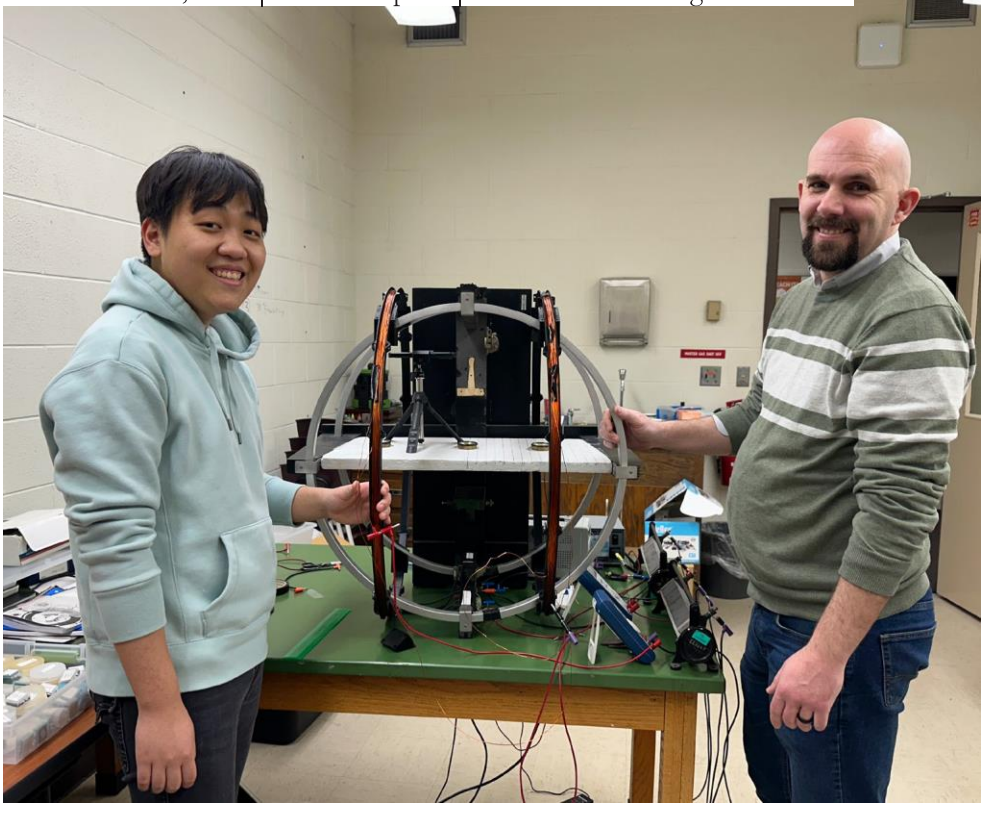
Honors Scholars and Undergraduate Research Poster Symposium

March 7, 2025 | 1:30–3:30 p.m. | Howard Performing Arts Center



Andrews University

J. N. Andrews Honors Program
Office of Research & Creative Scholarship

Welcome

Thank you for joining us for the 2025 Honors Thesis Poster Symposium. We are delighted to gather to celebrate the creativity and curiosity of this year's Honors Thesis researchers. Since its founding in the 1960s, the J.N. Andrews Honors Program at Andrews University has fostered enthusiastically the transformative experiences 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 Office of Research and Creative Scholarship, led by Dr. Gary Burdick, serves a vital role across campus in supporting and funding quality undergraduate research. 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 URS Award enables students to work closely with faculty mentors, participate in disciplinary conferences, and develop important professional skills. Many Honors Scholars have benefited from the URS funding and have noted that support on their poster boards.

A team of highly engaged faculty research mentors makes possible a rigorous program of undergraduate research. We thank each mentor for the commitment of time and energy invested in Andrews University's young scholars. The J.N. Andrews Honors Program and Office of Research and Creative Scholarship thank 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, Anthony Bosman, Kylene Cave, Vanessa Corredera, Ryan Hayes, Yoel Kim, Katherine Koudele, Nora Martin, Benjamin Navia, L. Monique Pittman, Davide Sciarabba, Karin Thompson, Rhonda Tomenko, Ackley Will, and Robert Zdor. We also thank our Honors Program administrative assistant and recruiter, Maxine Umaña, and the ORCS staff, Carlisle Sutton and Mordekai Ongo, as well as our student assistants, Audrey Lim and Anna Pak, and our ORCS assistant, Owen Bell, for their hard work in helping to make this event a success.

