Poster Abstracts

Name	Major	Faculty Advisor & Program/Course	Title	Abstract
Patricia Adu-Mensah, Ray Rodriguez, and Finn McManus	Nursing	Dr. Joann Latorre Dr. Gonzalo Miyagusuku-Cruzado DACC and NMSU Food Science Course Based Undergraduate Research Program	Preliminary chemical and bioactive characterization of New Mexico wines	Wine composition, particularly organic acids, phenolic compounds, and antioxidant constituents; plays an important role in determining not only sensory quality but also potential health-related bioactivity. These compounds can vary widely based on grape cultivar, terroir, and production practices, all of which are uniquely influenced by New Mexico's high-desert climate and diverse growing regions. Developing a preliminary chemical and bioactive profile of New Mexico Wines will help clarify what makes these wines distinctive and provides a foundation for future research, producer support, and quality differentiation. Objectives in this study evaluated key chemical parameters and bioactive properties of selected New Mexico wines to generate baseline data that can inform future research, quality optimization, and industry development.
Alyssa Aguilar	Human Nutrition and Dietetic Sciences	Dr. Shadai Martin	Enhancing Breast Milk Production Through Counseling and Behavioral Support Programs	Breastfeeding provides optimal nutritionfor infants, many postpartum mothers experience challenges with milk production and maintaining exclusive breastfeeding. This project proposes a comparative analysis of peer reviewed studies examining the effectiveness of counseling and behavioral support programs on breastfeeding outcomes. Data will be systematically collected from randomized controlled trials and observational studies published in peer-reviewed journals. Key outcomes to be observed and compared include timing of lactation onset, exclusive breastfeeding rates, milk volume, and maternal psychological outcomes such as anxiety. This analysis is amied to synthesize existing evidence to assess the overall effectiveness of counseling-based interventions and integrate structured lactation support into postpartum care.
Victor Aguirre	HNDS Pre-Dietetics/Dietetics	Dr. Shadai Martin	Hypohydration and performance decline in collegiate team sport athletes: implications for collegiate football	
Ryan Aldaz	Mechanical and Aerospace Engineering	Dr. Phame Camarena Honors Capstone	LANL Bolt Release Mechanism	In partnership with Los Alamos National Laboratory's Test Engineering Group, this capstone project develops a universal air operated retracting nut mechanism to reliably release and retract a 3/8-16 bolt under a given preload. The design accepts a ¼" NPT helium supply, retracts the bolt within 10 ms using up to compressed gas, and fits the provided mounting constraints. As an engineering student, I performed calculations and CAD simulations, produced ASME Y14.5 drawings, fabricated a functional 3D printed prototype, and prepared a test plan. This project will help increase LANL's drop testing capabilities while meeting all cost, safety, and reusability requirements.
Morgan Anderson	Human Nutrition and Dietetic Sciences	Dr. Sarah Ruiz NUTR 3750. Applied Nutrition Research	Iron Deficiency Anemia in Children Ages 1-13	Iron deficiency anemia (IDA) is the most common type of anemia in children and can cause cognitive issues, growth delays, fatigue, behavior issues, and more. The research question aims to explore the relationship between iron deficiency anemia and the elevated risk in low socioeconomic (SES) communities, specifically in children ages 1-13. The public health and pediatric nutrition fields could be impacted by this research. I approached this topic by researching pre-existing, peer-reviewed literature covering topics such as Iron Deficiency Anemia in Children, and its Relationship to Socioeconomic Vulnerability. My findings linked high rates of childhood iron deficiency anemia to food insecurity, a lack of

				nutritional education, and access to fewer nutrient-dense food items. These themes in the research can help inform healthcare workers, educators, and the general public on how targeted-intervetions and education programs could help improve the high rates of IDA seen in low SES children.
Joaquin Andrade	Mechanical Engineering	Dr. Bethuel Khamala Professor Mychael Smith PHYS 1320L. Calculus-Based Physics II Lab	Optimization of Launch Angle for Maximum Range: A Calculus-Based Experimental Study	Co-authors: Yitisian Gong, Tatiana Jordan, and Jacob Pelayo This study contributes to mechanical engineering through the analysis and optimization of projectile motion. Motivated by concepts from Calculus-Based Physics and calculus courses, the research investigated how experimental launch data compares to theoretical predictions and identified the optimal launch angle for maximizing horizontal range. A spring-loaded ball launcher was used to model projectile motion, and horizontal range and time of flight were measured at multiple angles. Experimental averages were compared with values predicted using calculus-based projectile motion equations. Results showed an optimal launch angle of approximately 38°, slightly lower than the ideal 45° predicted under ideal conditions. Minor discrepancies between theoretical and experimental results were attributed to air resistance and measurement limitations. These findings demonstrate the practical application of calculus concepts and support improved accuracy in the design of launchers and related engineering systems.
