

Honors Scholars & Undergraduate Research Poster Symposium



March 8, 2019

2:30-4:00 p.m.
Buller Hall Lobby

 J.N. Andrews
Honors Program

 Office of Research &
Creative Scholarship

Welcome

This symposium celebrates the efforts of undergraduate researchers and their faculty mentors which now culminate in the public presentation of their projects. Many of the students presenting today have worked over the course of several semesters or even years on the research topics they have chosen. We hope that their passion for their field, persistence despite unexpected results, and dedication to in-depth and integrated learning inspires you to be better administrators, educators, mentors, and students.

Since its founding in the 1960s, the J. N. Andrews Honors Program at Andrews University has fostered enthusiastically the challenges and discoveries of undergraduate research. By means of the Honors Thesis, the Honors Program requires its students to engage in substantive primary investigations in which students take an active role in posing research questions, designing and refining methodologies, collecting data and results, and critically analyzing the significance of their conclusions.

The Undergraduate Research Scholar Award was established in 2002 to facilitate more opportunities for students to engage in research and creative scholarship in greater depth than required by their individual programs of study. The Award enables students to work closely with faculty mentors, participate in disciplinary conferences, and develop important professional skills.

The Honors Program gladly joins hands with the Office of Research and Creative Scholarship in sponsoring the annual Honors Scholars and Undergraduate Research Poster Symposium, which recognizes the achievement of Honors Thesis scholars as well as other undergraduate students engaged in substantial research projects. A team of highly engaged faculty research mentors makes possible a rigorous program of undergraduate research.

The J. N. Andrews Honors Program and Office of Research and Creative Scholarship thank heartily the Andrews University faculty members and Honors Council members who give willingly of their time and energy to support and evaluate undergraduate research. The Honors Council Members include: Sonia Badenas, Karl Bailey, Carol Burtnack, Vanessa Corredera, James Hayward, Shandelle Henson, Joon Hyuk Kang, Teddy Kim, Katherine Koudele, Beverly Matiko, Benjamin Navia, L. Monique Pittman, Ingrid Radulescu, David Randall, Darah Regal, Davide Sciarabba, Rodney Summerscales, Tiffany Summerscales, Karin Thompson, and Robert Zdor. We also thank our administrative assistant, Maxine Umana and research staff, Jeff Boyd and Mordekai Ongo, as well as our student assistants, Isabelle Dias and Ingrid Radulescu, for their hard work in helping to make this event a success.

Many thanks for working together!



L. Monique Pittman
Director of the J.N. Andrews Honors Program
Professor of English

A handwritten signature in black ink, appearing to read "L. Monique Pittman".



Gary Burdick
Dean of Research
Professor of Physics

A handwritten signature in black ink, appearing to read "Gary W. Burdick".

Honors Thesis Poster Presentations

- P-01 *Parental Influence on Communicative Behaviors of Black Young Adults*
Sarah Brockett (Desrene Vernon-Brebnor, Communication)
J.N. Andrews Honors Scholar

This study sheds light on the influence family proceedings have on the communicative behaviors of Black young adults. Data was collected from a convenience sample ranging in age from 18-25 years. The instrument includes an argumentativeness scale consisting of 20 items (Infante & Rancer, 1982) which measured the student's argumentative approach and avoidance behavior in interpersonal relationships. The hypotheses predicted that the dissolution of a parent's marriage would have the greatest influence on a student's cautious approach in establishing relationships, with those with parents who went through a contested divorce being more likely to exhibit higher levels of argumentativeness.

- P-02 *Synthesis of 3-substituted Hybrid Coumarins and Testing of Their Anticancer Properties*
Haley Butler (Denise Smith, Biology; Desmond Murray, Chemistry & Biochemistry)
J.N. Andrews Honors Scholar

Glioblastoma has the highest incidence among brain and central nervous system cancers and is known for its high malignancy and poor prognosis. Coumarin, a compound that can be synthesized and found in nature, has demonstrated anticancer activity and other properties that suggest it could be successful in the treatment of glioblastoma. In this project, the Knoevenagel reaction, consisting of a reflux reaction followed by isolation, was used to synthesize eight different hybrid products achieved by varying reaction reactants. These hybrid coumarin compounds were tested on glioblastoma cancer cells in order to observe and record glioblastoma cell death.

- P-03 *Efficacy of a Three-Week Intervention Program for Children in the Areas of Language, Articulation, Phonological Awareness, and Auditory Processing*
Zoey Caballero (Darah Regal & Lara Scheidler-Smith, Speech-Language Pathology & Audiology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Competency in the areas of language, articulation, phonological awareness, and auditory processing are essential for children to succeed academically. Each summer in the Speech-Language Pathology and Audiology Department (SPLAD) at Andrews University, the professors and graduate student clinicians conduct an intensive three-week therapy program for school aged children to target these areas. By comparing pre/post-test scores, the purpose of the study is to obtain statistical evidence for specific therapy interventions in order to strengthen the effectiveness of the intensive therapy program.

- P-04 *Effect of Novel Thiohydantoin-Aldehyde Compounds on Glioblastoma Cell Viability*
Jesse Castang (Denise Smith, Biology; Desmond Murray, Chemistry & Biochemistry)
J.N. Andrews Honors Scholar

Hydantoin derivatives and heterocyclic aldehydes may be effective in diminishing the viability of glioblastoma cells. The goal of this project is to synthesize novel thiohydantoin-aldehyde hybrid compounds and determine the effect of those compounds on glioblastoma cell viability. Compounds are synthesized using a catalyst in a reflux procedure followed by purification via extraction. Testing is performed via a three-day LD50 assay. Varying concentrations of a compound is added to a 12-well plate containing glioblastoma cells. The viability of the treated cells is then analyzed using a crystal violet stain. Several compounds have been synthesized and testing is ongoing.