Many thanks for working together!

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

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

Honors Thesis Poster Presentations

P-01 Abigail Cancel (Diane Myers, Visual Art, Communication & Design, L. Monique Pittman, English)
The Art of Craft: An Inquiry Into the Illusion of Difference
J.N. Andrews Honors Scholar

The Art of Craft: An Inquiry Into the Illusion of Difference is an exploration of why art and craft have been historically separated and the ways in which this idea pervades into the modern world. It touches on the importance of art to society overall, as well as the significance of craft to the art world. Though art and craft were deliberately separated in western society for a time, this idea has long since been challenged and overturned with the powers that maintained said separation. Additionally, cultures outside of the western world have never acknowledged such a difference.

P-02 Ntakirutimana Francine (Marlene Murray, Biology)
The Effect of Lithium on Intracellular Myo-inositol Levels in Human Lymphoblasts of Biopolar Disorder Patients
J.N. Andrews Honors Scholar

Bipolar disorder is a chronic disorder characterized by mood swings of mania and depression. Bipolar I is characterized by intense mania, while bipolar II is characterized by hypomania and depression. Currently, there is no cure for bipolar disorder; however one mainstay of treatment is lithium which is hypothesized to alleviate symptoms by reducing myo-inositol. In this study, the effect of lithium on intracellular myo-inositol was determined in lymphoblasts derived from bipolar disorder patients and compared to that of lymphoblasts from an unaffected individual. The data showed lithium increased myo-inositol levels across cell lines; however, the results were not statistically significant.

P-03 Kamillie Hernandes (Ryan Hayes, Chemistry and Biochemistry)
Intrinsic Fluorescence Analysis of Novel Dendrimers
J.N. Andrews Honors Scholar

Dendrimers, highly branched and spherical polymers, have fascinated scientists for the past 35 years with constant findings of unexpected properties. One such property is their intrinsic fluorescence, which has been shown in polyamidoamine (PAMAM) dendrimers but not in other types. We have predicted that intrinsic fluorescence is based on the dendrimer structure rather than the bonds making up the dendrimer, which means practically any dendrimer should be fluorescent. A novel dendrimer synthesized by researchers at Southern Methodist University was evaluated and found to have intrinsic fluorescence. This research investigated the fluorescence profile along with its quantum efficiency when compared to fluorescent Tryptophan.

P-04 Yoel Kim (Brendan Cross and Mickey Kutzner, Physics)
Constructing and Confirming the Viability of Nested Helmoholtz Coils as an Education Model for Clinical MRI Systems
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

The experiment confirmed the viability of the nested Helmholtz coils set-up as an educational model for a clinical MRI setup through demonstrating that the oscillatory motion of protons within it is analogously manifest in the behavior of compass needles in our apparatus. Measurement of the amplitude of the compass needle oscillation under various magnetic field strengths and a set frequency shows that resonance – or a place where the amplitude peaks – is highly localized to a specific location and magnetic field strength within the apparatus. Thus, the apparatus visually demonstrates the localization and resonance expected of a clinical MRI setup

P-05 Charisse Lapuebla (Rhonda Tomenko, Tammy Shilling, and Kara Cotter, School of Communication Sciences & Disorders)
"Does My Student Need AAC?": Identifying the Factors Influencing SLPs' Initiation of AAC Evaluations Through Survey
J.N. Andrews Honors Scholar

Augmentative and alternative communication (AAC) methods and devices enable individuals to communicate when otherwise unable to communicate fluently and verbally. Introducing AAC to children with developmental disabilities encourages an increase in communication and speech production. The authors of this survey-based research aim to gather insights into the experiences of speech-language pathologists (SLPs) in educational settings, inquiring about the main factors influencing their decision-making process to initiate AAC evaluations for students with communication disorders. Examples of factors we are investigating are years of experience with AAC, educational background, caseload size, and whether the clinician considers AAC usage for every student on their caseload.