Mohammad Al Aqtash	Chemical Engineering	Dr. Gary A. Eiceman	Comparisons of Volatile Organic Compounds Produced from Electrosurgical Cauterization of Human Brain Tumors and Other Tissues	Surgical smoke generated by electrosurgical tools contains aerosols and vapors, including volatile organic compounds (VOCs), that may distinguish healthy from cancerous tissue. Previous approaches guiding tumor resection have relied on aerosol-based methods and pyrolysis mass spectrometry. In studies conducted at Tampere University (Finland), VOCs produced during electrosurgical cauterization of human brain tumors and other tissues were characterized using gas chromatography–mass spectrometry (GC–MS). Total-ion chromatograms revealed mixtures containing more than 100 compounds in human samples and porcine brain and muscle controls. Anonymized datasets are being analyzed to identify chemical markers or patterns that may distinguish brain tumors from healthy tissue and possibly between tumor types. Results are intended to advance cost-effective, real-time tumor margin diagnostics.
Makani Araujo	Environmental Science	Dr. Runwei Li New Mexico Water Resources Research Institute (WRRI)	Evaluating Soil Screening Levels (SSL) for selected Environmental Contaminants Introduced by Treated Produced Water (TPW) in Irrigation Uses	Treated produced water (TPW) is increasingly being considered as an alternative irrigation source in regions experiencing freshwater scarcity. However, TPW may contain contaminants such as benzene, toluene, and ammonium that can migrate through soil and potentially impact groundwater, ecosystems, and human health. Current soil screening levels (SSLs) are commonly used to estimate safe contaminant concentrations in soil, but they may not fully represent conditions associated with TPW irrigation. This study evaluates SSLs for benzene, toluene, and ammonium by examining their transport and retention in agricultural soils. Laboratory soil column irrigation experiments are used to simulate TPW application and observe contaminant movement through soil systems. Soil and water samples are analyzed to measure contaminant concentrations and leaching behavior. Results are expected to improve estimates of contaminant mobility and provide insight into whether existing SSL assumptions accurately represent TPW irrigation scenarios, supporting more reliable environmental risk assessments.
Anabella Arias	Kinesiology	Prof. Shawn Werner	From Doubt to Determination: The Experiences and Challenges of Pre-	Over recent years, the physical therapy field has grown significantly due to a high aging population and an increase in awareness of preventative care. Despite this, many are

			Physical Therapy Student	unaware of the process it takes to become a physical therapist in comparison to a traditional medical doctor. As a pre-physical therapy student, this can be difficult to understand and presents many obstacles such as balancing challenging classes and experiencing feelings of self-doubt. However, throughout the process, not only are many valuable skills gained that will assist in a future career in physical therapy, but a deeper passion for the field is developed. This presentation will discuss my experiences as a pre-physical therapy student, the challenges I've faced, and the key lessons I've learned.
Mia Badillo	Human Nutrition and Dietetic Sciences	Dr. Sarah Ruiz NUTR 3750. Applied Nutrition Research	Analyzing the Relationship Between Whole Grain Intake and the Risk of Nonalcoholic Fatty Liver Disease (NAFLD) in Adolescents Aged 14–18	The prevalence of nonalcoholic fatty liver disease (NAFLD) among adolescents continues to increase, indicating a strong association with obesity, type 2 diabetes, and hypertension. Evidence strongly indicates that diet quality and nutrient intake are associated with NAFLD diagnosis. Whole grains are an essential part of a well-balanced diet, providing fiber, vitamins, minerals, and phytochemicals that support positive health outcomes. Lower intake of whole grains, which are often underemphasized in the Western diet, ketogenic diets, and high-protein diets, is associated with reduced metabolic regulation, increased hyperinsulinemia, and increased systemic inflammation, among other predisposing factors significant in the development of NAFLD. This review of peer-reviewed literature aims to analyze the association between whole-grain intake and the risk of NAFLD in adolescents aged 14-18. The results are intended to establish potential associations between variables and to provide evidence-based nutrition intervention strategies, expanding the limited scope of research on NAFLD in adolescents.
