider themselves to live in a world in which everything can be forgiven. At the same time the modern reader looks at the experience of post-Gethsemane Peter (Matt. 26:69-75) and asks: How was repentance possible for him? A close look at the Greek syntax in the Heb 6 passage helps untangle what Luther considered to be a “hard knot” passage (Luther, Works, xxxv: 394).

5:24 pm    **O3-3**    *The Liminal Church: Exilic Consciousness and Adventist Theopolitics*  
**Ante Jeronic**, Department of Religion and Biblical Languages

In postcolonial and cultural studies the category of “exilic consciousness” is often depicted as a form of subversive imagination “set against Western intellectual hegemony and its protocol of objective knowledge” (R. Young). This article builds on such delineations of the exile metaphor by both appropriating it and nudging it into a different direction in an effort to restate important parameters of Adventist theopolitics—theopolitics here standing for the idea of the church as a “structured social body” shaped by God's apocalyptic inbreak. Following a brief exploration of 1 Peter and the theology of John Howard Yoder I argue for a remnant theology that seeks to eschew the apotheosizing of heterogeneity on the one hand and the privileging of doctrinal conformity over peaceable praxis on the other. I consider this to be of some importance as current debates in Adventism concerning creation, homosexuality, church-state relations, and so on reveal, implicitly and explicitly, different assumptions at work concerning authority structures, “regimes of truth” (M. Foucault), boundary crafting, and power, in turn shaping and informing Adventist theology and praxis.

5:36 pm    **O3-4**    *A Diachronic Study of the Conditionalist Faith among Sabbatarian Adventists from 1845 to 1860*  
**Denis Kaiser**, PhD Student in Adventist Studies and Historical Theology

Although the three founders of the Sabbatarian Adventist movement already believed in conditional immortality before 1844, it was not until early 1854 that they began considering this teaching a “leading doctrine” and “present truth.” Previously they expressed their conditionalist views only randomly in the context of other topics. However, when the mysterious rappings turned into demonic manifestations claiming the identity of deceased people, Sabbatarian Adventists realized that their conditionalist belief constituted the only safeguard against this deception. Thus they started to publish numerous articles and books on the topic in order to inform people about the deceptive nature of spiritualism.

#### **Session 4: Education, Communication, Music, and Art (BH208)**

5:00 pm    **O4-1**    *Gender and conversational interruption: A qualitative content analysis of five TV Discussion segments*

**Thula Lambert**, PhD Student in Curriculum and Instruction

This study explores the discourse pattern of conversational interruption as it relates to gender. A qualitative content analysis of an all-female and mixed gender panel revealed that discourse patterns such as interruption could not be attributed solely to gender differences but to other factors related to social context such as topic, status, interpersonal relations among panel members, group size and limited floor space. Similar results were obtained in a follow-up study of two all-male panels and an all-female panel. While gender-based discourse patterns were found, the social context in which these discourse patterns occurred was also an important factor.

5:12 pm    **O4-2**    *A Conversational Analysis of Mix Marital Couples Conversation*

**Ellen Nogueira Rodrigues**, PhD Student in Curriculum and Instruction

The present study analyzes three Brazilian mix-marriage couples' conversations on a private sphere speech situation, to understand the overall conversational behavior speech of male and female on conversational features, such as, word distribution, topical organization, topic shift, interruptions and back-channeling signals in order to grasp their conversational style. Overall, findings reveal that male and female conversations have more equal contribution, however different styles emerged. Women develop a conversational style based on solidarity and support to men statements, especially evident in the way they use back-channeling signals, interruptions, turn shifts and short responses. They constantly attend to what the current speaker is saying and work to maintain the conversation, developing most of their participation on the extended topics. On the other hand, man participate more on the main topics and are less eager to drop their topics and maintain interactions.

5:24 pm    **O4-3**    *Welcoming Nonverbal Behavior: A Case Study of Group Communication in Church*

**Katelyn Ruiz**, MA Student in Communication

Nonverbal behaviors occur simultaneous to verbal communications. The effectiveness of the overall message depends on coordinating the communications of these two interactive facets. When considering interpersonal communications within a group setting, evidence suggests that specific nonverbal behaviors positively influence the development of relationships between participants, thus confirming the significance of repeated, consistent, congruent verbal and nonverbal elements. Expanding on DeVito's (1990) model of human communication, this study uses interaction analysis (IA) techniques within the framework of attribution theory to explore the impact of nonverbal communication on the context and consequence of a first-time visitor to a Seventh-day Adventist church community.

5:36 pm    **O4-4**    *Early Developments of Harmonic Theory in the New World: Reflections on Two 17th-Century Mexican Treatises*

**Carlos A. Flores**, Department of Music

The study of music theory in the New World began with the arrival of Spanish musicians and teachers on American soil. Perhaps the first historical reference with regard to a theoretical treatise written in Mexico is the one given by the chronicler Fray Francisco de Burgoa (1604-1681). The existence of another contemporary treatise written by the Mexican poetess Sor Juana Inés de la Cruz (1651-1695) invites comparison and seems to provide enough information for one to understand what Mexican theorists really meant when they talked about harmony during the 17th century. Sor Juana titles her treatise *Compendio de armonía musical: El Caracol*. Matías reduced harmony to a "perfect circle" because he adopted equal-temperament; Sor Juana, in the other hand, reduced harmony to a "spiral line" because she used Pythagorean intonation.

5:48 pm    **O4-5**    *Poetic License*

**Greg Constantine**, Department of Art and Design

Exhibitions are the climactic events that reveal the merits of work done in studio. The "Poetic Licenses" is text art presented in the format of automobile vanity license plates. The license plate format is that of utilitarian objects transformed into functional objects wearing the mantle of "high art". They open another territory in the development of Text Art.



## **Session 5: Community & International Development (BH250)**

5:00 pm    **O5-1**    *The Impact of Education on Entrepreneurship*  
**Arian Emanuel and Kayla Piña**  
MSA Students in Community and International Development

This study intends to discover the extent to which education at the primary, secondary, and tertiary levels impacts entrepreneurship, as measured by new firms and entry density, when democracy and economic freedom are held constant. The data were analyzed using Pearson correlations and multiple regression. We found that economic freedom is a more significant predictor of entrepreneurship than democracy. Our results also tentatively suggest that education at the tertiary level promotes entrepreneurship in terms of new firms. Future studies of the topic may benefit from analyses of countries according to other variables such as region or GDP.