P-06 Nora Martin (Harvey Burnett and Karl Bailey, School of Social & Behavorial Sciences)
Religious Fundamentalism, Motivation, and Empathy Towards Sexual Minorities
J.N. Andrews Honors Scholar

In the United States, prejudice against sexual minorities is associated with high religiosity — in particular, Christianity (Bjork-James, 2019; Westwood, 2022). Religious fundamentalism is particularly correlated with such prejudice (Fisher et al., 2017; Laythe et al., 2002). Religious internalization, a related concept, assesses the degree to which an individual 'adopts' an external regulation (Ryan et al., 1993). A pilot test by this author showed that identification (a form of religious internalization), but not fundamentalism, was correlated with higher empathy scores towards sexual minorities. This research project interrogates the moderating effect of identification on fundamentalism and empathy towards sexual minorities.

P-07 Reagan McCain (Sonia Badenas, International Languages & Global Studies, Gary Wood, History & Political Science)
Las Malvinas and the Mind of Milei: An Analysis of President Javier Milei's Statements on the Malvinas
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

This research investigates the Malvinas (Falklands War) issue within contemporary Argentinian political discourse, focusing on the rhetoric of Javier Milei, the recently elected president. Known for his populist and provocative style, Milei has surprisingly adopted a more moderate approach to the Malvinas, raising questions about how this aligns with his broader political agenda. The study analyzes public statements from Milei and his administration on the issue, from the presidential campaign to the present. Through close textual and thematic analysis, this project seeks to shed light on Milei's ideological stance and its implications for Argentina's domestic and foreign policy.

P-08 Chris Ngugi (Stacie Hatfield and Karl Bailey, School of Social & Behavorial Sciences)
Queer Identity and Religiosity in Adventism
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

How do LGBTQ+-identifying students relate to their religiosity or relationship with religion? LGBTQ+ identity is socially significant and describes sexual orientation or gender. Religiosity is another valued aspect of identity. Within certain religious contexts (Chiongbian et al., 2023), including the Seventh-day Adventist (SDA) Church (Pew Research Center, 2014), LGBTQ+ identity may seem incongruent with religious group members' commonly held beliefs. Nevertheless, some may concurrently identify as being LGBTQ+ and religious. This study suggests that if LGBTQ+ people maintain their personal religiosity, they will feel it necessary to adapt it to quell cognitive dissonance and remain comfortable with both identities.

P-09 Addy Rodriguez Velasco (Benjamin Navia, Biology)
Assessing a Possible Effect of Male's Pheromones in the Phonotaxis of Female Acheta Domesticus
J.N. Andrews Honors Scholar

Acoustic communication in crickets is crucial for reproduction. Females exhibit selective phonotaxis in response to the male's call. Prior research has focused on virgin females to assess phonotaxis. However, evaluating phonotaxis in females raised in the presence of males remains unknown. This study aims to investigate the phonotactic response of female A. domesticus that were housed with males prior to testing. Results indicate that on average, male-exposed females respond phonotactically to a wider range of calls than those females in the control group. These results rule out the possibility that mating is a factor in changing the females' phonotactic response.

P-10 Anna Rybachek (Thomas Goodwin, Biology)
The Prillwitz Mammoth: Taxonomy, Sex, Age & Delayed Skeletal Maturation of a Geologically Young Mammoth
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

The Prillwitz mammoth, a nearly complete mammoth skeleton found in Southwest Michigan in 1962, is one of the geologically youngest mammoths from North America (AMS C-14 date: 11,300 ± 100 BP). This study investigates the taxonomy, sex, and age of this mammoth. The taxonomic identity of the specimen remains uncertain, but skeletal and dental evidence suggest it is a male. Of special interest is the mismatch between age inferred from tooth progression (~45 Asian Elephant Years) and age inferred from epiphyseal fusion (<~28 Asian EY if male). These results suggest substantially delayed skeletal maturation (>~17 Asian EY) for this mammoth.

