30th Annual Westmont College

Student Research Symposium

WESTMONT

April 16, 2026
3:00-4:30 p.m.

Winter Hall
Westmont College

2026 Spring Research Symposium

April 16, 2026
3:00-4:30 p.m.

Winter Hall
Westmont College

One of the hallmarks of Westmont College's academic program is the opportunity for undergraduate students to work directly with faculty on research and scholarly projects. Work presented at the Student Research Symposium includes student work conducted during the past year, from the divisions of the Humanities, Social Sciences, and the Natural and Behavioral Sciences. The purpose of this symposium is to celebrate the noteworthy accomplishments of Westmont students.

With special appreciation for support from the Office of the Provost

PARTICIPANTS

Caprisabel Acquistapace '27
Chemistry
Poster #3

Andrew Anthony '26
Psychology
Poster #16

Kennedy Burkett '26
Psychology
Poster #10

Blake Bush '29
Chemistry
Poster #6

Emma Bustamante '26
Biology
Poster #28

Emma Calderaro '26
Psychology
Poster #9

Matthew Cazares '28
Psychology
Poster #23

Kylie Cekalski '27
Chemistry
Poster #29

Abby Dickinson '26
Psychology
Poster #15

Nicholas Ferguson '26
Psychology
Poster #22

Jena Fujitaki '29
Chemistry
Poster #6

Maxwell Fuller '28
Chemistry
Poster #6

Carly Haggard '27
Mathematics
Poster #8

Bailey Hanson '26
English and Sociology
Poster #24

Mary Heldwein '27
Chemistry
Poster #3

Josiah Jessup '28
Biology
Poster #1

Kathryn Jones '28
Psychology
Poster #16

Skylar Jones '26
Chemisty
Poster #30

Elizabeth King '26
Psychology
Poster #17

Kara Kingsley '26
Chemistry
Poster #30

Elena Klingler '26
Sociology
Poster #25

Vaness Kragelund '29
Chemistry
Poster #6

Keira Larson '27
Mathematics
Poster #19

Emily Lindblad '26
History
Poster #21

Alexandra Lo '28
Psychology
Poster #12

Alan Lopez '26
Chemistry
Poster #6

Ellie Ludwig '26
Physics
Poster #14

PARTICIPANTS

Lucy Mangum '27
Psychology
Poster #7

Ainsley Martin '26
Physics
Poster #13

Sabrina Misra '26
Psychology
Poster #5

Sophia Morton '26
Psychology
Poster #12

Brandon Moses '27
Chemistry
Poster #6

Kiki Newton '27
Psychology
Poster #5

Andreas Olvera '26
Music
Poster #18

Christian Payne '28
Physics
Poster #11

Sabrina Rosales '26
Psychology
Poster #20

Jessica Rosenfeld '26
Chemistry
Poster #2

Peter Sullivan '28
Chemistry
Poster #29

Phoebe Tilburt '26
Chemistry
Poster #27

Caleb Tobey '28
Chemistry
Poster #6

Asher Trammel '27
Psychology
Poster #7

Joshua Treece '28
Physics
Poster #26

Clarie Van Horn '27
Psychology
Poster #4

ABSTRACTS

1. **Building a calcium channel: expressing calcium signaling proteins from human cells in yeast mitochondria**

Josiah Jessup '28

Dr. Nicole Marsh
Biology

Mitochondrial calcium uniporters (mtCU) are protein channels found in the mitochondria of human cells. Calcium ions serve the important purpose of signaling for increased ATP production, which is the main source of energy for cells to perform work. Most bodily processes require ATP. The mtCU allows for calcium ions to flow into the center (matrix) of the mitochondria, increasing ATP production as needed to fuel various bodily processes (neurons firing, muscle contraction, etc.). Our goal is to reconstitute this protein channel in a simple yeast cell's mitochondria, providing an isolated environment to test various drugs or modify aspects of the mtCU with greater precision. Our purpose is to find methods which inhibit or activate calcium signaling as potential treatment for various diseases such as cancer, or reduced tissue damage from heart attacks. To date, we have isolated and sequenced the genes which encode for human mtCU proteins.