Yair Barraza and Matthew Ochoa	Electrical Engineering and Computer Science Electrical Engineering	Dr. David Mitchell NM AMP Undergraduate Research Scholars (URS)	Sequential Low-Density Parity-Check (LDPC) Decoders	Low-density parity-check (LDPC) codes are a class of error-correcting codes that have been deployed in 5G cellular. Low complexity decoding can be achieved through the use of check and bit notes. The problem is new standards of 6G cellular demanding higher decoding rates. Our proposed solution is to utilize a technique known as sequential LDPC codes, which sequentially update check nodes. In conjunction with sequential LDPC codes, we utilize reinforcement learning (RL) in which an agent chooses which nodes to update first. Through its choices, the agent learns which sequences provide the best chance at decoding. From there, the agent provides a table of the best decoding sequence, and we utilize the best sequence for the most efficient decoding process, resulting in less power consumption. To validate our results, we have been developing a sequential decoder and we compare its results to the industry standard LDPC codes.
Isabella Jade Bartz	Kinesiology	Dr. Katie Hirsch-Agnew SPMD 4997 (Problems)	A qualitative exploration of formal and informal athlete leadership roles and expectations	Athlete leadership is the process in which an athlete in a formal (i.e., assigned or elected) or informal role (i.e., organically developed) influences teammates to achieve a common goal (Loughead et al., 2006). The purpose of this study is to conduct an in-depth exploration of coaches' and athletes' expectations of formal and informal athlete leaders. Participants included 12 university athletes and 10 university coaches. One-on-one semi-structured interviews were conducted, and then analyzed using Braun and Clarke's (2019) six steps for reflexive thematic analysis. Data analysis is ongoing; however, it is anticipated that informal athlete leaders play a critical yet less clearly defined role in team leadership structures. Findings can be used to explain role information to each athlete leader type and, in turn, help these athletes collaborate effectively within teams. Additionally, the findings can help inform athlete leaders on how to behave so their actions align with team members' preferences.

Emily Bell	Pre-Dental Hygiene	Dr. Concepcion Miller	Antibiosis Activity of Soil-Derived Bacteria Against ESKAPE Relatives	Antibiotic resistance is a major global health concern and has increased the urgency of discovering new antimicrobial compounds. In this study, soil samples were screened to isolate bacteria capable of producing compounds that inhibit the growth of other microorganisms. Selected isolates demonstrating antibiosis were further characterized by testing their inhibitory activity against safe relatives of the ESKAPE pathogens, a group of human pathogen organisms associated with antibiotic resistance. Purified isolates were evaluated using an antibiosis assay in which standardized bacterial lawns were prepared and isolates were patched onto the surface to assess inhibition. Zones of inhibition were measured to compare antimicrobial activity across isolates and target organisms. Preliminary observations suggest variability in inhibitory activity among isolates, and ongoing work aims to further characterize isolates with promising antimicrobial potential.
Alvin Birmingham-Monroe	Civil Engineering NM AMP Undergraduate Scholars Program	Dr. Runwei Li	Analyzing Research Trends in Per- and Polyfluoroalkyl Substances (PFAS) via Systematic Review	PFAS are persistent synthetic chemicals used for their resistant properties, leading to widespread environmental contamination and accumulation in living tissues. While research has rapidly expanded over the past decade, it remains fragmented without a clear overview of focus areas. Studies have heavily emphasized remediation, but critical topics like long-term human health effects are underexplored. This project systematically reviews existing academic reviews to map the distribution of research efforts, identify significant knowledge gaps, and guide future scientific and policy priorities.
Orion Blowe, Carolina I. Herrera, Gavin R. Limon, Logan A. Norton	2D Animation and Visual Effects Community and Counseling Psychology Business Administration-Information Systems Hotel, Restaurant, and Tourism Management	Prof. Shawn Werner, Dean Phame Camarena, President Ferme HNRS 338V. Leadership and Society	Programmatic Analytical Assessment Addressing Residential Housing Infrastructure	This project seeks to explore opportunities to strengthen the university's ongoing efforts surrounding campus residential housing infrastructure and maintenance support systems. Through the collection of data from publicly-available sources, NMSU housing-related organizations, and public news outlets, and other relevant university departments, the initiative aims to identify patterns in student experiences and assess where additional resources, coordination, or strategic support may further enhance current housing response processes. This academic initiative is designed to provide a structured, research-based opportunity to better understand student housing needs while supporting existing institutional efforts.