P-11 Gabriella Srikureja (Ryan Hayes, Chemistry and Biochemistry)
Antioxidant Activity of PAMAM Dendrimer Stabilized Ascorbic Acid
J.N. Andrews Honors Scholar

Ascorbic acid (vitamin C) is an essential micronutrient for human health. It acts as an enzymatic cofactor in anabolic biochemical pathways such as the synthesis of collagen, dopamine, and norepinephrine. Unfortunately, this versatility comes at the cost of a high degradation rate both in and outside of the food matrix. Previous research exploring stabilizing aqueous ascorbic acid through Poly(amidoamine) (PAMAM) dendrimers found success in reducing the rate of degradation. To confirm the activity of ascorbic acid in its stabilized dendrimer complex, 2, 2-Diphenyl-1-picrylhydrazyl (DPPH) assays examined via UV-VIS-NIR spectrophotometers quantified the amount of antioxidant activity remaining in the stabilized complex.

P-12 Amelia Stefanescu (Sonia Badenas, International Languages & Global Studies)
The Sacred and the Supernatural: Christianity and Pagan Folklore in the Grimms' Briar Rose
J.N. Andrews Honors Scholar and Undergraduate Research Scholar

During the 19th century, the Brothers Grimm undertook the task of preserving German folklore during a time of cultural upheaval and national identity formation. One such tale, *Briar Rose*, emerges as a site of ideological interplay between Christian themes and pagan traditions. By analyzing the Grimms' 1812 (first) and 1857 (last) editions, this thesis investigates how the text reflects and synthesizes these distinct belief systems into a coherent text and what these interactions reveal about the cultural and religious dynamics of 19th-century Germany. This positions *Briar Rose* as a cultural artifact demonstrating how oral traditions evolved to reconcile spiritual paradigms.

P-13 Michelle Thomas (Lisa Ahlberg, Chemistry & Biochemistry)
Greener Alternative to Dichloromethane: Improving Caffeine Extraction with Minimal Emulsions
J.N. Andrews Honors Scholar

This project aims to find a greener, less toxic alternative to dichloromethane for the extraction of caffeine from tea bags. Dichloromethane, while effective, poses health and environmental risks, requiring a more sustainable replacement. Various solvents will be tested to evaluate their effectiveness in caffeine extractions and their ability to minimize emulsions. Keeping the percentage of emulsion small is imperative, as emulsion can hinder phase separation, reducing extraction efficiency and purity. This research will be able to compare the average amount of emulsion produced, separation time, and caffeine recovery percentage, while also obtaining the goal of creating a greener, more sustainable extraction method.

P-14 Madison Vath (Kristin Denslow, English)
Unearthing the Hidden Transcript in Greta Gerwig's Little Women (2019)
J.N. Andrews Honors Scholar

In her film adaptation of *Little Women* (2019), Greta Gerwig expounds upon the subject of womanhood through her characterizations of the March sisters, individually and collectively, using film techniques such as flashback, lighting, sound, and costuming. Gerwig peels away the layers of the novel's public transcript, as stated by anthropologist James C. Scott, centering instead the hidden transcript which suggests that a woman cannot thrive in a patriarchal society without community and connection with other women. The methods for my research include close reading, theoretical frameworks from feminist criticism and anthropology, and the use of secondary academic sources.

Undergraduate Research Poster Presentations

P-15 Nathan Allyn (Boon-Chai Ng, Engineering)
Studies of 3D printed Continuous Fibers in Onyx Composites
Undergraduate Research Scholar

Continuous fiber reinforced additively manufactured (CFRAM) parts are 3D printed components that use continuous fibers to increase their strength and stiffness. The CFRAM parts are printed using two extrusion systems in a 3D printer to lay down continuous fibers in layers, replacing the infill material. In this project, Onyx ® - a micro Carbon fiber filled nylon, was used as the matrix and the reinforcing fibers used were Carbon fiber, glass fiber and Kelvar. The effect of fiber orientation and the number of fibers used were evaluated using the tensile test to determine mechanical properties such as the ultimate tensile strength, yield strength, percent elongation as well as the modulus of elasticity. The results showed that Carbon fibers reinforced tensile samples do perform better than both the glass fibers and Kelvar reinforced tensile samples.