P-05 *“The beauty! The beauty!”: Toxic Masculinity and Conquering the Female Body in Heart of Darkness and The Brief Wondrous Life of Oscar Wao*
Alexi Decker (Vanessa Corredera & Scott Moncrieff, English)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

In Junot Díaz’s *The Brief Wondrous Life of Oscar Wao*, scholars read the sensitive Oscar as the *machismo* narrator Yunior’s foil. However, Díaz links *Wao* to Joseph Conrad’s troubling colonial novella *Heart of Darkness*. These connections between *Wao* and *Darkness* present a negative view of both Oscar and the novel’s end. In connecting *Wao* to *Darkness*, I analyze the text’s and characters’s violence against women as descendent of colonizing masculine figures and colonized feminine ones, central to *Wao* and *Darkness*. These connections re-contextualize Oscar’s final triumph as a colonizing act against the women with whom he interacts.

P-06 *The Impact of Male-exposure in the Neuronal Response of the L3 Auditory Interneuron to Model Calls*
Shekinah Dosunmu (Benjamin Navia, Biology)
J.N. Andrews Honors Scholar

The L3 auditory neuron in female cricket *Acheta domesticus* responds to phonotactically attractive calls with decrement: a reduction in the number of action potentials in response to consecutive sound pulses within a chirp. Such unique response has been reported only in virgin females (Atkins *et al*, 1989). This study evaluates the response of the L3 in male-exposed females to determine whether they respond to auditory stimuli differently from those exhibited by virgin female crickets. Preliminary data indicate that L3 in young exposed female crickets responds with different levels of decrement as those reported for virgin females.

P-07 *The Effects of Adverse Childhood Experiences on Parenting Practices*
Talisa Gonzalez (Harvey Burnett & Karl Bailey, Behavioral Sciences)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Since the inception of the United States, Americans have held religious freedom in the highest reverence. Concurrently, with a plurality of faiths and non-faith, conflict has continually transpired between secular society and personal faith. At times, these conflicts are adjudicated in the courtroom and not in the church sanctuary. The deciding rationale in the courts has been informed by various factors as the arguments of conflicting parties have evolved over time. The purpose of this research is to help inform the discourse of religious liberty by charting both legal arguments and public opinion in their development over time.

P-08 *Synthesis of Perylenediimide-core PAMAM Dendrimers*
Jesse Michael Gray (Ryan T. Hayes, Chemistry & Biochemistry)
J.N. Andrews Honors Scholar

Many types of colored dendrimers with integrated conjugated systems have been synthesized in academia and industrial laboratories since the 1980s. However, there remains limited commercial production of water-soluble colored PAMAM dendrimers. Our research focuses on using chromophores as the core of a new class of colored nanopolymers. Perylenediimide is a robust, red colored chromophore that can be modified to perylenetetracarboxylic dianhydride which provides attachment sites for growing a PAMAM dendrimer. Results from the synthesis along with a spectroscopic and structural analysis of the products will be presented to show how the properties of perylenediimide change with attached PAMAM dendrimer functionality.

P-09 *A Cohesive Response to the Problem of Language in the Doctrine of God: A Phenomenological Approach*
Nathon L. Hilton (Davide Sciarabba, Religion & Biblical Languages)
J.N. Andrews Honors Scholar

In recent decades, numerous theologians have risen to defend new approaches to the Doctrine of God that favor, amongst other views, anthropological, ethnocentric, feminist, and ecocritical interpretations that ultimately put into question how modern language functions to describe the Divine. By zooming into four case studies (Gen. 16:13-14; Ex. 3:13-15; Job 42:1-6; and Lk. 1:46-55), this project responds to these and other theological views by creating a model for the language of theology based upon the way in which Biblical authors engage God's revelation. Amongst other things, I argue that the God-language employed throughout Scriptures relies upon an altogether theophanic, metaphoric, and paradoxical spectrum that provides a model for theological inquiry and discourse.

P-10 *Women and Work in 1970s America: A Creative Writing Exploration in Short Stories*
Rebecca Keller (Stephanie Carpenter, History & Political Science; Beverly Matiko, English)
J.N. Andrews Honors Scholar

Between the 1950s and 1970s, the status of working women in the United States changed drastically. With the second wave of feminism in the 1960s, increasing numbers of women continued their education at the post-secondary level and sought work outside the home. By the 1970s, working women had become the rule, not the exception. By creating a series of historically informed short stories, I seek to help both myself and readers understand and appreciate some experiences of these working women. My characters represent different age groups and work environments, exemplifying both the struggles and successes typical of this time period.

P-11 *Acoustic Reflex and Extended High-Frequency Testing in Relation to Tinnitus*
Deborah S. Kim (Darah Regal, Speech-Language Pathology & Audiology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Tinnitus, a growing concern among adults, is the perception of sound without an external acoustic source. Tinnitus is a common symptom of people who have been exposed to excessive loud sounds and described in various ways including ringing, buzzing or clicking. The purpose of this study is to determine if there are any common factors or characteristics in acoustic reflex, standard pure tone and/or extended high frequency testing results between two groups; people who report and do not report tinnitus.

P-12 *The Restoration of God's Character in Physical Disabilities*
Delaneira Kuntoria (Rodney Palmer, Religion & Biblical Languages)
J.N. Andrews Honors Scholar

Several passages in Scripture illustrate the manifestation of physical disabilities as the result of divine interference. Jacob walked away with a limp; Paul was left partially blind; and an unnamed man was born completely blind in order to demonstrate divine providence. The maladies of these characters can be chalked up as God's means for the edification of their faith, but this defense does not account for inconsistencies between God's actions and His compassionate character. Is God a shepherd who would break the legs of His sheep in order to teach them how to depend upon Him? The object of this study is to uncover a theodicy that reconciles God's character to His dealings with physiological incapacities through careful exegesis of three passages: Genesis 32:25-31; Acts 9:3-9, 17-19; and John 9:1-7.