5:12 pm    **O5-2**    *Cooperation between the U.S. and Diaspora Communities: Implications for Development and Foreign Policy*  
**Joel Raveloharimisy and Kayla Piña\***, Department of Behavioral Sciences  
\*MSA Student in Community and International Development

In a partnership between the Migration Policy Institute and the United States Department of State, the International diaspora Engagement Alliance (IdEA) was launched in May 2011. IdEA is a platform for public-private partnerships designed to engage diaspora communities, the private sector, and public institutions in a collaborative process based on five pillars: diaspreneurship (entrepreneurship), Diasplomacy (diplomacy), Diasporacorps (volunteerism), Diaspora 2.0 (networking), and Diasphilanthropy (philanthropy). In this paper we evaluate the effectiveness of these pillars for the development of diaspora communities' countries of origin and the United States by examining their applicability to diaspora communities in the U.S. Finally, we discuss and explore the implications of our findings to the American foreign policies regarding the diasporas' country of origin.

5:24 pm    **O5-3**    *Informal Institution Moramora and Distribution of Entrepreneurship in Madagascar*  
**Joel Raveloharimisy**, Behavioral Sciences Department

This paper explains the role of informal institution called moramora or hurry slowly on the distribution of entrepreneurship in Madagascar. The moramora institution is very influential in Madagascar. It shapes Malagasy's behavior, affects their way of doing things. It has a reward and punishment mechanism. Its origin comes from two factors: the Malagasy perception of time and the value of human relationship. These two factors are intertwined and construct the moramora institution. Using quantitative and qualitative data about entrepreneurship and bureaucratic effectiveness, this paper shows that moramora institution affects entrepreneurship through its influence on bureaucracy and interpersonal relations. It creates slow and burdensome bureaucracy, promotes absenteeism, emphasizes personal transactions and presents opportunity for corruption. Like all Malagasy people, entrepreneurs evolve around institutional context.

5:36 pm    **O5-4**    *Helping or hurting? The impact of call centers on the English teaching profession in Costa Rica*  
**Janet Blackwood**, Director, Off-Campus TESOL Programs, Department of English  
PhD Candidate, Literacy, Culture & Language Education, Indiana University

Over the last thirty years, globalization has significantly altered the employment landscape in the developing world. One example of this can be seen in the recent establishment of call centers in numerous locations worldwide. Using data collected through interviews with Costa Rican university English professors and students, this presentation examines preliminary evidence of the unexpected consequences of the growing call center industry on English language teaching and teacher preparation in Costa Rica, and raises questions regarding possible long-term implications for the English teaching profession.

## **Session 6: English, Nutrition (BH251)**

5:00 pm    **O6-1**    *Physiognomy in Renaissance Society and Drama*  
**Vanessa Corredera**, Department of English

The relationship between the inward self and the body has been widely examined in early modern studies, particularly through the lens of humoralism—the makeup and effects of a person’s four humours. I want to redirect attention toward a largely overlooked discourse that likewise reveals a great deal about early modern understandings of the relationship between the body and inward selfhood—that of physiognomy, the practice of discerning character through the body, particularly the face. I suggest that by exploring early modern physiognomic practice, we can see the emergence of both the concept of character and the Cartesian separation of body and mind.

5:12 pm    **O6-2**    *Big-Shouldered Shakespeare: Three Shrews at Chicago Shakespeare Theater*  
**L. Monique Pittman**, Department of English and J. N. Andrews Honors Program

This performance criticism project enlists theorist Michel de Certeau’s concepts of institutional strategy and individual tactic to examine social resistance in three productions of William Shakespeare’s *The Taming of the Shrew* (1593/94) staged by the premiere Midwestern Shakespearean repertory company, the Chicago Shakespeare Theater. The three productions date from CST’s new millennium rise to prominence on the Navy Pier skyline and instantiate the ways in which the theater reconciles its self-promotional image of Shakespeare the Great Humanist with the misogynist content of *Taming*. Since 1999, CST has staged two full-scale productions of *Taming*, one led by David H. Bell (2003) and one helmed by Josie Rourke that featured purpose-written induction matter by playwright Neil LaBute (2010). During the summer of 2012 as part of Chicago’s fledgling Cultural Plan initiative, the theater launched a Chicago Shakespeare in the Parks outreach that transferred a Short Shakespeare! production of *Taming* (Dir. Rachel Rockwell) from the theater’s main stage to parks in neighborhoods underserved by the city’s major arts institutions. Analysis of these productions demonstrates just how difficult it can be to extricate high art from its institutional moorings and how vexed the authorizing imprimatur of Shakespeare the Great Humanist can be.

5:24 pm    **O6-3**    *Body mass, BMI and body composition of teens in Berrien Springs public and Adventists schools*  
**Marval White\* and Peter Pribis**, Department of Nutrition  
\*MS Student in Nutrition and Wellness

It is observed that the changing dietary patterns of American families and the growing number of convenient food products available both in frozen sections of groceries and fast food centers greatly influence what children and teens eat. Fast food consumption leads to increased energy intake especially among overweight teens compared to their lean counterparts. Since overweight/obesity and early occurrence of puberty have implications in future (adult) health of adolescents, we have explored body mass, BMI and body composition of teens in Berrien Springs public and Adventists schools.

5:36 pm    **O6-4**    *Relationship between body composition and age of menarche in teen-age girls*  
**Samara Sterling\* and Peter Pribis**, Department of Nutrition  
\*MS Student in Nutrition and Wellness

While it is established that diet is associated with health and disease, studies on children and teens are now revealing the impact of early dietary exposure to their pubertal development and future health. There is mounting evidence that early menarche is associated with increased risk of breast cancer, thus, the need to determine what dietary factors can help prevent early menarche. Since overweight/obesity and early occurrence of puberty have implications in future (adult) health of adolescents, we have explored the relationships between body composition and pubertal development in teen-age girls.