Saul Campos	Human Nutrition and Dietetics	Dr. Sarah Ruiz Professor Judith Chavira-Mendoza ASPHN	Education as Prevention: A Community Assessment of Hypertension Knowledge and Awareness	Food insecurity is a growing concern among college students and may contribute to poor dietary patterns and increased risk for chronic diseases, including cardiovascular disease. This study aims to examine the relationship between food insecurity and cardiovascular disease risk factors among college students. Participants will complete a cross-sectional online survey that includes demographic questions, the U.S. Household Food Security Survey Module (Six-Item Short Form), the Rapid Eating Assessment for Participants (REAPS), and questions related to hypertension awareness and health behaviors. Data collected will be used to assess potential associations between food access, dietary patterns, and cardiovascular disease risk indicators. Understanding these relationships may help inform campus health initiatives and nutrition education programs designed to support student health and reduce chronic disease risk among college populations.
Carolina Canedo	Animal and Range Sciences	Dr. Gonzalo Miyagusuku-Cruzado	Turning Up the Heat: Accelerated Frying Reveals Rapid Soybean Oil Degradation	Deep frying is common in food preparation, but repeated heating of oils causes degradation that impacts food quality and safety. Accelerated frying methods help evaluate oil stability and degradation. Herein, soybean oil degradation was assessed using tofu as a model of food to simulate repeated frying. Six 1L fryers were operated simultaneously, each containing 700 g of vegetable oil maintained at 170–180°C. Tofu pieces (70 g, 10% frying load) were fried for 10 minutes followed by a 10-minute resting period, repeated three times

				per hour to mimic continuous frying. Degradation was monitored by measuring total polar materials (TPM) and color. Initial TPM was approximately 4%, increasing to 15–17% after seven hours, indicating substantial deterioration. Tofu samples darkened progressively with continued frying. These results show that tofu serves as an effective model substrate for accelerated frying studies. Future work will evaluate the effect of antioxidants on oil degradation patterns.
Ivan Cano and Cassie Awolusi	Civil Engineering	Dr. Douglas Cortes NM AMP Undergraduate Research Scholars (URS)	Characterizing Thermo-Mechanical Properties of Lunar Simulant Under Vacuum Conditions	This research will characterize the thermal and mechanical properties of the New Mexico Lunar Mare (NMLM) simulant to evaluate its effectiveness as a high- fidelity proxy for lunar regolith. While existing simulants like LMS-1 are optimized for concrete applications, NMLM is specifically designed to replicate geotechnical density functions and geochemical compositions found on the lunar surface. The study consists of a comparative analysis between atmospheric and vacuum conditions to observe changes in material behavior and particle interaction. To achieve this, a vacuum chamber will be utilized to eliminate atmospheric bias while conducting thermal conductivity and wave propagation tests across varying pressure gradients. Specifically, Multichannel Analysis of Surface Waves (MASW) will be employed to determine shear-wave velocity (Vs) and P-wave conductivity as functions of material density (ρ). The study hypothesizes that vacuum conditions will significantly alter interparticle contact and thermal resistance. These findings will provide essential data for assessing NMLM's performance, ultimately informing the structural design of landing pads and foundations for future lunar missions.
Damian Cano	Kinesiology-Exercise Science	Dr. Katie Hirsch-Agnew Discovery Scholars Program	Coaching Fairness: Mapping the Psychological and Behavioral Consequences of Fair and Unfair Coaching Practices	Research that explores the impact of coach fairness has predominantly utilized quantitative tools created for non-sport contexts (e.g., business settings). This study addresses gaps in sport psychology research by exploring coaches' and athletes' perceived consequences of fair and unfair coaching. Participants included intercollegiate coaches (n =10) and athletes (n = 10) who completed a one-on-one interview focused on their experiences with fair and unfair coaches. All interviews were recorded and transcribed verbatim. Preliminary findings suggest that fair coaching can cause enhanced social and task cohesion, athletes' confidence, and individual and team performance, whereas unfair coaching can cause social and task cohesion conflicts, distrust among players, decline in athletes' mental health, and tension between players and coaching staff. The results of this research could inform the development of a framework for coaches that describes how coaches can facilitate positive consequences as a product of fair coaching practices.