P-13 *Methodology for the Synthesis of an Antibacterial Isoxazoline Ring*

Taejun Lee (Lisa Ahlberg, Chemistry & Biochemistry)

J.N. Andrews Honors Scholar

Due to the growing need of antibiotics in modern day medicine, this study attempts to find a method that would create a novel inhibitor for a lesser known target of gram negative bacteria, the LpxC enzyme. This study proposes that a synthetic plan which consists of combining components of different molecule to create a more effective inhibitor. These components include a binding group for the active site of the enzyme, a hydrophobic chain which has been shown to interact with an allosteric site on the LpxC enzyme, and the isoxazoline ring which interacts with the active site zinc ion.

P-14 *Effects of Technology on Visual and Auditory Memory in Preschoolers*

Caitlin Lopez (Darrah Regal & Suzanne Mondak, Speech-Language Pathology & Audiology)

J.N. Andrews Honors Scholar

Auditory and visual memory are important skills for academic achievement. Technology availability continues to increase in homes, including for children and even infants. This study will examine visual and auditory memory ability of three- to five-year-old children, and the data will be correlated to a parent survey regarding technology availability and use as well as non-technological opportunities to develop visual and auditory memory. This research seeks to discover possible correlations between auditory or visual memory enhancement depending on either the use/availability of technology versus more traditional forms of memory development such as reading books aloud or creative play.

P-15 *Managing White-nose Syndrome in Bats: A Spatially Dynamic Modeling Approach*

Mykhaylo M. Malakhov (Shandelle M. Henson, Mathematics)

J.N. Andrews Honors Scholar

White-nose syndrome (WNS) is a rapidly spreading fungal disease that has caused unprecedented mass mortality among hibernating North American bat populations. Many control strategies are in development, but nothing is known about the impact of seasonal bat dispersal on those potential interventions. We study the spatial dynamics of WNS by posing and analyzing a two-patch model that incorporates five promising WNS treatment methods. We find that optimum management decisions must take interpopulation movement into account, and show that the effects of dispersal depend on both the control combination and the primary mode of disease transmission.

P-16 *Anticancer Activity of Selected Alpha-Cyanostilbenes*

Joseph Mayor (Denise Smith, Biology; Desmond Murray, Chemistry & Biochemistry)

J.N. Andrews Honors Scholar

Cancer continues to be one of the leading causes of death in the US. Resveratrol, a naturally occurring compound, has shown promising anticancer properties in many studies. Through a reflux process, we were able to combine different phenylacetonitriles and benzaldehydes and thus created resveratrol analogs that have bicyclic structures but different functional groups coming off the carbon skeleton. We synthesized and analyzed nine of these analogs, known as alpha-cyanostilbenes. We then tested different concentrations of the alpha-cyanostilbenes on glioblastoma cells in order to determine effective dose after a 24-hour incubation. Analysis of this data is still under way.

P-17 *Analysis of DL-Amino Acids Ratios in Eggshells using Reverse Phase-High Pressure Liquid Chromatography*

Gergana Milkova (Lisa Ahlberg, Biochemistry & Chemistry)
J.N. Andrews Honors Scholar

HPLC methodology was developed to determine the concentrations and ratios of D to L amino acids in emu and ostrich eggshells treated with heat at different temperatures. We aim to determine an internal standard and how ratios were affected under different conditions. An HPLC method was determined that gave consistent retention times and satisfactory enantioseparation. Calibration curves for each amino acid were developed from single and multi-amino acid containing dilution series producing a model that most closely replicates the eggshell-extracted amino acids.

P-18 *Strengthening Social Bonds in Bujumbura through Public Space: Redesigning Jardin Public de Bujumbura for the Restoration of the City's Sense of Community*

Gwendoline Albright Ndikumenge (Andrew von Maur, Architecture)
J.N. Andrews Honors Scholar

In the last century, Public Spaces have been one of the most studied element by both architects and designers as some of the most used and impactful places that shape public life. Unfortunately, the necessity of public spaces for public life is not a focus everywhere. In places that have continuously experienced war and instability over the years, like Burundi, the public realm is perceived as a source of problems rather than a promoter of the city's well-being. Public spaces are seen as settings that contribute to an increase of death rates, rapes and other insecurities in the city. My project explores the possibility of redesigning an existing public space using different pattern languages and principles that could result in a well-designed space and help promote public spaces and life in the city. My creative project will consist of redesigning Bujumbura's public park "Jardin Public", one of the underutilized parks in Burundi, in the hope to promote a peaceful and community-oriented neighborhood in Bujumbura.

P-19 *The Romanian Bard: Translating Shakespeare for a Post-Communist Nation*

Ingrid Radulescu (L. Monique Pittman, English)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Leading up to the 400th anniversary of Shakespeare's death in 2016 new Romanian translations emerged to correct communist-era censored manuscripts. Analyzing these translations can answer questions of Shakespeare's shifting functionality in Romania as well as how a post-communist society positions his works. This project specifically examines Shakespeare's role in third-millennium Romanian culture and political climate by exploring George Volceanov's Opere Shakespeare translations, focusing on the Hamlet text. Investigating the cultural contexts and conducting close textual analysis of the Hamlet translation indicate distinctive Romanian values and practices further revealing Shakespeare's purpose as a tool for western assimilation.

P-20 *The Relationship between the Magnitude of Single-day Stock Price Declines and Subsequent Abnormal Returns*

Austin Rodgers (Alan Kirkpatrick & Lucile Sabas, Accounting, Economics & Finance)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

We investigate the relationship between the magnitude of large single-day stock price declines and their subsequent abnormal returns. We select 444 events in which securities traded on the New York Stock Exchange experienced a decline of greater than 10% on any trading day during the period of July 1, 2017 to June 30, 2018 and calculate their Cumulative Abnormal Returns at 10 trading days, 1 month, 3 months, and 6 months after each event date. Based on our regressions, we find no statistically-significant relationship linking larger initial share price declines to greater subsequent abnormal returns. We conclude that investors should not consider the size of initial decline in NYSE securities when designing a trading strategy centered around “buying the dip.”