# Poster Presentations

## Seminary and Archaeology

- P-01** *Egypt as God's People: Isaiah 19:19-25 and its Allusions to the Exodus*  
**Stephane A. Beaulieu**, PhD Student in Old Testament

Isaiah 19:19-25 provides an overview of God's relationship with Egypt and, more particularly, portrays the Egyptians as God's people. When reading these concluding verses of Isaiah 19, one is struck by the question: How do the allusions to Exodus 3 in Isaiah 19:19-25 contribute to the meaning of the latter? Isaiah employs allusions with certain key words that lead the reader to see the associated story of Exodus. However, instead of Israel being the subject of a long narrative story, we have here a concise prophecy, but this time with Egypt as the subject.

- P-02** *Gods, Demons, and Other Semi-Divine Beings in the Book of Deuteronomy*  
**J. Amanda McGuire-Moushon**, PhD Student in Religion

This research analyzes Deuteronomy chapters 4, 17, 29, and 32 exegetically in order to determine the characteristics and role of supernatural sub-divine beings within the message of the book. These particular chapters illustrate the thesis of the book of Deuteronomy, that YHWH alone is worthy of worship as both the Creator and Redeemer. Its mention of other so-called deities and objects of worship enhance this thesis. Deuteronomy acknowledges the existence of other supernatural beings but prohibits Israel from worshipping such beings. This research is part of a larger project that examines angels, demons, gods, and other semi-divine beings from Deuteronomy to Kings.

- P-03** *Looking at Sabbath through a lens of holism*  
**Cory Wetterlin**, PhD Student in Theology

The basic content of this paper is looking at Sabbath through a lens of holism. The lens of holism is the middle ground in between the modernist atomism and the deconstructionist nihilism. It allows the whole as well as the parts to be important in constructing a system of theology. Recognizing that God's presence is the whole of the Sabbath. God resting in the Sabbath is what caused the Sabbath to be holy. Therefore all of the different aspects of the Sabbath (the seventh day, rest, grace, social justice, ecology, covenant, and worship) are affected by God's presence. Just The whole of God's presence affects each part each part also if needed to show the whole of the presence of God. For example: without social justice God's presence is not fully represented. Jesus showed social justice clearly in his actions on the Sabbath. Following this holistic view of Sabbath further I also suggest that Sabbath is the culmination or the whole of the week. Therefore all the different aspects of Sabbath are to be integrated into the rest of the week. For example: we worship every day of the week, pursue social justice every day of the week, rest in God's provision every day of the week, etc. Sabbath stands out from the other days of the week because it is the culmination of the other days of creation and it is the sign of the covenant. The "whole" of the presence of God is also reflected in the covenant aspect of the Sabbath because the sign of seal of God is the Holy Spirit.

- P-04** *Potential Indicators of Catastrophic Flooding in Chinle Valley*  
**Reed Richardi**, MDiv Student, SDA Theological Seminary

The Chinle Valley project is an ongoing study of potential indicators of previously unidentified catastrophic flooding in Chinle Arizona. These potential indicators include: the presence of scoured bedrock channels in several locations, erratic quartzite and granodiorite boulders (the largest of which is approximately 20 tons) resting on top of the alluvium, and a large number of streamlined mesas (interdunal deposits) whose shape and orientation could be partly due to aquatic sculpting. The combination of these data hold good potential toward forming a hypothesis of previously unidentified catastrophic flooding in Chinle Arizona.

- P-05** *East Jordan in Global History: The View from Hisban and the Madaba Plains*  
**Oystein S. LaBianca and Jeffrey Hudon\***, Behavioral Sciences Department  
\*PhD Student in Biblical and Near Eastern Archaeology

In this paper the perspective and narrative of global history will be adopted as a heuristic for synthesizing over four decades of archaeological survey and excavations in the country of Jordan by the Madaba Plains Project (MPP). The MPP collaboration sponsors on-going investigations of three major multi-millennial archaeological sites and their hinterlands in Jordan, namely Tall Hisban, Tall Jalul and Tall al-Umayri. Some examples of global history events and processes to which the rich and complementary data sets of the three MPP projects promises to contribute include the history of tribal societies and their interactions with secondary states and empires; responses by local populations to killer famines, draughts, plagues and epidemics; the causes and consequences of in- and out-migrations of small and large groups of peoples; local transformations wrought by ever-expanding economic world system; local responses to episodic climatic changes and intensifying rates of environmental degradation; and last, but not least, local adaptation to four millennia of nearly unabated imperial interventions. The will conclude by assessing the merits of the global history perspective as a grand narrative for synthesizing the findings of a multi-disciplinary and regional collaboration such as MPP.

### **Agriculture**

- P-06** *2012 Student/Faculty Research at Tall Hisban, Jordan*  
**Stanley Beikmann**, Department of Agriculture

This poster will summarize the work of the Grant Research Goals of the Jordan Field School trip to Tall Hisban in May/June of 2012. Specifically the Poster will review our findings on 1.) observations made of environmental, genetic and morphological factors that make Jordanian plants “xeriscapic” plants, the implications for their sustainability and xeriscapic plants discovered that have potential for introduction into the U.S. for use in the home landscape 2.) the results and formative conclusions, of our academic and physical research, for evidence supporting our premise that Tall Hisban is the site of an Iron Age Royal Garden.

- P-07** *Preparing Students for Careers in Effective International Agricultural Development*  
**Katherine Koudele, Kristin Witzel, and Thomas Chittick**, Department of Agriculture

The Department of Agriculture at Andrews University receives many requests to assist various parts of the developing world with improvement of their food security. In order to more effectively address these needs, we have developed a Bachelor of Technology degree in International Agriculture Development. The goal of the program is to prepare student to work with non-profit organizations, governmental agencies, and others to address the world’s growing food needs in a sustainable manner.

### **Business**

- P-08** *The Impact of Servant Leadership on Job Burnout among Employees of a Christian Hospital: Structural Equation Model*  
**Jerry L. Chi<sup>1</sup> and Grace C. Chi<sup>2</sup>**, <sup>1</sup>School of Business Administration, <sup>2</sup>Department of Nursing

Servant leadership reflects the Christian values and Biblical principles of providing service to others. The effects of servant leadership on employees are not known. Our purpose was to examine whether the practice of servant leadership in a Christian hospital improves effectiveness and/or decreases job burnout among employees. Full-time employees of the Metroplex Adventist Hospital were surveyed. Structural Equation Model analysis of the 644 responses showed that servant leadership offers five virtues: interpersonal support, community building, altruism, egalitarianism, and moral integrity, all of which were significantly negatively correlated with job burnout in terms of emotional exhaustion, depersonalization, and personal accomplishment. Age was the most significant demographic variable: older healthcare providers perceived a higher level of servant leadership and experienced less job burnout. The results suggest that a spirit of service in the executive leader can permeate an entire hospital, alleviating human “pain” both physical and psychological.