2. **Development of a novel palladium catalyzed ortho-arylation of aryl carbamates**

Jessica Rosenfeld '26
Caprisabel Acquistapace '27
Mia Kenyon '26
Skylar Jones '26
Cara McGuffee

Dr. Amanda Silberstein
Chemistry

Aryl-aryl carbon bonds are important in chemical synthesis, particularly pharmaceutical and natural product synthesis. Here we present the development of a novel palladium catalyzed ortho-arylation reaction of N,N-dialkyl carbamate substituted aryl rings. Arylation conditions were optimized and the substrate scope/functional group tolerance was explored. Purification methods were developed for arylated product mixtures and product purity and identity were determined by 13C-NMR and 1H-NMR.

3. **o-Arylation of Pyrrolidine Carbamate Substituted Aryl Rings**

Caprisabel Acquistapace "27
Mary Heldwein '27
Skylar Jones '26

Dr. Amanda Sparkman
Biology

Aryl-carbon to aryl-carbon bonds are important in chemical synthesis, particularly medicinal drug synthesis. Recent research efforts have been focused on optimizing the o-arylation reaction of different carbamate-substituted aryl rings with other substituent groups. Arylation conditions were optimized and the substrate scope/functional group tolerance was analyzed. Purification methods were developed for arylated product mixtures and product purity and identity were determined by various kinds of NMR spectroscopy.

4. **Empathy, Status, Prosocial Behavior**

Claire Van Horn '27
Elise Kilmer '26

Dr. Gewnhi Park
Psychology

People sometimes make decisions and actions for the benefit of those around them, even though they might gain nothing. These actions characterize prosocial behavior. Empathy, as well as perceived social status, is thought to affect an individual's prosocial intentions and actions. This study, specifically, seeks to induce empathy through a film clip and measure emotional changes through heart rate variability (HRV). In this study, participants will either watch

an emotionally neutral or empathy-inducing film while their HRV is monitored. Following this, all individuals' likelihood to engage in prosocial actions and perceived social status will be recorded. Results are analyzed to understand the effect of social status and empathy on prosocial intentions. It is hypothesized that lower levels of social status paired with higher levels of induced empathy, seen in HRV, will affect higher levels of prosocial intentionality.

5. The Effect of Race on Nonverbal Communication Cue Decoding

Sabrina Misra '26
Kiki Newton '27

Dr. Gewnhi Park
Psychology

Communication is a basic building block of relationships and society. Nonverbal communication specifically plays an important role in judging the attitudes of speakers. In ambiguous situations, people tend to rely on facial expression to interpret the attitude of the speaker, but the cross-race effect and ingroup advantage can lead to deficits in assessing the emotions and intentions of outgroup members. This study seeks to explore whether race has a main effect on people's assessment of outgroup members' emotional attitudes when speaking. Participants encountered Black and White American speakers onscreen with varying vocal tones and facial expression. They rated each speaker's attitude on a Likert scale of emotional valence (1 = very negative, 7 = very positive). The hypothesis predicts that participants will have more extreme emotional valence scoring for speakers in their racial outgroup than for their racial ingroup while rating facial expression and vocal tone, due to ingroup advantage.

6. Enhanced Fluorescence of Naphthalene and Biphenyl Overlayers by the Passage of Cyclohexane and Chlorocyclohexane

Blake Bush '29
Jena Fujitaki '29
Maxwell Fuller '28
Vanessa Kragelund '29
Alan Lopez '26
Brandon Moses '27
Caleb Tobey '28

Dr. Allan Nishimura
Chemistry

Cyclohexane caused naphthalene that was exhibiting excimer fluorescence to become almost entirely trap fluorescence. This change began as cyclohexane desorbed about 50 K *before* the maximum in the naphthalene trap emission was observed. The maximum in the naphthalene trap emission was about 10 K before it desorbed. When the fluorophore was biphenyl, cyclohexane caused the trap to emit with increased intensity about 60 K *after* it had desorbed. The maximum trap intensity in biphenyl was observed at about 30 K before it desorbed. Chlorocyclohexane caused naphthalene that was exhibiting excimer fluorescence to increase its excimer fluorescence until a maximum at 10 K before desorption of naphthalene. Since the excitation source selectively targeted only the naphthalene and biphenyl fluorophores, the passage of the underlayers, cyclohexane and chlorocyclohexane, served to cause physical changes to the morphology of the overlayers, whether amorphous or crystalline. Further investigation is being carried out.