P-21 *Design and Synthesis of a Novel Isoxazoline as a Potential PAM-Agonist*

Josselyn Roosenberg (Lisa Ahlberg, Chemistry & Biochemistry)
J.N. Andrews Honors Scholar

Progression of Alzheimer’s disease is associated with a loss of M1 receptor activation in the brain. However, a lack of clinical success following attempts to activate the M1 receptor at the orthosteric site has contributed to a transition towards the allosteric pocket of the receptor. Here, positive allosteric modulators (PAMs) interact to potentiate the acetylcholine response. Recent research proposes that optimization of PAM activity at the expense of intrinsic agonism may posit a means to limit adverse side effects. Therefore, this project proposes a design and synthesis of a novel isoxazoline as a potent PAM agent with weak intrinsic agonism.

P-22 *Rebuilding Iron Age Tell Hisban: Creating a Theoretical Model of Tell Hisban During the Iron Age for Digital Modelling*

Paul Roschman (Øystein LaBianca, Archaeology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

The goal of this research project has been the creation of a theoretical model of Tell Hisban and its environs during the Iron Age for use in digital modeling of the site. This model, taking the form of a drawn site map, utilizes excavation data from other Iron Age archaeological sites in the surrounding area. This data is then used to fill in gaps in extant knowledge of the site’s Iron Age settlement and generate the most likely layout of the historical site. Furthermore, this model has potential for use in informing future excavation of Tell Hisban and its environs.

P-23 *Investigating a Relationship between Neuronal and Behavioral Responses in Individual Virgin Females Crickets of Acheta Domesticus*

Brandon Shin (Benjamin Navia, Biology)
J.N. Andrews Honors Scholar

Female crickets *Acheta domesticus* exhibit differing phonotactic and neuronal responses to model calls with varying syllable periods. This study uses identical auditory stimuli to evaluate these responses in the same animal. This allows us to establish a relationship between neuronal and behavioral responses and predict behavior based on the neuron’s response. In response to attractive syllable periods, the L3 auditory interneuron produces action potentials which diminish in response to consecutive syllables - this decrease is calculated as a percentage (decrement). Preliminary results indicate that syllable periods that produce positive phonotaxis also elicit higher decrement values in the same animal.

P-24 *Isolation and Characterization of Novel Arginine-Derived Heterocyclic Amines*
Nathaniel Srikureja (Ryan T. Hayes, Chemistry & Biochemistry)
J.N. Andrews Honors Scholar

Most known heterocyclic amines (HCAs) are potent mutagens present at significant concentrations in cooked meats, and can be synthesized from burned mixtures of L-creatin(in)e with various amino acids. We hypothesize that novel mutagenic HCAs may be synthesized from a heated plant-based food simulating binary amino acid mixture: L-arginine and L-threonine. A two-part solid phase extraction is used to separate nitrogen heterocycles from byproducts followed by prep-HPLC to purify a small amount of a single compound, and characterization using GC-MS, IR, and NMR. The Ames mutagenicity assay using Salmonella TA98 is used to determine the mutagenic profile of the purified compound.

P-25 *A PFA Study: Exploring the Relationship of Anxiety and Self-Esteem Through Expressive Writing*
Abraham Walayat (Harvey Burnett, Behavioral Sciences)
J.N. Andrews Honors Scholar

This study will examine the efficacy of Psychological First Aid (PFA) on anxiety, mood, and self-esteem compared to an expressive writing condition across time utilizing a treatment and control group. Research has indicated that expressive writing is thought to be beneficial by decreasing inhibitions, but what is still unknown is how the use of self-esteem words can mediate the changes in anxiety levels. The purpose of this study is to examine the differences in anxiety levels across time with the number of self-esteem related words used through an expressive writing task, and how usage of self-esteem words mediates this effect.

P-26 *Relationship of Chewing Rate and Body Mass in West Indian Manatees*
Adam Weir (Daniel Gonzalez-Socoloske, Biology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

This study investigates the intraspecific relationship between body mass and chewing cycle duration (CCD) among West Indian manatees (*Trichechus manatus*). We recorded 18 captive manatees of varying body lengths consuming two food types. Additionally, nine manatees were recorded on two separate occasions (2012 and 2018) allowing us to control for individual variation to test whether CCD increases as the manatees grow. CCD was determined from the recordings using Raven Pro 1.5 sound analysis software. We modeled CCD, taking into account body size, food type, and individual variation to test what factors significantly influence CCD.

P-27 *An Examination of the Mother-Baby Relationship*
Morgan Winkfield (Duane McBride, Behavioral Sciences)
J.N. Andrews Honors Scholar

This study examines the relationship between Postpartum Depression and mother-child bonding. Data is being collected from 84 mothers, 18 years and older who have given birth in the last 6 months through an online survey and two health centers. Participants will complete the Post-Partum Bonding Questionnaire, the Edinburgh Postnatal Depression Scale, and demographics. A correlational analysis will be done to analyze how PPD and mother-child bonding relate to each other, as well with other demographics. It is hypothesized that higher levels of Postpartum Depression are associated with weaker mother-child bonds, and certain demographics increase this likelihood.

Undergraduate Research Poster Presentations

- P-28 *Sexual Orientation and Mental Health*
Trevor Furst (Duane McBride, Behavioral Sciences)
Undergraduate Research Scholar

In the spring of 2018, the Institute for the Prevention of Addictions conducted a survey of students at Andrews University (N=650). While a wide variety of health data were collected, this study focused on sexual orientation and mental health. Mental health was measured using the DASS depression, anxiety and stress scales. Sexual orientation was determined from the survey data. Bisexual students were significantly more likely to be classified in the extreme categories of the DASS compared to heterosexual students. These large differences indicate a significant mental health issue that the university needs to address.