## Education

**P-09** *The Use and Understanding of the International Leadership Association's Guiding Questions: An Exploratory Study*

**Shirley Freed; Dan Jenkins; Rian Satterwhite; Matthew Sowcik; Kristine Hoover**  
Leadership Department

Over the past ten years, the International Leadership Association (ILA) has become the premier association for leadership programs. One of their contributions to the growing numbers of programs/members is the development of the "Guiding Questions" document which leads program faculty through a series of questions as they plan program components: Context, Conceptual Framework, Content, Pedagogy and Assessment. Data (interviews and documents) were collected from eight institutions who have used the Guiding Questions to understand how they are being used, challenges related to their use and recommendations for ILA as they continue to fine tune the questions. Results indicate a wide variety of usage.

**P-10** *Differentiating math and test anxiety, results from two samples*

**Rudolph N. Bailey**, Department of Educational & Counseling Psychology

Differentiating math anxiety from test anxiety has been difficult since researchers have typically used measures of math anxiety that are based on a test anxiety conceptual base. In our study, we investigated children from two different studies. In the first study, 341 children, aged 9-11 years from rural Northeastern Indiana while the second study was comprised of 523 children, aged 9-12 years from a diverse Northeastern Indiana school district. Exploratory factor analysis indicated In the first study a 3-factor model for the NMAQ/MASC/CTAS, explained 44.97% of the total variance and was comprised of General Math Anxiety, Worry, and Off-task Behaviors. Items from the math anxiety questionnaires loaded on the same factor while items from the test anxiety questionnaire loaded on the remaining two factors. In the second study, a 4-factor solution was deemed the best fit. The conclusion seems to be that math anxiety is unidimensional and different from test anxiety.

**P-11** *Test Anxiety in Girls and Boys: A Detailed Analysis*

**Jeannie Montagano**, Department of Educational & Counseling Psychology

This study examined gender differences in test anxiety using the Children's Test Anxiety Scale (CTAS; Wren & Benson, 2004). The sample was 521 student equally divided between boys and girls. There was a significant difference between genders on the CTAS ( $F(2,515)=11.682$ ;  $p=.001$ ). The mean score for females was 2.33; while the mean score for males was 2.14. An exploratory factor analysis suggested the same factor structure for both samples. Thus both boys and girls experience test anxiety in the same way. More girls than boys were found in the moderate to severe groups, according to our criterion of 1.5 standard deviations above the mean. Considering all three approaches, more girls were test anxious but both genders experience test anxiety in the same way.

## Library

**P-12** *Evaluating Sources: Information Literacy and the Epistemology of Testimony*  
**Terry Robertson**, James White Library

Evaluating information is a core facet of “information literacy.” Most IL literature on evaluating information illustrates principles with examples drawn from the objective and the empirical, i.e. medicine, economics, etc. While these examples may speak to evaluating the qualitative and quantitative research of religious experience (Doctor of Ministry projects), the connection to theology and exegesis is not evident. I suggest recent works on the epistemology of testimony provide a useful framework for discussing the evaluation of information in theological inquiry.

**P-13** *E-Textbooks Usage by Students at Andrews University: A Study of Attitudes, Perceptions, and Behaviors*  
**Silas Marques de Oliveira**, James White Library

Although e-books have been incorporated into the academic library’s collection for over a decade now, it has not been, until today, without question. It is still, as the literature reveals a controversial topic for librarians, publishers, and users around the globe. Although many researches indicate that patrons still prefer the printed format over the electronic version, the tipping point seems to be reaching us earlier than many might think. The growing availability of e-books to users has begun to affect user perceptions and attitudes, creating more access and usage opportunities, a recent research concluded. This paper presents the results of a large scale survey designed to investigate usage patterns of and attitudes towards e-books by students at Andrews University. One important aspect which the study investigated is how the use of e-books impacts student’s learning. The subjects were divided into two different groups, namely, (1) students who purchased the electronic version of an e-textbook for a class (the bookstore offered 74 books in an electronic format), and (2) students who had the opportunity of purchasing the electronic version of a textbook but preferred the traditional print format. Only four percent of the population studied opted to use an e-textbook. The print version is still greatly preferred by college students. However, the majority of those who used e-textbooks, would use it again and would recommend it to a friend. Lack of awareness, not knowing how to get it, eyestrain, and difficulty of reading are the culprits for students not using e-books more often. Although it is possible to note an increase of e-books usage, caution is recommended when developing collection development policies when includes e-books.

**P-14** *Ebooks and SDA Libraries*  
**Lauren Matacio**, James White Library

Although ebooks have been incorporated into the academic library's collection for over a decade, their adoption is still controversial and problematic. Many studies indicate that the majority of patrons still prefer the printed format; however, the growing availability of e-books to users has begun affecting perceptions and attitudes. This poster presents the results of a survey of Seventh-day Adventist librarians' perceptions and experiences with e-books in the library collection.

**P-15** *Evaluation of the Library Collection of Andrews Academy and its Use by Faculty and Students*  
**Felipe E. Tan**, James White Library

Evaluation of library collections helps determine how the library fulfills its mission. This study is an analysis of the collection at the Andrews Academy Instructional Media Center. The researcher looked at the growth and funding of the library collection from 1969 to 2012. Its present holdings of 11,204 items (9,901 print and 1,303 media materials) gives a ratio of 50 items per student based on the current enrollment of 223 students. These figures show that the holdings are quantitatively strong. As of press time, survey questionnaires on the use of the library collection have been distributed to Andrews Academy faculty and students. The survey data will help identify the strengths and weaknesses as well as the opportunities and threats. However, the challenges appear to be along the lines of digital technology. The eight computers in the Instructional Media Center are long overdue for replacement. The strong print and media collection should be complemented by academic databases and online resources. Recommendations for improving the effectiveness of the library collection will be made to the Andrews Academy administration.