P-16 Ying Cao (Desmond Murray, Chemistry and Biochemistry)
Lime Juice – Baking Soda Catalyzed Synthesis of Rare Azooxime Dyes
Undergraduate Research Scholar

The summer research focused on the synthesis of azooxime dyes, nitroaniline dyes, and triazenes through diazotization reactions of primary amines. Four main reaction sets were explored: (1) the synthesis of azooxime dyes from (E)-benzaldehyde oxime and 4-nitroaniline, which yielded insufficient solid product (<1%) and produced unwanted nitrile byproducts due to base-induced dehydration; (2) the reaction between dimethylaniline and 4-nitroaniline, which achieved an 85.24% yield using PEG-400 as a mixed solvent with water, demonstrating promising results with minimal starting materials in the product; (3) the reaction between dimethylaniline and 4-methylbenzamidoxime, which yielded only 24.38% and showed no product formation in most NMR analyses; and (4) the attempted synthesis of triazenes from 4-nitroaniline with N-methyl-1-butylamine and 4-methylbenzamidoxime, which showed partial success and potential for future optimization. Over 40 experiments were conducted, revealing challenges in product isolation, yield optimization, and NMR interpretation. Future work will focus on refining reaction conditions, exploring nonaqueous media, and using purified standards for better NMR analysis. This research provides a foundation for further development of diazotization-based dye synthesis.

P-17 Eunseo Cho (Roberd Zdor, Biology)
The Effect of Corn Gluten Meal on Culturable Populations of Bacteria in Slit Loam Soil
Undergraduate Research Scholar

Chemical fumigation is a widely used pest control technique in agriculture that effectively manages soil-borne pests and pathogens. However, this technique can negatively impact soil health and the environment, necessitating the search for sustainable alternatives for weed and pathogen control. One such alternative is the use of Corn Gluten Meal (CGM), which is one of the byproducts of corn processing. While it is known that soil amendments with CGM can be used in weed management and as well as agents to reduce velvetleaf seedling growth in a soil type-dependent manner, how the composition of the soil microbiome changes due to CGM is not well understood. This study aims to research what impact CGM has on culturable bacterial populations in silt loam soil. Understanding these interactions could provide insights into the broader ecological effects of using seed meals as soil amendments and their potential as sustainable agricultural practices.

P-18 Francine Drysdale-Brown (Hyun Kwon, Engineering)
Accessibility Maps on an Inaccessible Campus
Undergraduate Research Scholar

The biofuel industry is seeking efficient alternatives to petroleum-based fuels. However, challenges such as high production costs and low yields, particularly in ethanol production, remain significant obstacles. This project aims to develop a soft sensor using machine learning to estimate critical variables from existing fermentation data, improving efficiency and reducing waste. Generative models are used to create synthetic data, while regression models are trained and validated against existing ethanol data. We found that the Time-Series Generative model proved ineffective; with further modifications, however, the variational autoencoder emerged as a promising alternative.

P-19 Alexandria Dunham (Kristen Witzel, Behavioral Sciences)
Accessibility Maps on an Inaccessible Campus
Undergraduate Research Scholar

Disability studies is an underdeveloped research topic, particularly on the Andrews University campus. While using my own lived experience as a guide, this project's goal is to push the need for accessibility maps and examine how beneficial this would be for individuals with disabilities. On a campus that is not designed with accessibility in mind, these maps would be an important step in the accessible direction. The maps would include items such as locations of elevators or ramps, a path to get into the building, and other aspects of accessibility. This project aims to start a trend of meeting accessibility needs campus-wide.