- P-29 *Lineup Instructions Effects on Eyewitness Identification Rates*
Brittney A. Byrd (Harvey Burnett, Behavioral Sciences)
Undergraduate Research Scholar

This study examined whether biased photo lineup instructions lead to more misidentifications by specifically modeling Michigan's photograph lineup procedure. Subjects were randomly assigned to either a biased or unbiased lineup instruction condition, and after signing a consent form, the subjects watched a 42-second mock-crime video, completed word-search puzzles, completed an identification procedure, and a completed a post-questionnaire which included demographics. Preliminary results show that biased lineup instructions do not lead to more misidentifications. These results do not affirm that Michigan's model for photo lineup procedures is evidence-based, nor does it strengthen previous research. However, data is still being collected.

- P-30 *Investigating the Link Between Eye Movements and Related Speech Under Working Memory Load*
Ye Lim Kim (Karl G. D. Bailey, Behavioral Sciences)
Undergraduate Research Scholar

Participants in visual world studies direct attention towards objects relevant to concurrent language, notionally allowing for inferences about representations based on eye-movement patterns. However, these studies do not typically consider the role of working memory in linking language and visual attention. This study aims to explore the role of working memory load on the spoken language-eye movement link in visual world paradigm. We predict that loading either the phonological loop (language) or the visuospatial sketchpad (spatial relationships) will attenuate the language-eye movement link and that the visual world paradigm depends on the available capacity of working memory.

- P-31 *An Exploratory Study into the Effects of Crowd Funding for School Shooting Victims and Survivors on Existing Social Inequalities and Prejudices*
Abigail Lopez (Kristen Witzel, Behavioral Sciences)
Undergraduate Research Scholar

Americans are rapidly turning to crowdfunding platforms like GoFundMe.com to pay for medical bills and funerals. Scholars have cautioned that medical crowdfunding could deepen existing social inequalities, while drawing attention away from systemic problems in the welfare state. Few studies have systematically examined the effect of race/ethnicity, gender, or age on crowdfunding success because these variables are not explicitly reported on most crowdfunding platforms. The present study on crowdfunding for victims of school shootings addresses this gap by using court records and news articles to gather demographic data about victims to compare with campaign outcomes. This data will give us some insight into the effects of crowd funding on existing social inequalities.

- P-32 *Seventh-day Adventist Persons with Disabilities and Their Experiences with Involvement in Church Life and Ministry: A Proposal*
Mikelle Wile (Shannon M. Trecartin, Social Work)
Undergraduate Research Scholar

Sixty-one million adults in the United States (26% of the population) are living with a disability (CDC, 2019). Many people with disabilities experience barriers to access in their communities as well as their churches. Not only are these barriers physical, but they can also be social. This poster will summarize the findings from our literature review regarding the experiences of people with disabilities in church social and religious activity involvement. It will then present a proposal for analysis of the 2018 Global Church Survey data, using the North American Division sample.

- P-33 *Tinnitus: A Comparative Study of Patients Who Report Tinnitus Subsequent to Noise Exposure or Head Injury*
Gillian Jurek (Darah Regal, Speech-Language Pathology and Audiology)
Undergraduate Research Scholar

The purpose of this study is to examine initial tinnitus evaluation results and the level of support needed to habituate tinnitus in patients with traumatic brain injuries and noise-induced hearing loss. The study also looks at whether or not the tinnitus habituated in patients who underwent treatment. Tinnitus is the perception of sound when no actual auditory stimulus is present. Common causes of tinnitus are prolonged exposure to noise and injury to the head and/or neck. Correlations will be evaluated in an effort to provide clinicians with more accurate prognosis for tinnitus treatment based on initial testing results.

- P-34 *Gender Roles and Class Hierarchy in Beauty and the Beast as Adapted by Jean Cocteau and Christophe Gans*
Adair Kibble (Sonia Badenas, International Languages and Global Studies)
J.N. Andrews Honors Scholars and Undergraduate Research Scholar

This poster examines the two major French film adaptations of “The Beauty and the Beast”—one directed by Christophe Gans (2014), and the other by Jean Cocteau (1945)—as they re-imagine a story conceived in folklore, then written and published, and finally, put to film. The medium’s influence on the story will be analyzed, as well as that of historical context. Furthermore, this poster scrutinizes the gender and class relations portrayed in these films in how this tale is designed to inculcate domestic values in 18th century bourgeois women evolved over time in its treatment of class and gender relations.

- P-35 *An Artistic Response to God’s Word*
Kate Reitz (Kari Friestad, Visual Art, Communication, and Design)

While reading through an illustrated children’s Bible some years ago, I realized that whole books and chapters had been omitted. The children’s Bible only included the scriptures that had stories with illustrations of concrete events. My goal for this project was to create works of art in response to scripture that were not part of a linear narrative. I focused on the more metaphorical verses, such as those found within the books of Psalms and Proverbs. Research included how artists have approached similar projects in the past and how symbols were used in early Christian art.

- P-36 *Kenosis and Self-Denial in Jean-Luc Marion's Formulations on the Language of the Doctrine of God*
Nathon L. Hilton (Davide Sciarabba, Religion and Biblical Languages)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Parting from Jean-Luc Marion's reflections on the knowability of God in *God Without Being* (2012) and *In the Self's Place* (2012), this project proposes a response to the problem of language in the Doctrine of God by highlighting Marion's concept of hermeneutical humility as an efficient path for theological discourse. I argue that Marion's model for discourse within his critique of ontotheology adamantly advocates for an intellectual *kenosis*—or abandonment of one's presuppositions—that ultimately subverts all desire to speak unequivocally of the Divine. In *kenosis*, the theologian gains a voice to speak of and engage God's reality within the limitations of human cognition.