## **Behavioral Sciences**

**P-16** *Parental and Religiosity Influence on Alcohol Use and Sexual Behaviors Among Christian College Students*

**Alina M. Baltazar\***, **Duane McBride** and **Kathryn Conopio\*\***

Behavioral Sciences Department and Institute for Prevention of Addictions

\*PhD Student in Human Development and Family Studies, Michigan State University

\*\*MSA Student in Community and International Development

Alcohol use and having sex is often synonymous with being a college student. There are public health concerns regarding these behaviors. Certain variables appear to be protective and others put students at risk for these behaviors. The hypothesis that religiosity and parental involvement are inversely correlated with college student alcohol use and sexual activity was supported as was the hypothesis that family conflict would be positively correlated with alcohol use and sexual activity. College campuses should try to encourage continued parental involvement for their students, make available counseling resources to work on family conflict, and encourage religiosity among college students as a way to address alcohol use and sexual behavior.

**P-17** *Well-Being and the Internalization of Sabbath Keeping*

**Karl G. D. Bailey** and **Arian C. Emanuel\***, Department of Behavioral Sciences

\*MSA Student in Community and International Development

The internalization of religion is related to increased subjective well-being. However, relatively little is known about the process of religious internalization. In order to examine whether internalization of core religious behaviors show the same relationships with well-being as do overall measures of internalization, we studied the internalization of Sabbath keeping among a convenience sample of Seventh-day Adventist young adults on a Seventh-day Adventist university campus. In addition to replicating previous findings from more general measures of religious internalization with the internalization of a specific set of behaviors, we also developed a short instrument for measuring internalization of Sabbath keeping for use in further studies on the means of increasing internalization of Sabbath keeping, and on the role of internalized Sabbath keeping on individual and church health.

**P-18** *Family Meals Participation and Suicidal Ideation*

**Lionel Matthews**, Department of Behavioral Sciences

Suicide has been widely studied as a social phenomenon across time and national boundaries. Despite the considerable literature generated on suicide and the associated factors, the specter of suicide remains. It is estimated that over 33,000 Americans committed suicide in the 2001 -2009 decade. Adolescents are especially prone with an estimated 16% of students in grades 9 to 12 indicating they have seriously considered taking their own lives and 7.8% saying that they attempted doing so. Among the factors that have demonstrated a mediating effect on adolescent risk behaviors including suicide is participation in family meals. This study examines the effect of family meal participation by adolescents in four states on suicidal ideation. Preliminary analysis reveals an inverse relationship between family meal participation and suicidal ideation.

## Science, Technology, Engineering, and Mathematics (STEM)

### P-19 *Developing an Integrative Wholistic Paradigm of Research*

**Desmond H Murray**, Department of Chemistry and Biochemistry

Building Excellence in Science and Technology (BEST Early), [www.bestearly.com](http://www.bestearly.com),  
[www.youtube.com/user/dmond1960/videos](http://www.youtube.com/user/dmond1960/videos)

My philosophy of research begins with a constant and deep recognition of the divine spark that gives rise to human insight and creativity. Research is, for me, an intensely sacred calling that winds through inspiration, revelation and imagination. It is also a journey of discovery as the root word – recherche – ‘to go about seeking,’ suggests. I believe the attitude of a relentless researcher is eternally embedded in the Old Testament archetype of Jacob wrestling and in the New Testament text ‘Ask, and it shall be given unto you; seek, and ye shall find; knock, and it shall be opened unto you.’ Emily Dickinson’s poem, ‘This World is Not Conclusion’ also expresses a powerful reason ‘to go about seeking.’ My approach to research integrates varied and sometimes discordant elements, like a jazz composition, that answers the questions: when, who, what, and why? It proactively seeks, promotes and provides early engagement for all God’s children in one of the most consequential adventures known to humankind. The ‘what and why’ of my research focuses on organic synthesis, while ‘when and who’ is manifested through longstanding efforts towards universal adoption of early research participation. These aspects are supplemented by public science initiatives.

### P-20 *Validation of Bird Flu and Human Flu Viral Haemagglutinin (HA) Multimers as Probes for the Detection of 2, 3- and 2, 6-Sialic Acid Bond Structures*

**K. Partyka<sup>1</sup>, M. McDonald<sup>1</sup>, D. D. Nowack<sup>2</sup>, B. B. Haab<sup>1</sup>**

<sup>1</sup>Cancer Immunodiagnostics, Van Andel Institute, Grand Rapids, MI

<sup>2</sup>Chemistry and Biochemistry, Andrews University, Berrien Springs, MI

The carbohydrate (CHO) moieties attached to glycoproteins are proving to be important loci for detection and regulation of cellular activity. Changes to the CHO moieties are linked to the presence of pre-cancerous and cancerous changes in the cells and tissues. In particular, changes in sialic acid bonds between 2,3 and 2,6 linkages may be important indicators of disease, but unfortunately an effective way of precisely measuring these linkages in biological samples does not yet exist. The various HA proteins (bird flu, swine flu, human flu) bind to 2,3- and 2,6-sialic acid bonds as a preliminary step for infection within the host. We hypothesized that HA proteins could be used to detect specific presentations of sialic acid moieties on glycoproteins captured from biological samples. In this study we used a simple method of multimerizing the HA protein to increase its binding avidity, and applied the HA proteins to the detection of sialic acids on biological glycoproteins. Using that specificity to detect changes in glycoprotein CHO structures, we discovered that the HA probes can differentiate between 2,3- and 2,6- sialic acid bond types in an efficient and reproducible manner. Studies also are underway to determine the relationship between sialic acid linkages and the presence of pancreatic cancer. This approach may provide robust and sensitive measurements of specific sialic acid presentations in biological samples.

### P-21 *Nitric Oxide interactions with Iron investigated with spectroscopy*

**David Randall<sup>1</sup>, Sheng Zheng<sup>2</sup>, Timothy Berto<sup>2</sup>, Nicolai Lehnert<sup>2</sup>**

<sup>1</sup>Department of Chemistry, Andrews University

<sup>2</sup>Department of Chemistry, University of Michigan

Nitric Oxide (NO) is an important molecule in mammalian physiology that is involved in both signaling and immune defense. However, certain pathogenic bacteria have evolved enzymes that are able to detoxify NO by reduction to nitrous oxide (N<sub>2</sub>O), thus neutralizing this important immune defense agent. Collaborators at the University of Michigan have recently developed a model complex for the active site of this enzyme. This compound binds two NO molecules, and upon two-electron reduction, transforms them into N<sub>2</sub>O. Current work is now focused on understanding the mechanism of this reaction. Towards that end, we will present a titration of this model complex with NO as followed by EPR (and IR?) spectroscopy. We will also present an assay that was developed in which a cobalt(II) porphyrin complex (CoTPP) is used to measure the quantity of NO dissolved in various organic solvents.