P-20 Jonathan Gomide (Davide Sciarabba, Religion and Biblical Languages)
The Epistemology of Divine Mercy: Heuristics of Anabaptism and Modern Adventism
Undergraduate Research Scholar

In 1959, Karl Pooper contended that "the central problem of epistemology… is the problem of the growth of knowledge." Vis-à-vis divine forbearance, how is it possible to develop a knowledge of God's mercy? What are the epistemological sources of this cognition? We evaluate two positions: Sixteenth-century Anabaptist articulations and modern Adventist renderings of God's mercy. We organize the process of this outgrowth of knowledge into four phases: (1) Anabaptist and modern Adventist understandings of the sources of revelatory mercy; (2) The Anabaptist ideal of the communal embodiment vs. the modern Adventist understanding of a cosmological teleology—the question of coherent metaphysical worldviews; (3) The Anabaptist epistemology of the Christocentric praxis vs. modern Adventist systematic theologies of God—praxis-driven vs. systematics-driven; and (4) The falsifiability of conceptions of divine mercy—the analysis of key canonical pericopes (Ex. 34:6-7; Ps. 103; Jonah 4; Mt. 9:13; Lk. 6:36; Eph. 2:4-5) in order to remove non-inductive constraints from both viewpoints. In this way, an epistemological heuristic of divine mercy is developed via the dialectical interaction of both models: The Spirit and the Word, the community and the individual, canonical revelation and divine acts—objective mercy and subjective mercy.

P-21 George Isaac (Daniel Gonzalez-Socoloske, Biology)
Non-native Freshwater Turtles in Puerto Rico
Undergraduate Research Scholar

Puerto Rico has only one species of native freshwater turtle, Trachemys stejnegeri, commonly referred to as the Central Antillean slider. The Central Antillean slider is found on two other nearby islands (Hispaniola and Great Inagua) in addition to Puerto Rico. A subspecies of T. stejnegeri known as the Puerto Rican slider (T. stejnegeri stejnegeri) is found only on the main island of Puerto Rico and on small surrounding islands such as Isla de Culebra. However, in recent years there has been an increase in sightings of non-native freshwater turtles, particularly the red-eared slider, Trachemys scripta, and the Florida softshell turtle, Apalone ferox. We document cases of non-native freshwater turtles brought into the Caribbean Manatee Conservation Center (CMCC), a wildlife rescue facility located on the campus of the Inter American University in Bayamon, Puerto Rico, since 2024. In addition, we compile all known cases of non-native turtles in Puerto Rico found in the literature, online databases (USGS Nonindigenous Aquatic Species (NAS), GBIF, and iNaturalist), Puerto Rican biodiversity Facebook post, and past records of turtles brought to the CMCC, to assess the extent of the distribution and risk of invasion of each species. We also report preliminary surveys on several dams at which park rangers and federal agents have indicated the potential presence of non-native turtles. Finally, we provide suggestions to the governing bodies on how to deal with any potential future releases and any currently established species of non-native turtle in Puerto Rico.

P-22 Anders Jeronimo[1], Erica Shin, Masy Domecillo, Donn LaTour (Peter Lyons, Biology)
Rethinking Protein Folding Mechanisms: Prodomain Independence in the Metallocarboxypeptidase Family
Undergraduate Research Scholar[1]

Protein misfolding contributes to diseases like pancreatic cancer and pancreatitis, with carboxypeptidase misfolding potentially involved. While their folding mechanisms remain unclear, prodomains are considered essential intramolecular chaperones. To investigate this, prodomains were deleted, and stabilizing residues mutated in CPA1, CPA2, CPA3, CPA6, and CPO. HEK293T transfection and Western blotting confirmed expression in wild-type and prodomain-deleted constructs. Enzyme assays suggest deletion does not enhance activity and may affect structure or stability. However, comparable enzymatic activity in extracellular CPA6 constructs supports that some carboxypeptidases, like CPO and CPA6, can fold without a prodomain, offering insights into biogenesis and potential therapeutic strategies.