- P-37 *Moabite and Ammonite Painted Ware Project*
Elizabeth Bates (Randall Younker, Archaeology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

The Moabite and Ammonite Iron Age cultures the lived at Tall Jalul decorated their pottery with uniquely painted designs. This painted ware changed over time, and the styles can be used to categorize specific time periods. This poster examines the painted ware found in Fields B and G and organizes them by color, style, historical period and form, where available. Each sherd was registered, photographed, and analyzed using the Madaba Plains Project standards for ceramic analysis. The data was collected, correlated, and entered into a database. The paint designs and other surface treatments were compared with similar sherds from nearby sites. Stratified sherds were also compared with unstratified sherds to determine the dates for each. Then the sherds were organized into a timeline representing the painted ware from each historical period. The results show the variety of paint designs found at Tall Jalul within their stratigraphic context.

- P-38 *Tall Jalul Ceramics Project*
Jessica Bates (Randall Younker, Archaeology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Tall Jalul is the largest Iron Age Tall on the Madaba Plains in Jordan, and collecting archeological data from this site provides insight into the Iron Age cultures that lived there. During the process of excavation, two approach ramps were uncovered on the eastern slope of the Tall leading up to the city gate. A date for these two ramps can be determined by a careful examination and analysis of the pottery that was found in Field B squares containing them. This poster presents the results of a detailed analysis of the ceramic corpus associated with the construction of the two Iron Age ramps. The diagnostic sherds discovered during the excavation of the two ramps were categorized by shape, color, particles, surface treatment and form to determine relative dates.

- P-39 *The Domestic Prospects of Field D at Tall Jalul, Jordan*
Alma N. Cortez Alvarez (Constance E. Gane, Archaeology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Household Archaeology, the study of household dynamics, has slowly but surely integrated itself into the larger field of archaeology and has seen development to further understand the daily lives of older societies. At Tall Jalul in field D, an unearthed domestic complex has revealed potential for household studies. How can Tall Jalul field D aid our understanding of household archaeology? Through a preliminary study of ceramic typology in Square 1 of the field, I have been convinced that there is large potential in this field to learn more about the daily lives and household dynamics of the Late Iron/Persian period.

P-40 *Synthesis and Analysis of Fluorescence-Core PAMAM Dendrimers*
Ryutaro Jacobson (Ryan T. Hayes, Chemistry & Biochemistry)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Colored PAMAM dendrimers that fluorescence are important for use as probes in biochemical research analyses. In this research, perylenetetracarboxylic dianhydride (PTCDA) and blue diamino inks were used to synthesize new diamino core molecules which could be used to grow the highly branched polyamidoamine structure. PTCDA is bright red, chemically stable, poorly water soluble, and highly fluorescent molecule while the blue-diamine compounds are fairly water soluble and commonly used in ink pens. Results of the initial synthesis to modify PTCDA and other diamino-dyes will be presented along with analysis of regarding integrating chromophores into the core structure of dendrimers.

P-41 *Rapid and Versatile One-flask Synthesis of Dendrimer Cores*
Claire Covrig (Desmond Murray, Chemistry & Biochemistry)
Undergraduate Research Scholar

The objective of this project is the development of a rapid, one-flask synthesis of dendrimer cores. Dendrimers are highly-branched molecules with a central core. We sought to use sequential Knoevenagel condensation and amine conjugation addition reactions as a general new synthetic approach to dendrimer cores. The component reactants in this strategy are chosen so that they would provide the requisite functionalities to create the core and build upon the core. To develop this approach, so far, we have used dimethyl malonate, Meldrum's acid as Knoevenagel donors; 4-chlorobenzaldehyde and 4-dimethylaminobenzaldehyde as Knoevenagel acceptors; butylamine as the conjugate addition nucleophile; and catalysts ranging from calcium bases to enzymes and fruit purees.

P-42 *Method Optimization to Isolate Potentially-Carcinogenic, Arginine-Based Heterocyclic Amines*
Kieun Chung (Ryan T. Hayes, Chemistry & Biochemistry)
Undergraduate Research Scholar

Burning creatinine and phenylalanine together produces, in very small quantities, PhIP, which is a known HeterocyclicAmine(HCA)-type carcinogen. PhIP can be purchased and used a control to determine the effectiveness of burning, extracting, and purifying HCAs from burnt amino acids. This study evaluated the steps to create, extract, and analyze the production of PhIP from burning creatinine with phenylalanine. This process can be used to train students and make improvements to existing protocols and procedures, such as how to best utilize and recycle expensive PRS cartridges that are used in the isolation of HCA.

P-43 *Improving the Discovery of Mutagenic Arginine-based Heterocyclic Amines*
Skyler Schell (Ryan T. Hayes, Chemistry & Biochemistry)
Undergraduate Research Scholar

Previous research has demonstrated that creatinine and other amino acids in meat, when cooked at high temperatures, produces a class of carcinogenic molecules called heterocyclic amines (HCA). Our research suggests that mutagenic HCAs may be created by substituting arginine for creatinine. Burned arginine-threonine mixtures have been the focus of the current research. They have been used to determine methods that reproducibly produce mutagenic compounds indicated by the Ames test. Studies into the methods of burning, extraction, and purification aim to improve the production and recovery of mutagenic compounds. These details will be presented on various arginine-threonine burnings.

P-44 *Synthesis of Benzothiazoles to Test for Anti-cancer Properties and Prevent Invasion of Glioblastoma*
Delight S. Pazvakawambwa (Denise Smith, Biology)
Undergraduate Research Scholar

Glioblastoma is a malignant brain cancer responsible for taking many lives. With a high fatality rate and a post-diagnosis survival rate of about 15 months, Glioblastoma needs an urgent solution. The current treatments for Glioblastoma are surgical and do not completely remove all the cancerous cells. This research investigates whether introducing novel drugs (Benzothiazoles) as treatment will decrease the chances of reoccurrence and increase survival rate of Glioblastoma. Currently, I am synthesizing Benzothiazoles and running IR and NMR tests. After synthesizing the Benzothiazoles, I will proceed to test their effects on cell viability, determine the lethal dose (LD50) of the cells, and pursue other objectives of this research.