**P-22** *Simultaneous Hydroxyl Number Determination and Moisture Analysis of Highly Functional Polyols using NIR Spectroscopy*

**Ryan T. Hayes, Stephen Gardner, Andrew Master, and Ethan Catron**

Department of Chemistry & Biochemistry

Highly functional polymers, including hyperbranched polymers and dendrimers, are an emerging class of additives for a variety of industries such as the paints and coatings, plastics, adhesives, inks, and personal care products. The outer functional group density determines how these highly branched materials will perform and enhance the properties of consumer products. Traditional electrochemical titration methods provide an indirect method for determining the concentration of hydroxyl functional group per gram of material, and these methods are well known but challenging for highly branched polymers. Near Infrared spectroscopy provides a promising alternative that directly and nondestructively measures the concentration of hydroxyl functional groups in a dendritic polymer sample without chemically modifying the sample. This method can be adapted for the simultaneous determination of hydroxyl number and water content thus providing quality control information for formulators and manufacturers in the use of dendritic polymers for commercial products. NIR spectroscopy is simple, direct, and does not require the time and sample preparation of hydroxyl number titrations. This poster will show how NIR spectroscopy can be performed on highly functional polymers samples and how these values compare to theoretical and measured values of hydroxyl number and moisture content.

**P-23** *Carboxypeptidase O Regulates Epithelial Cell Migration and Adhesion*

**Peter J. Lyons\* and Lloyd D. Fricker**

Department of Molecular Pharmacology, Albert Einstein College of Medicine

\*Currently Department of Biology, Andrews University

Proteolytic enzymes play important roles in many tissues of the body. We have recently begun to characterize a protease named carboxypeptidase O (CPO), which is found in epithelial cells lining the small intestine and is able to remove C-terminal glutamates from substrate proteins. When CPO was expressed in a model epithelial cell line, it was found to be present in small intracellular vesicles of unknown identity. These CPO-expressing cells exhibited faster migration and greater cell-cell adhesion than control cells. This phenotype and other work suggest a possible role for CPO in cancer mechanisms.

**P-24** *Stable Isotope Analysis of Incisor Enamel in Thirteen-lined Ground Squirrels (*Ictidomys tridecemlineatus*)*

**Jang, Woo Jong<sup>1</sup>, H. Thomas Goodwin<sup>1</sup>, Benjamin H. Passey<sup>2</sup>, and Brooke Kissler<sup>1</sup>**

<sup>1</sup>Department of Biology, Andrews University, Berrien Springs, MI

<sup>2</sup>Department of Earth and Planetary Science, Johns Hopkins University, Baltimore, MD

We investigated stable-isotope profiles of incisor enamel from 8, well-referenced thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*), using laser ablation coupled with gas chromatography–mass spectrometry. Stable isotope profiles were referenced to real time (cumulative dental growth record from mid-August to early May) based on known dates of events reflected in incremental dentin structure (entry into and exit from the hibernation season, fall injections of oxytetracycline). During late summer and fall,  $\delta^{13}\text{C}$  of incisor enamel peaked between late August and mid September (individual peak values ranged from -3.7 to -1.9 ‰), with lower values before and after. Values of  $\delta^{13}\text{C}$  were relatively low but variable during hibernation ( $\leq -9.6$  ‰) and in the spring immediately after hibernation ( $\leq -11.0$  ‰). Fall values of  $\delta^{18}\text{O}$  were significantly and positively correlated with  $\delta^{13}\text{C}$  for 5 of 8 squirrels. The roughly coordinated peak in  $\delta^{13}\text{C}$  values in late summer across squirrels may indicate transient increase in the proportion of C4 plants (directly or indirectly via insects that feed on C4 plants), although this interpretation must be tested. Overall, our results indicate that fine-scale seasonal variation in paleo-diet and perhaps other paleoecological attributes might be reconstructed from incisors of fossil rodents.

**P-25** *Rocks and Fossils Reveal Island History*

**James L. Hayward<sup>1</sup> and Shandelle M. Henson<sup>2</sup>**

<sup>1</sup>Department of Biology, <sup>2</sup>Department of Mathematics

Protection Island National Wildlife Refuge, a marine bird and mammal breeding center, was established on the island in 1988. Several geological features of this island serve as wildlife attractants: steep cliffs of unconsolidated Pleistocene and Holocene sediments around the island periphery afford ideal nesting sites for burrowing auklets and puffins; cliff ledges provide platforms for nesting cormorants; longshore currents deposit gravel spits at the east and west ends of the island on which gulls and guillemots nest and seals haul out. These features attract about 70% of Washington's inland breeding seabirds each year and a high proportion of the state's breeding seal population. Despite the presence of geologic features crucial to the breeding success of marine birds and mammals, little is known about Protection Island's geological structure and paleoecological history. In collaboration with two geologists, we are 1) developing a geologic framework of mapped stratigraphic units; 2) collecting and preserving sediment and fossil samples from each stratigraphic unit; 3) characterizing the composition, thickness, depositional history, palynology, and paleoecological history of each of the island's stratigraphic units; 4) developing a geologic map of Protection Island which will detail its stratigraphic features; 5) determining the ages of the various stratigraphic units; 6) developing a paleoecological history of the entire island; and 7) developing recommendations for the conservation of geological features of Protection Island. This poster provides a preliminary report of our findings.

**P-26** *Copulation behavior in the Glaucous-winged Gull*

**Amanda Sandler\*<sup>1</sup>, Gordon Atkins<sup>1</sup>, Mindy McClarty<sup>1</sup>, Melisa McCormick<sup>1</sup>, Shandelle Henson<sup>2</sup> and James Hayward<sup>1</sup>**

<sup>1</sup>Department of Biology, <sup>2</sup>Department of Mathematics, \*MS Student in Biology

Biologists measure an animal's reproductive fitness by the number of viable offspring produced, so reproductive behavior is considered a critically important aspect of an organism's biology. Copulation by most birds is relatively quick and silent, but copulation in gulls involves highly visible wing-flagging and loud vocalizations. Copulation behavior and the male's copulation song have not been described for any species of gull. We aim to describe the temporal and spectral features of the male's copulation song and the influence that abiotic environmental factors have these features. Poisson distribution analysis indicated that the copulation mounts were not randomly distributed in space and time in a large area of the breeding colony, suggesting social facilitation may play a role in copulation behavior of these birds. For three weeks during the 2012 nesting season, we closely observed copulation behavior and recorded male copulation songs for approximately 30 pairs of Glaucous-winged Gulls. Average duration of a copulation mount was 87 seconds and the average number of cloacal contacts per mount was 2.45. Copulation song analysis is underway. This study provides the first baseline data for understanding the impact of the dramatic behaviors associated with gull copulation on reproductive fitness in detail.