Janeth Carrasco	Electrical Engineering	Dr. Jessica Houston Samuel Orozco Scholar's Undergraduate Research Experience (SURE)	Effect of Media Collection Frequency on Extracellular Vesicle Production in a Hollow-Fiber Bioreactor	Extracellular vesicles (EVs) are small lipid membrane-bound particles released by cells and involved in cellular communication and cargo delivery. These particles are of interest both for disease diagnostics and as gene and cargo delivery vehicles, specifically microvesicles, which bud from the cell membrane and range from 100–600 nm. Large-scale production using multiple flasks (2-D culture) is possible, but constitutive release produces low concentrations that are inefficient for demand. Hollow-fiber bioreactors (HFBs), where cells are maintained on fibers within a tube, allow sustained long-term production without passaging, reducing hands-on time and increasing yield. Modeling such systems is challenging without sufficient data, including the effects of extra-capillary space (ECS) media changes. Here, we established an HFB and compared EV production under two collection schedules: three times per week versus once weekly. EVs were stained and analyzed via flow cytometry; concentration and size were measured by dilution series and nanoparticle tracking. Less frequent collection reduced total concentration but increased tetraspanin abundance, and reactor viability declined, highlighting the importance of regular maintenance.

Angel Carrillo	Computer Science	Dr. Ayman Alzaid	Scaling Nearest Neighbor Search: Optimizing Scikit-Learn with Hierarchical Navigable Small World (HNSW) Graphs.	This research investigates the scalability limitations of the KDTree data structure within the Scikit-Learn machine learning library. While KDTrees offer efficient O(\log n) retrieval in low-dimensional spaces, performance degrades toward O(n) as dimensionality increases, creating a significant bottleneck for large-scale data analysis. To address this, this study proposes the implementation of a Hierarchical Navigable Small World (HNSW) graph. By utilizing a multi-layered proximity graph, HNSW achieves high-speed, approximate nearest neighbor search that maintains logarithmic scaling even in high-dimensional environments. Benchmarking demonstrates that while HNSW introduces a minor trade-off in exact precision, it provides an exponential increase in processing speed for massive datasets. This project illustrates how swapping traditional tree structures for graph-based navigation can drastically improve the efficiency of real-world machine learning pipelines.
Belen Carrillo	Communication Disorders	Dr. Megan Young Honors Capstone	Employers' Hiring Decisions for Candidates Who Stutter: A Reflexive Thematic Analysis	This study explores employers' perspectives regarding hiring an individual who stutters for a role with high communication demands. Stuttering is a speech disorder characterized by disruptions in the forward flow of speech that is often associated with stigma, particularly in employment settings. A sample of 270 employers participated in an experimental study to examine how self-disclosure of stuttering and high communication competence influence employers' hiring decisions. After being randomly assigned to view a video of a virtual hiring interview, participants indicated whether they would hire the candidate. Afterwards, participants answered two open-ended questions to explain their hiring decision. Reflexive thematic analysis was used to analyze these responses. Themes reflecting decisions not hire include stuttering is not suitable for client/customer-facing roles and inefficiency. Themes reflecting decisions to hire the candidate include candidate resilience and disability discrimination is unjust. These findings will inform future educational stuttering interventions for employers.
Miranda Y. Carrillo-Moreno, Evelyn Grossman, Jisselle Ozaeta, Kate Padilla, Ruwaa Al-Aqtash	Finance Biology Early Childhood Education & Psychology Animal Science- Human Animal Interaction Civil Engineering	Prof. Shawn Werner Honors 388V. Leadership and Society	Mesilla Valley Community of Hope Fundraiser	This project was designed with the goal of raising funds and collecting goods for the nonprofit organization Mesilla Valley Community of Hope. We selected the Community of Hope as we feel strongly about their mission to provide aid and support for those facing homelessness. They understand the importance of not only providing support in times of need but also providing a second chance for people to get back on their feet. Monetary donations will be collected through tabling on the New Mexico State University campus, while tangible donations will be collected via a goods drive stationed at a local K-12 school.
Emery Carter	Agricultural Biology	Prof. Shawn Werner Honors Capstone Internship	Special Needs Dentistry in New Mexico	My project is meant to encourage students interested in dentistry to pursue the path of special needs dentistry. Dentists in New Mexico are rare enough as it is, but special needs dentists even more so, with there being only one in the south east half of the state. This project will bring more awareness to the necessity of special needs dentists, as well as the requirements to get there.