P-45 *Differences in Enamel Microstructure of Ictidomys Tridecemlineatus Formed during Hibernation Versus the Active Season*
Amanda Cho (Tom Goodwin, Biology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

The incisors of a ground squirrel grow continually throughout their life, making them a record of their most recent weeks of life. Previous research demonstrated that an abnormality in the incisor enamel and dentin of thirteen-lined ground squirrels (*Ictidomys tridecemlineatus*) corresponded with hibernation. Using scanning electron microscopy, we will determine whether the external disruption in incisor enamel is reflected in internal enamel microstructure by comparing the microstructure of normal enamel versus hibernation enamel. Our results may give insights as to why and how enamel disruption occurs during hibernation rather than the active season.

P-46 *Florida Manatees Have Less Functional Teeth and Higher Levels of Mesowear Than Other Manatee Populations*
Nina Woodard (Daniel Gonzalez-Socoloske, Biology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

Florida manatees experience greater levels of mesowear and have less functional teeth than other manatee populations. Decreased functionality may mean they spend more time feeding and less time in other behaviors, decreasing their fitness. Skulls were analyzed in order to determine if there is variation in mesowear between manatee taxa. Average number of teeth, number of functional teeth, and mesowear were statistically analyzed in order to see if they vary between taxa. If they have significantly more worn teeth, Florida may not only be a marginal habitat because of the cooler winter waters, but also because of the greater dental burden.

P-47 *Are Florida Manatees Thicker than Caribbean Manatees? An Investigation into Body Shape between the Two Subspecies*
Juliane L. Johnson (Danie Gonzalez-Socoloske, Biology)
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

The West Indian manatee has two subspecies, the Antillean and Florida subspecies. This research is looking at differences in surface area to volume ratio (SA:V) with respect to total length between the subspecies. It is hypothesized that Florida manatees will have a significantly smaller SA:V, indicating the Florida manatee is more stout in body shape. This hypothesis is based off of Allen's rule, as Florida waters are on average colder than Caribbean waters. This research may help aid conservation efforts, support Allen's rule, and indicate that the subspecies are diverging on two separate developmental paths.

P-48 *Egg Cannibalism in Gulls: If the First-laid Egg in a Nest Has Been Cannibalized, Is the Second-laid Egg Likely To Be Cannibalized?*

Brandi Seawood (Shandelle M. Henson, Mathematics)

Cannibalism is the greatest source of egg loss in a large Glaucous-winged Gull colony on Protection Island, WA. Previous work showed that the first egg laid in the nest was more likely to be cannibalized than the second or third egg. Here we show that for those nests in which the initial egg was cannibalized, the second egg was not at a significantly higher risk of being cannibalized. We hypothesize that after the first egg is laid, parental care increases, preventing the second and third eggs from being as vulnerable to cannibalism.

P-49 *Mathematical Model of Gull Egg-laying Behavior: Tracking the Egg Order*

Yosia Nurhan (Shandelle M. Henson, Mathematics)

J.N. Andrews Honors Scholar and Undergraduate Research Scholar

During years of high sea surface temperature, food resources for glaucous-winged gulls (*Larus glaucescens*) are scarce. In response, male gulls cannibalize the eggs of neighbors. When this occurs, female gulls in dense areas of the colony adopt a tactic called egg-laying synchrony, in which they lay eggs synchronously on an every-other-day schedule. Field observations show that the first-laid egg of each clutch is the most likely to be cannibalized. Here we analyzed the equilibria, stability, and bifurcations of a discrete-time model of egg-laying behavior that tracks the order in which eggs were laid in the nest.

P-50 *Positive Solutions to a General Predator-Prey System with Combined Self-limitation and Competition*

Lucinda Ford (Joon Hyuk Kang, Mathematics)

Undergraduate Research Scholar

The Lotka-Volterra predator-prey biological model tells us about the population dynamics in a two-species system, where one of the species preys upon the other. We seek the mathematical existence of a unique positive solution to a more generalized form of the predator-prey model with homogeneous boundary conditions. Using the sub- and supersolution method, we employ the mean value theorem to see that even though one species is food for the other, a solution exists where both species can survive, giving us more insight into the nature of the limiting factors and competition between the species in the predator-prey relationship.

P-51 *An Involute and Evolute of a Rectifying Curve*

Jeongjin Park (Yun Myung Oh, Mathematics)

The idea of involute is due to C. Huygens (1658), and he is also known for his work in optics. He found involutes while trying to build a more accurate clock. Now, the involute and evolute are well-known concepts to study space curves in 3D space. In this project, we are investigating rectifying curves using their partner curves, involute and evolute.

P-52 *Curve Behavior in Minkowski Space*

Devin Garcia (Yun Myung Oh, Mathematics)

Undergraduate Research Scholar

The behavior of a space curve α in Minkowski space was studied. The existence of the involute and evolute of α were determined. The ratio of torsion to curvature was also inspected in Minkowski space.

P-53 *Using Item Analysis to Identify Common Student Misconceptions on Remedial Mathematics Exams*
Lisa Johnston (Lynelle Weldon, Mathematics)
J.N. Andrews Honors Scholars and Undergraduate Research Scholar

This research project operated in two phases. In the first phase, we read relevant literature, reviewed sample exams from MATH 091 and 092, and set up a framework for mass data collection. The second phase involved the actual collection and analysis of the data. The data collection involved reviewing student work on specific problems and recording the data within the designed framework. The final data analysis identified which misconceptions students most commonly hold at this stage. This data was used in revising the curriculum of MATH 091 and 092.