**P-27** *Egg-laying behavior in Glaucous-winged Gulls*

**Gordon Atkins<sup>1</sup>, Amanda Sandler\*<sup>1</sup>, Mindy McClarty<sup>1</sup>, Melisa McCormick<sup>1</sup>, Shandelle Henson<sup>2</sup> and James Hayward<sup>1</sup>**

<sup>1</sup>Department of Biology, <sup>2</sup>Department of Mathematics, \*MS Student in Biology

Various aspects of reproductive biology of Glaucous-winged gulls have been evaluated. Egg laying behavior has not yet been documented. We modified digital spy-cameras to monitor nests continuously during daylight hours. During labor, females stood or crouched over their nest for an average of 4.8 minutes. An average of 27 visible contractions occurred with maximum rates of 15.3 contractions/min during hard labor. During labor the wings were slightly spread and the abdomen was held close to the ground in a crouched position. After laying, females stood over the nest for an average of 8.9 min, which was followed by turning the egg and sitting on the egg. Three of the females vocalized during labor. This consisted of very short single or doublets of syllables having a fundamental frequency 900 kHz. Two females gathered small amounts of nest material and placed it on their backs while sitting on their nests prior to labor, and one did so while incubating after laying. While eggs were laid throughout the day and night, more eggs were laid between 0500-0800hr. The loss of eggs (mostly cannibalized) also varied significantly with most eggs lost in the early morning or later in the afternoon.

**P-28** *Onset of Synchrony in Avian Ovulation Cycles*

**Danielle Burton<sup>1\*</sup>, Shandelle Henson<sup>1</sup> and James Hayward<sup>2</sup>**

<sup>1</sup>Department of Mathematics, <sup>2</sup>Department of Biology, \*MS Student in Math & Science

Spontaneous oscillator synchrony occurs when populations of interacting oscillators begin cycling together. Synchrony has been documented in many physical and biological systems, including estrous/menstrual cycles in rats and humans. In previous work we showed that Glaucous-winged Gulls (*Larus glaucescens*) can lay eggs synchronously on an every-other-day schedule, and that synchrony increases with colony density. Here we pose a discrete-time model of avian ovulation to study the dynamics of synchronization. We prove the existence and uniqueness of an equilibrium solution which bifurcates to synchronous cycles as colony density increases.

**P-29** *Steady State Solutions to General Population Model*

**Joon H. Kang**, Department of Mathematics

Multiple species of animals are competing in the same environment. Under what conditions do they coexist peacefully? Under what conditions do they coexist in a unique pattern? Or under what conditions does either one of the species become extinct, that is, is either one of the species excluded by the other? It is natural to say that they can coexist peacefully if their rates of reproduction and self-limitation are relatively larger than those of competition rates. In other words, they can survive if they interact strongly among themselves and weakly with others. We investigate this phenomena in mathematical point of view.

**P-30** *A note on an inequality of Riemannian submersion invariant*

**Yun Myung Oh**, Department of Mathematics

It has been known that if a Riemannian manifold admits a non-trivial Riemannian submersion with totally geodesic fibers, then it cannot be isometrically immersed in any Riemannian manifold of non-positive sectional curvature as a minimal submanifold. B.Y. Chen proved this using an inequality involving the submersion invariant and his inequality shows the maximum value of the invariant. I could find another inequality that gives the minimum of the submersion invariant under a certain assumption.

**P-31** *Mathematicians' Evaluation of Students' Proofs*

**Robert C. Moore**, Department of Mathematics

The purpose of this study is to identify mathematicians' beliefs and practices in evaluating students' written mathematical proofs and teaching students to write proofs. Thus, this study addresses the call for research on mathematicians' pedagogical practices in advanced mathematics courses. Mathematicians were interviewed and asked to (a) evaluate proofs written by students, (b) discuss the characteristics they view as constituting a well-written proof, and (c) discuss their teaching practices with respect to proof.

**P-32** *Undergoing a Series of Stress-Relaxation Cycles*

**Boon Chai Ng, Gunnar Lovhoiden, Kalyanram Sompalli and Tanner Williams**

Engineering and Computer Science Department

Di-electric electro-active polymers have potential applications as actuators and sensors. Their core characteristic is the ability to dynamically change their physical shape as a function of an electric stimulus. In this experiment, the electrical resistance of these materials are measured while the material is been subjected to a series of stress-relaxation cycles. The relation between the electrical resistance and the stress-relaxation cycles are determined and analyzed.

- P-33** *Development of a novel biosensor setup of combined QCM-D and FET*  
**Hyun Kwon, Ricardo Huancaya and Thomas Zirkle**  
Engineering and Computer Science Department

A novel setup of a biosensor that combines an EGFET (extended gate field effect transistor) and a QCM-D (quartz crystal microbalance with dissipation) has been developed. The setup utilized a commercial, affordable MOSFET, hard wired to the QCM-D without having to undergo complicated nanofabrication procedures. This sensor was capable of detecting changes in electrochemical and thickness/flexibility during bio-molecular interactions. For the proof of concept, DNA fragments of H1N1 were detected in the setup. The sensor demonstrated in situ, label-free, and multi-modal characterization of bio-molecular interactions with high sensitivity and multiple parameters through a simple instrumentation.