7. Afterlife in Forelife: How Religion Modifies Economic Responses to Mortality

Lucy Mangum '27
Asher Trammel '27

Dr. Gewnhi Park
Psychology

Does contemplating death influence how individuals evaluate monetary rewards over time? Prior research on mortality salience and delayed discounting—the tendency to devalue rewards as the delay to their receipt increases—shows mixed findings. We propose religiosity moderates the relationship between

mortality salience and delayed discounting. Participants were instructed to write about their own death or write about a painful dental procedure in the control condition. Then, participants completed a standard delayed-discounting task and a measure of religiosity. Results revealed a significant interaction between religiosity and mortality salience. In the mortality salience condition, individuals with higher religiosity exhibited reduced delayed discounting, demonstrating a greater preference for larger, delayed rewards over smaller, immediate ones compared to those with lower religiosity. This pattern was not observed in the control condition. These findings support the afterlife beliefs theory, which suggests that contemplating an afterlife may attenuate preferences for immediate rewards, particularly among more religious individuals.

8. The "Shape" of Digital Language: A Comparison of 2014 and 2024 Word Embeddings

Carly Haggard '27

Dr. Maryke van der Walt
Mathematics

I am investigating whether the mathematical "shape" of our digital language is expanding or narrowing by comparing the effective rank of 2014 and 2024 word embeddings. Using Stanford GloVe data, I conducted side-by-side comparisons of Wikipedia and general Web text (Crawl/Dolma). To ensure structural alignment, I intersected the vocabularies to create matching matrices and unit-normalized the vectors to isolate semantic structure from word frequency. I computed the Singular Value Decomposition (SVD) and calculated the Effective Rank (r_{eff}) (Roy \& Vetterli, 2007) via Shannon Singular Value Entropy (H_{SVE}):

$$H_{SVE} = -\sum_{i=1}^{k} \bar{\sigma}_i \ln(\bar{\sigma}_i), \quad r_{eff} = e^{H_{SVE}}$$

Results show a distinct "flip": Wikipedia's effective rank increased (264.39 to 274.77), suggesting curated knowledge is expanding. Conversely, general Web data decreased (277.43 to 267.91). This reduction in utilized dimensions suggests "model collapse": an algebraic narrowing and flattening of vocabulary. While curated knowledge diversifies, the general digital commons is structurally simplifying.

9. The Effect of Self-Regulation and Threat Response on Working Memory

Emma Calderaro '26

Dr. Gewnhi Park
Psychology

This study examines whether exposure to threatening emotional stimuli influences working memory performance and whether this effect is moderated by existing levels of emotion regulation. College student participants were randomly assigned to either control or emotional stimuli (via IAPS images), completed the James Gross Emotional Questionnaire, and performed an online N-back task to measure working memory, with an analysis to assess differences between conditions. It is hypothesized that individuals with higher levels of emotion regulation will demonstrate better working memory performance when exposed to threatening emotional stimuli. If supported, these findings may inform how individuals are prepared to manage cognitive demands during

stressful situations. These findings may suggest that incorporating emotion regulation strategies into educational drills could support cognitive functioning during stressful situations.

10. The Effects of Corporate Worship on HRV and Emotionality

Kennedy Burkett '26
Preston Illman '29
Gwen Lundgaard '28

Dr. Gewnhi Park
Psychology

Corporate worship, specifically in a Christian context, involves singing, teaching, and prayer in a collective setting. It closely resembles a secular concert in experience and structure, such as music, crowd participation, and emotional engagement. However, the spiritual component of corporate worship may produce different physical and emotional changes in a participant than in a concert. The present study investigates how corporate worship and secular concerts differentially influence heart rate variability (HRV) and emotionality. College aged students that meet the criteria outlined in the Duke University Religiosity Index were randomly assigned to either a worship or concert condition. Heart rate variability (HRV) was measured as a baseline before the study, and then continuously during the study. Participants also completed the State Trait Anxiety Inventory before and after the musical conditions, and a self-report questionnaire after, to assess emotionality and interconnectedness.