P-54 *Mental Health Awareness: Exploring the Factors Related to Depression among College Students at a Religious University*
Nicolai Williams (Melissa Ponce-Rodas, Behavioral Sciences)
Undergraduate Research Scholar

While young adulthood is often a time of learning and growth, many college students face the challenge of dealing with mental health concerns. There are many theories as to why this happens, from societal to biological, yet multi-factor explanations provide the most comprehensive understandings. The current study sampled religious college students and assessed their mental health stigma, religiosity and sense of belonging, and explored how these related to their mental health. We found that gender and different patterns of religiosity were related to different levels of depressive symptomatology. Implications for how students, parents, faculty, and mental health practitioners can utilize these findings will be discussed.

December Honors Thesis Poster Presentations

D-01 *A Survey of the Effectiveness of the Flipped Classroom in the Communication Sciences*
Amanda Bange (Darah Regal, Speech-Language Pathology & Audiology; Karl Bailey, Behavioral Sciences)
J.N. Andrews Honors Scholar

This study examines how the flipped classroom model impacts student performance in the communication sciences. The flipped classroom is defined as an educational technique that utilizes technology to provide lecture materials outside of class time, while students complete projects and engage in discussion in class with the professor. Twenty-six participants responded to a survey regarding their flipped classroom experiences in four spring semester speech-language pathology and audiology classes. Responses were mixed, indicating a dislike of the formatting of the style while appreciating the extra practice, question-and-answer time, and thorough engagement with the topic that the flipped classroom model provided.

D-02 *Investigating the Effects of Popularity on Comment Civility: A Tale of Two Spiderman Videos (A YouTube Case Study)*
Isaac Smith (Heather Day, Communication)
J.N. Andrews Honors Scholar

This project seeks to explore the connection between the civility of internet comments and the popularity of the page that hosts them- through the lens of two YouTube videos. Both are on the same topic and were released around the same time. By using a combination of manual review and computer data analysis, readers will be able to discover if video popularity has a negative effect on comment civility. My findings will also reflect possible correlations between manual and computer analysis of factors encouraging civility, and provide examples of notable and intriguing comments I found during my study.

D-03 *Psalm 22 and The Passion Narrative of the Gospels, Prophetic, Analogous, or Both?*
Nancy Kardos-Moldovan (Erhard Gallos, Religion and Biblical Languages)
J.N. Andrews Honors Scholar

Psalm 22 is quoted throughout the Passion Narrative within the Gospels. With comparison between the translations of the Hebrew Old Testament and the Greek New Testament, whether citation purposes are prophetic or analogous becomes clear. If the New Testament translations match the Old Testament translations, a direct prophetic fulfillment is presented. Many of the verses within the Gospels recount how the quoted Psalm 22 verses were fulfilled, especially within John's Gospel. If mirroring of actions is displayed instead, an analogous approach is presented. This viewpoint may be witnessed in Psalm 22:7, and its accompanying New Testament citations.

D-04 *Assessing the Mean Neuronal Firing Rate Information Hypothesis via Mutual Information*
Greg Zdor (Jay Johnson, Engineering)
J.N. Andrews Honors Scholar

While it is currently well accepted that the mean neuronal firing rate (MNFR) is a key parameter encoding information about sensory and motor events, in some cases the measured information due to MNFR is not adequate to explain the total neuron signal information content. In this study, several auditory neuron responses and corresponding MNFR—generated surrogates are analyzed using mutual information (MI) as a metric of information content. Results showed that for particular inter-spike gaps (ISG), data MI exceeded two standard deviations of the MNFR mutual MI, indicating spike spacing and order also encode information.

D-05 *Comparing the Effectiveness of Frameworks for Religious Motivation: A Secondary Data Analysis of Four Seventh-day Adventist Samples*
Michele Prodans (Karl Bailey, Behavioral Sciences)
J.N. Andrews Honors Scholar

My project examines two theoretical frameworks for understanding religious motivation and corresponding instruments, which need to be tested for reliability and consistency. Religious orientation theory defines religious motivation as pursuing religion for either extrinsic or intrinsic reasons. Self-determination theory defines motivation as internalization of religious practices. I examined four surveys of Seventh-day Adventists from 2005 to 2018 that had either a religious orientation scale or a self-determination theory scale. Confirmatory analysis found the structure of the scale to be marginally acceptable and identified problematic items that caused the instruments to be less reliable.

Upcoming Research Events

AU Teaching and Learning Conference (March 28, 2019), <http://digitalcommons.andrews.edu/autlc>

Summit on Social Consciousness (April 11-13, 2019), <http://digitalcommons.andrews.edu/scs>

Spring Honors Thesis Symposium (April 12, 2018), <https://www.andrews.edu/services/honors/>

Andrews Research Conference: Early Career Researchers in the Arts & Humanities
(May 22-25, 2019), <http://digitalcommons.andrews.edu/arc/>

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P: Poster **D:** December 2018 Thesis Defense (pages 16-17)



Description: Jesse Grey, second from left, and other students learn how to change the electron source in a Mass Spectrometer, which is used in the isotopic analysis of nitrogen and oxygen in the atmosphere. The students participated in a National Science Foundation funded summer Research Experience for Undergraduates (REU) at Purdue University.

Left to Right: Ben Wilkins (PhD, Purdue University), Jesse Gray (Andrews University), Ambar Maldonado Santos (Interamerican University of Bayamon Campus), Geoff Bright (Purdue University), Liliya Chernysheva (Albion College), Wenqi Zhang (Purdue University), Greg Michalski (Professor of Analytical Chemistry, Purdue University). Photo Credit: Ben Li (Graduate Student, Purdue University).

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Back image: 2018 AU Honors Scholars. (Photo Credit: J.N. Andrews Honors Program)