Celeste Cervantes	Elementary Education and Spanish	Dr. Anne Hubbell Honors Capstone	Bringing Youth to NMSU	This capstone project explores whether early recruitment in elementary school increases students' interest in attending college. It examines NMSU's Annual "Day as an NMSU Student" program, where 110+ fifth graders from Sonoma Elementary experience college life. This program began in 2017 but has not been evaluated for long-term effectiveness. Teacher interviews will be used to assess whether exposure before middle school influences college aspirations, especially among first-generation students. Data will be collected in

				April 2026 and analyzed by May 5th to determine if early college experiences encourage long-term educational goals. This assessment will aid in future program planning and implementation.
Aurelleia Chavez	Chemical Engineering	Dr. Catherine Brewer RIO NM STEAM Fellows	Determination of Phase Diagram and Crystallization Behavior of a CO_2–H_2O–Acetic Acid ternary System	Co-Authors: Aurelleia Chavez, Asher Barriero, Moises Gutierrez, Dr. Catherine Brewer Understanding phase behavior in a ternary carbon dioxide–water– an organic acid system is essential for improving sustainable metal recovery processes. This study focuses on constructing a phase diagram for the supercritical CO_2–H_2O–acetic acid ternary system using a phase analyzer to investigate vapor–liquid–liquid equilibrium and crystallization behavior. Acetic acid, a simple carboxylic acid, has potential as a biodegradable chelating agent for metal ions such as gadolinium (Gd), which is currently being recovered from coal fly ash in related research. Although these studies provide foundational thermodynamic data, gaps remain in understanding crystallization behavior and its application to selective metal recovery. By expanding available phase data and analyzing crystallization trends, this research contributes to the development of sustainable separation strategies using simple organic acids.
Ethan Cichon	Physics	Dr. Boris Kiefer Sandia National Laboratories	In(As, Sb) Alloys for Improving Infrared Detector Performance	Co-Authors: Cichon, E. (1), Schultz. P. (2), Anderson, E. (2), Kiefer, B. (1) Infrared detectors operate by converting incoming infrared (IR) radiation into a detectable electrical current. The radiation that can be detected through this process is locked in by the electronic properties of the host material. This material specificity severely limits the range of radiation that can be detected with a selected material. Our goal is to address this restriction by altering material properties through alloying InAs with Sb. In this project, we will use Density Functional Theory (DFT) to model In(As, Sb) alloys with ~10% Sb. We will compute alloy formation energies for random In(As, Sb) alloy configurations and analyze corresponding short-range-order parameters. The results will give insights into local compositional variability in the randomly chosen In(As, Sb) alloys. Since IR absorption depends on the charge density, which in turn depends on the atomic species distribution, our results form an important step toward a better understanding of Sb alloying for tuning the IR absorption characteristic of InAs. SNL is managed and operated by NTESS under DOE NNSA contract DE-NA0003525.
Jade Clark	Chemistry and Chemical Engineering	Dr. Corey E. Frank McNair Scholars Program	Crystal Quality vs Yield: Determining the Optimal Synthesis Method for an Unconventional Superconductor	The unconventional superconductor UTe_2 has attracted significant international attention since its identification as a candidate for spin-triplet superconductivity in 2018. This unusual pairing mechanism may enable the realization of non-Abelian quasiparticles, which could play a critical role in the development of topological quantum computing. To date, most studies have focused on the physical properties of individual crystals rather than the optimization of synthetic methods. From a chemical perspective, an important question remains: how can the synthetic yield of UTe_2 be maximized while maintaining high crystalline quality?
Joseph Coil	Marketing-Advertising	Dr. Kevin Trainor Honors Capstone Strategy and Policy Course	Facility Strategy and Consumer Behavior: Comparing Two Planet Fitness Locations	This comparative case study examines how localized management strategies influence consumer behavior, retention, and competitive positioning within the two Planet Fitness locations in Las Cruces, New Mexico. Using customer interview data and qualitative insights from regional and site-level management, the study explores how each location adapts its target market in a college-driven environment. Findings show that management emphasizes affordability,

				cleanliness, and consistency while also responding to increased demand from younger and more serious lifters through strength-focused equipment upgrades. The study also analyzes how behavioral observation and usage tracking inform operational decisions, including equipment reallocation and facility redesign. In addition, it considers how differences in atmosphere, perceived "vibe," operational constraints, and localized marketing efforts shape member experience and strategic growth. Overall, the project demonstrates how location-specific decisions within a standardized national franchise can meaningfully affect customer perception, retention patterns, and competitive positioning.