It was hypothesized that both conditions would influence HRV, emotionality, and interconnectedness, but the worship condition would produce greater synchronization of HRV in the groups and would show a greater effect on the post-test questionnaires. Findings are expected to clarify whether the experience of collective worship uniquely modulates autonomic and emotional responses beyond the effects of communal music engagement.

11. Are Randomly Generated Numbers Truly Random?

Christian Payne '28

Dr. Ben Carlson
Physics

The random walk problem is computed using a computer simulation to generate paths to get an understanding of random number generation. The paths are generated by using steps of equal length with a randomly chosen angle to give the path its randomness. To get a clean value to use for data analysis, I ran the simulation through several iterations and found the mean output value and stored that along with the number of steps taken. When varying the number of steps and repeating the process of finding mean output values, I noticed that there was in fact a pattern to the randomness when displaying the outputs graphically. This pattern is commonly known as the Rayleigh Distribution.

12. The Impact of Emotion Regulation on Cortisol and Psychological Stress Responses

Alexandra Lo '28
Sophia Morton '26

Dr. Gewnhi Park
Psychology

Emotional regulation strategies shape how individuals respond to stress both psychologically and physiologically. Cognitive reappraisal generally reduces emotional distress, while expressive suppression is associated with increased sympathetic activation and elevated cortisol levels. This study examined

how reappraisal, suppression, and a no-strategy control condition influenced hypothalamic-pituitary-adrenal (HPA) axis activity and subjective emotional responses following the Maastricht Stress Test (MAST). Participants provided salivary cortisol samples and completed measures of affect, perceived stress, and trait emotion regulation at multiple time points before and after stress exposure. Expanding on prior research, the study included both male and female college-aged participants to address previous sampling limitations and investigate potential sex differences in stress responses. It was hypothesized that reappraisal would lead to reduced cortisol reactivity and more positive affect, whereas suppression would produce heightened cortisol responses and greater negative affect. These findings aimed to deepen understanding of emotion regulation and stress physiology.

13. Spin assignments and a potential new 6+ state in ^{76}As

Ainsley Martin '26

Dr. Robert Haring-Kaye
Physics

The exotic arsenic isotope ^{76}As offers a valuable opportunity to explore nuclear structure in the "Wild West" region. Recent studies have suggested possible octupole deformation in ^{76}As , an interpretation which depends on tentative spin assignments, linking transitions, and a possible missing 6+ state. Using coincidence data from a fusion-evaporation experiment at Florida State University, this work examined the ^{76}As level scheme through gamma-ray coincidence gating, spin-parity considerations, and comparison with neighboring isotopes. All but eight transitions on the published level-scheme were verified, but the two which would restrict a potential 6+ state were not. Additionally, directional correlation of oriented nuclei (DCO) ratios were calculated in order to determine the spin assignments of levels. Notably, these ratios indicated that the 86-keV gamma ray is a dipole transition, supporting a potential (7+) → (6+) assignment rather than the currently proposed (7+) → 5+, resulting in a "missing" energy gap between the 6+ and 5+ levels. Other methods were also used to determine this gap, including comparisons with other odd-odd isotopes, low-energy detector data, and theoretical level energies, but the results were inconclusive.

14. New excited states in spin assignments in ^{73}As

Ellie Ludwig '26
B. Abromeit
J. Döring
R. A. Dungan
S. Gowen
R. A. Haring-Kaye
K. D. Jones
K. Q. Le
R. A. Lubna

Dr. Robert Haring-Kaye
Physics

The excited-state structure of ^{73}As remains a valuable subject for study in the mass A ~ 70 region since it represents a candidate for strong shape deformation due to a rare driving mechanism. Using previously collected data from Florida State University, energy-level transitions were investigated to confirm their placement within the level scheme and to refine spin assignments. A Compton-suppressed Ge detector array consisting of three Clover detectors and seven single-crystal detectors was used to record γ-γ coincidence data. Mutual coincidence relationships and directional correlation of oriented nuclei (R_{DCO}) ratios were then used to evaluate the spins of selected excited states and to determine the ordering of key transitions within the scheme. The analysis confirmed the placement of 19 new transitions and the confirmed rearrangement of 6 others. In addition, the RDCO ratio measurements led to the firm spin assignments for 12 states, assignments which were previously unknown.