P-23 Aiko J. Ayala Rios (Karin Thompson, Music and Music Performance)
Moritz Moszkowski's Piano Concerto Op. 59 – New Program Notes: Modern Perspectives on an Undervalued Classical Piece
Undergraduate Research Scholar

As my performance of Moritz Moszkowski's Piano Concerto Op. 59 with the Andrews University Symphony Orchestra was approaching in November 2024, there was a need for program notes. Past program notes for the piece were not updated to the current findings and analysis of the composition. Therefore, through a literature review and documentation about the concerto's whereabouts and history, new program notes were written to meet the current needs of a twenty-first-century audience not accustomed to listening to a piece of music that has been neglected for a long time

December 2024 Honors Thesis Poster Presentations

D-01 Trey Matus (Anthony Bosman, Mathematics)
Analysis of the Snake Cube Puzzle and Adjacency Criteria
J.N. Andrews Honors Scholar

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

D-02 Anastasia Pasechnik (Ackley Will, Computing)
Improving Accented Speech Recognition: An In-Depth Study of Feature Engineering with Convolutional Neural Networks (CNN)
J.N. Andrews Honors Scholar

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

D-03 Katherine Pierre (Marlene Murray, Biology)
The Effect of DHA on MYO-INOSITOL Levels in Cell Lines Derived from Patients with Bipolar Disorder
J.N. Andrews Honors Scholar

Bipolar disorder is a common mental health condition that affects mood, activity level, and concentration. Bipolar disorder is characterized by episodes of mania and depression. The currently recommended treatments for bipolar disorder, lithium and valproic acid, are hypothesized to exert their therapeutic effects by lowering intracellular myo-inositol levels, but they can cause harmful side effects. Seeking safer options, previous research investigated the omega-3 fatty acid docosahexaenoic acid (DHA), which increased myo-inositol in yeast cells, corresponding to possible alleviation of the depressive phase. This study explores DHA's effect on myo-inositol levels in human lymphoblasts derived from patients with bipolar I disorder, bipolar II disorder, and a neurotypical cell line.

D-04 John Roosenberg (Ryan Hayes, Chemistry & Biochemistry)
Concentration and Health Risk Assessment of Metals in Betel Quid from New York, United States
J.N. Andrews Honors Scholar

Betel quid or betel nut is a potentially harmful chewing blend consisting of a betel piper leaf, areca nut, and slacked lime, and it's been reported as the fourth most common psychoactive substance in the world. Although primarily used in specific Asian countries, it has been available in specialty grocery stores in the US since before 1998. The toxicity of betel quid component samples, purchased in the US but grown in various countries, was assessed by their concentration of heavy metals (Cr, Pb, As, etc.) determined by ICP-OES and the estimated daily intake (EDI) and hazardous index (HI).

D-05 Abby Shim (Brian Wong, Biology)
The Selective Induction of Apoptosis by Scutellaria barbata in PANC-1 Pancreatic Cancer Cells
J.N. Andrews Honors Scholar

Pancreatic cancer is a particularly aggressive type of cancer with elusive symptoms and a poor prognosis. Finding safe and effective treatment methods is therefore of clinical relevance. Traditional Chinese medicinal herbs, such as Scutellaria barbata (SB), Oldenlandia diffusa (OD), and Bryophyllum pinnatum (BP) have been used as anticancer therapies. In this study, the modulation of pro-apoptotic and anti-apoptotic proteins via these Chinese medicinal herbs was analyzed. Aqueous extracts of the herbs were applied to cancer cell lines BxPC-3 and PANC-1 as well as human pancreatic ductal epithelial cell line HPDE. The results were analyzed via fluorescent microscopy and antibody array detection.

D-06 Davielle Smith (Max Keller, Music, Anthony Bosman, Mathematics)
The Uniform Triadic Transformation and Claude Debussy's Music
J.N. Andrews Honors Scholar

UTTs, or Uniform Triadic Transformations, were developed by Julian Hook who described them as the set of all pitch classes with an operation that defines a group. Currently, the UTT contains only the composition of functions operation that changes minor triads to major triads or vice versa, as well as keeps triads the same. To expand UTTs applicability, the permutation group S4 is introduced. This research analyzes two pieces by 19th century Romantic composer Claude Debussy, Berceuse Heroique and Clair de Lune, to show S4's extension of the general UTT.

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Student Presenters

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