- P-34** *Beyond the Judd-Ofelt approximation: Direct calculation of the two-photon absorption spectrum of  $Gd^{3+}:LaF_3$*   
**Gary W. Burdick<sup>1</sup>, C.-K. Duan<sup>2</sup>, M. F. Reid<sup>3</sup>**  
<sup>1</sup>Department of Physics, Andrews University, Berrien Springs, MI  
<sup>2</sup>Department of Physics, University of Science and Technology of China, Hefei, China.  
<sup>3</sup>Department of Physics and Astronomy and MacDiarmid Institute for Advanced Materials and Nanotechnology, University of Canterbury, Christchurch, New Zealand

Two-photon absorption (TPA) line strengths for transitions within the  $4f^7$  configuration of  $Gd^{3+}$  have been determined directly using a two-configuration  $4f^7$  and  $4f^65d$  calculation. This direct calculation takes into account the major interactions for the  $4f^7$  and  $4f^65d$  configurations nonpertubatively. Contributions from dynamic coupling (also called ligand polarization) are found to be important in order to reconcile calculated and experimental spectra for the  ${}^8S_{7/2} \rightarrow {}^6I_J$  transitions. Resulting calculated TPA spectra are shown to give a good reproduction of experimental line strengths and polarization dependencies.

- P-35** *What are gravitational waves?*  
**Tiffany Summerscales**, Department of Physics

According to Einstein's theory of general relativity, mass curves spacetime. When the distribution of mass changes, the curvature must also change and that change spreads outwards through space like the ripples on a pond. These ripples, also called gravitational waves, are very faint. Only the most catastrophic events and massive objects in the universe are capable of producing gravitational waves of measurable strength. LIGO (the Laser Interferometer Gravitational-wave Observatory) consists of three detectors, two in Hanford, WA and one in Livingston LA, built to find gravitational waves. Once these elusive spacetime ripples are caught, they will reveal important information about their sources. With gravitational waves it will be possible to watch neutron stars and black holes collide, see into the heart of a supernova, and look back to the moment of the universe's creation. The Andrews University Gravitational Wave Group (AUGWG) members are members of the LIGO Scientific Collaboration (LSC), an international group including hundreds of physicists who work on LIGO science. Currently, the AUGWG is involved in efforts to extract signals from multi-detector data and determine what information is carried by a gravitational wave.

## Health Professions

- P-36** *Assessing Reliability of the PTSE Tool for the Evaluation of Clinical Instructors*  
**Kim Coleman-Ferreira, A Lynn Millar, Brett Buda, Elliott Davis, Connor Knapp, and Yeong Park**, Department of Physical Therapy

Introduction: A reliable tool to assess Clinical Instruction is essential to maximizing Physical Therapist student clinical education experiences. The purpose of this study was to analyze the reliability of the PTSE. Methods: Quasi-experimental design with test-retest. Subjects: 101 Students. Procedure: The PTSE survey sent, twice once to obtain scores which were reviewed with the CI and again for scores which were not reviewed with the CI. Statistical Analysis: Descriptive statistics were used for demographics variables; paired t-test to determine difference between first and second survey; an interclass correlation coefficient (ICC) test to determine reliability from first to second survey and frequencies and percentages for the 5 point Likert scale. Differences were considered significant if at the .05 probability. Results: 142 student surveys. For the student responses from the first to the second survey, there was a significant difference in 12 of the 29 PTSE questions, ranging from .001-.049. An ICC showed moderate to good reliability. Discussion: The significant difference found on the t-test suggests the possibility of unreliability however the ICC shows moderate- good reliability. Conclusion: Based on the ICC and the small difference in scores the statistical analysis suggests that the PTSE is a reliable tool for CI evaluation.

- P-37** *The Validity and Reliability of the Incontinence Impact Questionnaire and SF-36 for Stress Urinary Incontinence in Bangladesh Women Post Caesarean Section and Vaginal Delivery*  
**Lori M. Walton\***, Center for Rehabilitation of the Paralyzed, Dhaka-Savar, Bangladesh  
\*Currently: Department of Physical Therapy, Andrews University

Purpose: To determine the validity and reliability of IIQ-7 and SF-36 for use in Bangladeshi women. Subjects: (n=20) 20 women between the age of 18-54, living in Bangladesh and identified as having one or more births, either caesarean section or vaginal delivery within the last three years. Materials and Methods: Translation of the IIQ-7 and SF-36 was obtained by a certified Bengali language translator. IIQ-7 and SF-36 Bengali version were completed by 20 Bangladeshi women. Results: Test-retest reliability (ICC=.94-1.0) and internal consistency of both IIQ-7 and SF-36 (Cronbach's alpha = .94-.99) were good. Conclusion: The Bengali translated SF-36 and IIQ-7 demonstrated good test-retest reliability, internal consistency, construct, concurrent, and convergent validity.

- P-38** *Intake of convenience foods by teens in Berrien Springs public and Adventist schools*  
**Lillian-Marie Drew\* and Peter Pribis**, Department of Nutrition  
\*MS Student in Nutrition and Wellness

It is observed that the changing dietary patterns of American families and the growing number of convenient food products available both in frozen sections of groceries and fast food centers greatly influence what children and teens eat. Exposure to fast foods and other convenience foods is associated with intake of meat products and increased intake of sodium and fats among white and black girls. Previous studies on Seventh-day Adventist (SDA) and non-SDA schoolchildren showed that differences in eating patterns among schoolchildren showed tendencies for those who ate significantly more plant-based foods and less animal proteins to have lower BMI. We have explored the intake of convenience foods in Berrien Springs public and Seventh-day Adventist schools.

**P-39** *Exposure to occupational health hazards among Zambian workers: Results from the 2009 National Labour Force Survey*

**Seter Siziya<sup>1</sup>, Emmanuel Rudatsikira<sup>2</sup>, Aggrey Mweemba<sup>3</sup>, George Rachiotis<sup>4</sup>, Duncan Mugala<sup>1</sup>, Kasonde Bowa<sup>1</sup>, Adamson S. Muula<sup>5</sup>**

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Data on occupational safety and health are scant in the southern Africa region. Hence the negative impact of poor working conditions is unappreciated and the scientific basis for interventions and policy formulation is lacking. The objective of the study was to determine the prevalence and associated factors for occupational health hazards exposure in Zambia. We used data collected in the 2009 National Labour Force Survey. Unadjusted odds ratios (OR) and adjusted odds ratios (AOR) and their 95% confidence intervals (CI) were used to measure magnitudes of associations. Results from this study indicate Zambian workers are exposed to a broad range of occupational health hazards. The results of the present study could be useful for the formulation of a multi-sectoral approach aiming at the prevention and control of occupational hazards.

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