15. The Effects of Trauma as a Moderator of Stress Recovery

Abby Dickinson '26

Dr. Gewnhi Park
Psychology

Building on recent research, this study investigates the interaction between trauma exposure and physiological stress regulation to improve understanding of emotional resilience and recovery mechanisms. The purpose of this study is to examine how prior experiences of trauma influence physiological and emotional recovery following exposure to a mild acute stressor. Specifically, the aim is to determine whether trauma history moderates stress recovery by analyzing changes in heart rate variability (HRV) and self-reported stress levels before, during, and after stress induction. It is hypothesized that participants with higher trauma exposure will exhibit slower or poorer recovery following stress induction compared to participants with lower trauma exposure. Additionally, regardless of trauma history, participants with higher HRV will show better stress recovery which is measured by less HRV reactivity when faced with an induced stressor. Lastly, participants with higher trauma scores will exhibit lower baseline HRV.

16. The Effect of Emotional Valence on Thought Suppression: The Moderating Effects of Anxiety, Depression, and Heart Rate Variability

Andrew Anthony '26
Kathryn Jones '28

Dr. Gewnhi Park
Psychology

Thought suppression is a commonly used strategy for managing unwanted cognitions, yet research suggests that suppression often produces paradoxical increases in intrusive thoughts, particularly when the suppressed content is emotionally salient. The present study examines how the emotional valence of a target thought influences suppression success and whether individual differences in heartrate variability (HRV), anxiety, and depression moderate this effect. Forty-four undergraduate students from Westmont College will be randomly assigned to suppress either a neutral thought (white bear) or a negative thought (imagining a loved one in a car accident). Intrusive thoughts will be measured behaviorally via keypress frequency across monitoring, suppression, and return-to-monitor phases, alongside continuous HRV recording and self-reported distress and effort ratings. It is expected that participants suppressing negative thoughts will experience more intrusive thoughts than those suppressing neutral thoughts, particularly during suppression. Lower resting HRV and higher anxiety and depression symptoms are expected to predict greater intrusion frequency. These findings are expected to clarify how emotional, cognitive, and physiological processes interact to influence thought regulation, potentially informing and benefiting clinical approaches to intrusive cognition.

17. The Impact of Religiosity on Electrodermal Activity and Subjective Stress Levels

Elizabeth King '26
Emma Johnson '25
Dorie Minnix '25

Dr. Gewnhi Park
Psychology

Stress is a universal, human experience characterized by both physiological and psychological responses to stressors. Acute stress activates the sympathetic nervous system (SNS), which results in increased heart rate, cortisol release, and electrodermal activity (EDA). Recent psychological studies of stress have come to find that religiosity may function as a protective factor against stress. This study aims to investigate the hypothesis that higher levels of religious involvement is associated with reduced acute stress response following

artificially-induced stress via the Maastricht Acute Stress Test (MAST). In order to test this, 100 participants were gathered and tested using the MAST, whilst their EDA was measured along with a subjective scale rating their stress levels. Before the implementation of the test, each individual completed the Duke University Religion Index questionnaire in order to quantify their respective levels of religiosity. With these data points gathered, they were comparatively studied, searching for a significant relationship.

18. Redemptive Listening: An Alternative Vision for Music Consumption

Andreas Olvera '26

Dr. Daniel Gee
Music

For many adult Christians, there is a lack of thoughtful guidance in how to think about music consumption. Typical advice given, if any, generally relates to what sort of lyrics or genres one should not listen to, and the rationale either lacks evidence or assumes a younger audience. This project argues that neither complete permissiveness nor the purely negative guidelines typically offered are sufficient for the adult Christian. Rather, a more robust understanding of the formative effects of our music consumption encourages us to be more concerned about the habits and postures of our consumption than the content of our consumption; the how is more important than the what. After proposing a framework for how our music consumption habits and postures shape us, this project concludes by proposing that intentional music consumption can be a powerful tool for positive formation, particularly for cultivating empathy.

19. Principal component analysis of sedentary equine cardiac arrhythmia prevalence and risk factors

Keira Larson '27

Dr. Maryke van der Walt
Mathematics

Principal component analysis (PCA) helps reduce a data set into points that are the most important. This research uses principal component analysis to analyze a large dataset that is searching for cardiac arrhythmia prevalence and potential risk factors in sedentary horses through electrocardiograms. The dataset documents various characteristics of horses that could be potential risk factors for cardiac arrhythmia prevalence. Almost 25% of horses have some form of cardiac arrhythmia that may affect performance, and the risk factors are often up for debate. This dataset with the PCA scatterplot showed that there is correlation between heart girth size and prevalence of cardiac arrhythmia.

20. The Role of Exercise Identity and Self Compassion in Predicting General Anxiety: The Moderating Effect of Exercise Behavior

Sabrina Rosales '26

Dr. Gewnhi Park
Psychology

This study examined the relationship between exercise identity and general anxiety, and whether self compassion can act as a moderator. It was hypothesized that self compassion would weaken the connection between exercise identity and general anxiety, meaning those with higher self compassion would experience less anxiety. In the study, 82 participants completed a survey full of questionnaires having to do with exercise identity, self-compassion, general anxiety, and exercise behavior. Correlational analyses showed a significant positive relationship between exercise identity and self compassion, $r = .442$, $p < .001$, as well as a small, but significant relationship between exercise identity

and anxiety, r = .219, p = .048. A multiple regression analysis supported self compassion being a moderator, with the interaction being significant, p < .001. Results did support the hypothesis, suggesting that having a higher self compassion does weaken the relationship between exercise identity and general anxiety.

21. Aloha ʻĀina: Newspapers as Political Activists in 1890s Hawai'i

Emily Lindblad '26

Dr. Alastair Su
History

In the 1890s, as the United States began a decade-long attempt to annex the Kingdom of Hawai'i, Kanaka Maoli (Native Hawaiians) also became increasingly politically mobilized. Resistance grew in many ways, but especially through the written word. Newspapers, introduced to Hawai'i in 1823, exploded during this period, though often overshadowed by the age of Yellow Journalism within the US. This project uses an archival collection of newspapers in ʻŌlelo Hawai'i (Native Hawaiian) in order to evaluate the extent of indigenous agency and political action. It also compares the political positions of English-speaking papers versus those in ʻŌlelo Hawai'i, and how that fueled impressions of Hawai'i within the United States.

22. The Effect of Social Conformity and Persuasive Communication on Undergraduate Students' Willingness to Use AI

Nicholas Ferguson '26

Dr. Gewnhi Park
Psychology

In the past couple of years, Artificial Intelligence (AI) has been widely used in many areas of society. An area with particular debate is the use of Large language models (LLM) in the education system. There has been research on specific factors that drive students to use an LLM, and the Technology Acceptance Model (TAM) has been applied to this topic. The present study aims to examine social conformity and persuasive communication on students' willingness to use AI in essay tasks. This will be done by using confederates to enact conformity, and news articles to operational persuasive communication. The participants will complete essay tasks while these factors are manipulated. The hypothesis is social conformity and positive persuasive communication will increase participant's frequency of AI use in the essay task.

23. More Money Allocation to Deontological Decision-Makers in a Trust Game, and HRV's Moderating Role in Trust Toward Utilitarian Judgments

Matthew Cazares '28

Dr. Gewnhi Park
Psychology

According to mutualistic partner-choice models of moral evolution, individuals preferentially select partners who are more likely to engage in behaviors that promote mutually beneficial outcomes (Alexander, 1987; Baumard, André, & Sperber, 2013; Krebs, 2008; Noë & Hammerstein, 1994; Trivers, 1971). In the present study, we examined whether faces associated with deontological moral judgments would receive greater monetary entrustment in an economic trust game. We also tested whether cardiac vagal tone—indexed by resting heart rate variability (HRV)—moderates this effect. Cardiac vagal tone is considered a physiological marker of self-regulatory capacity, supporting cognitive and emotional regulation as well as social cognition, including moral judgment

(Park & Thayer, 2014; Park et al., 2016). Prior research indicates that lower resting HRV is associated with stronger utilitarian tendencies (Park et al., 2016; Rosas et al., 2021). Accordingly, we predicted that lower resting HRV would amplify the influence of utilitarian moral judgments on trust behavior. Following HRV assessment, participants viewed neutral male faces paired with either deontological or utilitarian responses to sacrificial moral dilemmas and then completed a trust game in which they allocated money to these targets. Participants entrusted significantly more money to faces associated with deontological judgments than to those associated with utilitarian judgments. Moreover, as predicted, HRV moderated allocations to utilitarian targets.

24. Girl Deconstructed: An Analysis of the Teenage Girl in Young Adult Literature from 1970-2020

Bailey Hanson '26

Dr. Sarah L. Jirek
English and Sociology

This project is a qualitative content analysis of twenty bestselling American Young Adult novels written between 1970 and 2020, with each featuring a female protagonist between the ages of 12 and 18 years old. It examines the themes spanning across this fifty-year span, signaling the experiences unanimously shared by American teenage girls regardless of their era. Prominent themes identified in this study include exploration of sexuality and romance, body image, navigating relationship with mom, and peer comparison. While the approach to these topics shifts in various ways with time, these themes remain consistent across the dataset. The literary construction of the American Teenage Girl reflects the gendered cultural expectations, rites-of-passage, and narratives presented to and consumed by American teenage girls.

25. Healthcare Access and Utilization Among the Latino Community in Santa Barbara, CA

Elena Klingler '26

Dr. Blake Kent
Sociology

In the United States, access to and quality of healthcare services is largely dependent on social and structural factors, including immigration status. This study investigates healthcare services available to and used by Latino immigrants in Santa Barbara. This research examines the intersectionality of immigrant status and Latino identity on access and utilization of healthcare services in the US. It is framed by the Social Determinants of Health (SDOH) theory and the understanding of immigration status as a social determinant of health. Results were gathered from demographic surveys and semi-structured, in-depth interviews of Latino immigrants residing in Santa Barbara, CA.

26. Identifying and placing new energy states and transitions in ^{75}As

Joshua Treece '28

Dr. Robert Haring-Kaye
Physics

In a high-spin band consisting of magnetic dipole (M1) transitions in ^{75}As, theoretical calculations suggest an alignment of the total neutron angular momentum J_ν with the total angular momentum of the nucleus body J_π referred to as the "stapler mechanism" (as the momentum vectors resemble the movement of a closing stapler), a novel phenomenon among odd-even isotopes. In order to see if this alignment persists to higher energy and to enhance the existing level scheme as much as possible, a high-spin study of

^{75}As was conducted. A 64Ni(14C, pn) reaction at 50 MeV was performed at Florida State University to create ^{75}As products. The resulting gamma decays were measured in coincidence using an array of Ge detectors consisting of 6 Clover detectors, 3 coaxial single-crystal detectors, and 1 low-energy photon spectrometer (LEPS). As well as confirming the known high-spin states, 11 new transitions were placed in the ^{75}As level scheme, revealing 5 new excited states, and 8 others were identified as likely belonging to the high-spin decay but not yet placed. Spin assignments were inferred from a means of directional correlation of oriented nuclei (DCO) ratios.

27. Spectrum of Non-Neoplastic Diagnoses in Cryobiopsies Obtained During EBUS-Guided Cytopathology Evaluation of Pulmonary Nodules and Masses

Phoebe Tilburt '26
Selina Ji, M.D.
Kelsey E. McHugh, M.D.
Xiaoyan Cui, M.D.
Yasmeen M. Butt, M.D.
Brandon T. Larson, M.D.
Maxwell L. Smith, M.D.
Henry Tazelaar, M.D.

Dr. Henry Tazelaar
Mayo Clinic, Arizona
Chemistry

Endobronchial ultrasound guided sampling with cryobiopsy (EBUS-C) is being increasingly used to sample thoracic nodules and masses. The range of non-neoplastic diseases encountered in this setting has not been reported. This study aims to characterize the spectrum of non-neoplastic diseases identified by cryobiopsy obtained during EBUS-C. We collected all EBUS-C samples of thoracic masses performed at our institution from 03/2023 to 05/2025. Cases with neoplasms were excluded, resulting in 446 cases. All infectious and non-infectious diagnoses were tallied, with percentages showing the proportion of total cases per diagnosis, including coexisting ones. Cases of infections are most common (49%), followed by granulomas (28%). But a wide variety of other causes were identified. (Figure 1). Our data shows the spectrum of non-neoplastic diagnoses that may be encountered with EBUS-C for thoracic nodules and masses. Many of these diagnoses could explain the radiologic findings, obviating the need for further investigation.

28. Home is where the acorns are: A multi-year analysis of shifts in acorn woodpecker cavity and granary use across an urban gradient

Emma Bustamante '26

Dr. Amanda Sparkman
Biology

Behavior in urban wildlife may shift in response to decreased habitat quality, novel stimuli, and novel resources. Urban acorn woodpeckers are cavity-nesting cooperative breeders that maintain long-term acorn storage granaries. Previously, we have shown that urban woodpeckers change social structure and behavior in response to changes in habitat quality, artificial light, and novel granary/cavity types. Here we tested whether changes in cavity/granary type could be explained by cavity/granary type or degree of urbanization. Over five years, we found that granary type remained unchanged between years in 89% of cases. Of the 11% that did change, families were more likely to leave utility poles than palms or ornamental trees, and more likely to select utility poles than palms or ornamental trees. Cavity changed in 20% of cases between years, with high urbanization families more likely to switch. These results have broader implications for urban horticulture and wildlife-friendly landscape management.

29. Dendrimer-Enhanced Fluorescence Quenching by Covalent Attachment of Ruthenium-Diimine Complexes to PAMAM Dendrimers

Kylie Cekalski '27
Peter Sullivan '28
Mary Heldwein '27

Dr. Stephen Contakes
Chemistry

One promising approach for removing harmful ions from water is photocatalytic degradation, although existing systems for some ions perform poorly under typical waste regeneration conditions. Building on our previous work which demonstrated enhanced interaction between photoactive metal diimine complexes and soluble ions when the complexes are covalently-attached to carboxy-terminated PAMAM dendrimers, we investigated how the structure of the dendrimer and the presence of competing substrates affect the quenching of ruthenium diimine emission on exposure to copper(II) ion. Conjugates of rac-4,4'-dicarboxyphenanthroline-bis-2,2'-bipyridineruthenium(II) and amine-terminated G2.0 PAMAM were prepared by HOBt and DMAP-assisted EDC coupling in dry DMF, purified by membrane dialysis, and structurally characterized by 1H NMR Spectroscopy. These studies revealed that the conjugates contained substoichiometric ratios of the ruthenium complex to dendrimer and that aqueous membrane dialysis alone was insufficient to remove EDC urea from the conjugates; methanolic membrane dialysis was also needed. The amine-terminated conjugates acted similarly to the carboxy-terminated conjugates in exhibiting enhanced fluorescence quenching with Copper(II). They similarly exhibited nonlinear Stern-Volmer behavior consistent with both faster bimolecular quenching than in mixtures of the catalyst and dendrimers alone and, unlike those mixtures, by rapid quenching by dendrimer-associated copper(II) at micromolar copper levels. The extent of dendrimer-associated quenching increases with the nominal complex to dendrimer ratio and intermediate nominal ratios (1:1, 2:1, and 4:1) exhibit significant positive allostery characteristic of structural remodeling of the dendrimer on copper(II) binding. Quenching of the conjugates was lowered in the presence of significant quantities of EDC urea (e.g. before methanolic dialysis), suggesting that it may be susceptible to interference by other dendrimer-associated substances.

30. The Development of Novel Oxygen-Based Directing Groups in *ortho*-Arylation

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Carbon-carbon bonds are the backbone of all organic molecules, making them essential for life. The formation of these bonds is especially critical for pharmaceuticals, agricultural fertilizers and insecticides, along with plastics. Despite how important carbon-carbon bonds are, they are difficult to make due to a limited number of known reactions and most also require pre-activation or specific conditions. Our group aimed to utilize C-H activation to make a carbon-carbon bond between two aryl groups with a specific placement on the starting material. We focused on optimizing a reaction using an oxygen-based directing group, to form a carbon-carbon bond adjacent to the directing group. With optimized conditions in hand, we explored the scope of this reaction.

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