Aimee Coletti	Biology	Dr. Teri Orr Honors Capstone	Social Behavior in *Artibeus Jamaicensis*	*Artibeus jamaicensis* (the Jamaican Fruit-Eating Bat) is known to have a harem-style breeding system; a mating system involving a large group of females associated with one primary male. However, the individual behaviors that influence mate selection and establish harem groups are unknown. To examine these behaviors, video footage was coupled with a Passive Integrated Transponder (PIT) tag identification system. Fourteen, mixed-sex, captive bats were monitored in two simultaneous trials. Continuous recording on four cameras occurred daily from 12am to 11:59pm for seven days. Interactions between individuals were placed in five established categories by three observers blind to bat identities. Here we present our preliminary findings to expand the current understanding of individual behaviors, mate choice, and fitness trade-offs in mammal breeding systems.
Sebastien Comtois	Fisheries and Wildlife Conservation Ecology	Dr. Joe Youtz, and Dr. Jennifer Frey NM Agriculture and Experiment Station ACES Undergraduate Research Scholar Program	Efficacy of Acoustic Recording Units and AI Classifiers for Surveying Rare Small Mammals in New Mexico	The research question asks whether acoustic recording units (ARUs) combined with AI models can reliably detect vocal activity of rare montane squirrel species in access-limited landscapes such as White Sands Missile Range (WSMR). Methods included ARU deployment at 28 sites from June–September 2025 to capture background soundscapes and target species vocalizations. These recordings were then analyzed using classifiers trained on verified recordings from online acoustic libraries (Macaulay Library and Xeno-Canto), and opportunist recording events. BirdNET models were trained and tested, with manual validation of detections in Raven Lite. Findings show successful classifier development for three target species, the Oscura Mountains Colorado Chipmunk, Texas Antelope Squirrel, and Rock Squirrel, with classification accuracies exceeding 95% with a subset of 14 vocalizations matching candidate calls. These results demonstrate that passive acoustic monitoring can provide an additional non-invasive approach for monitoring rare small mammals in restricted-access regions.
Jaime Dominguez	Mechanical Engineering	Dr. Fangjun Shu	Adapters for measuring forces on a wing in a low-speed wind tunnel	When measuring load factor on a wing there are three things we need to consider. Drag, lift and weight. The goal of this project was to measure and study the effects that these things have on the airfoil. The sensors we are going to be using are Micro Load Cells and the specific one we chose have a uncertainty of 0.01N. This means that the sensor is very precise and has a small margin of error. We are using two of these sensors as this allows us to measure both lift and drag of the wing. The actual tunnel is a low speed wind tunnel and allows us to measure these forces with relative ease. The wing itself will not be straight and level, instead it will be placed at an angle and mounted on top of a pole in the wind tunnel
Emily D. Earnest	Biology and Spanish, minors Chemistry and Pre-Health	Dr. Graciela A. Unguez Honors Capstone	Alternative splicing in electric fishes: detection of transcript variants of ube2d3 within the context of the electric organ and skeletal muscle tissues	In electric fishes, electric organ (EO) cells called electrocytes derive from skeletal muscle (SM) cells. How electrocytes acquire and maintain distinct function from SM remains unresolved. Expression studies suggest the involvement of post-transcriptional events in the specialization of the EO. This study focuses on differential alternative splicing between EO and SM tissues of three electric fish species. Splicing detection software predicted disproportionate use of variants between the two tissues across multiple genes, including the gene ube2d3. Qualitative PCR data show similar transcript

				variant expression patterns between their EOs and SMs in *Eigenmania virescens* and *Brienomyrus brachyistius* - patterns not shared with *Sternopygus macrurus*. These transcript variants are highly conserved across vertebrates and invertebrates, suggesting an important role in the ubiquitin-proteasome system (UPS). However, the specific roles of these transcripts are unknown. These results may highlight a distinction in UPS regulation for *S. macrurus* compared to other electric fish.
Belicia Esquivias	Mechanical Engineering	Dr. Luke Nogales Engineering Capstone Project - Honors Capstone	Polymer Welding of Nylon-12 Additively Manufactured Specimens Using Rotary Friction and Hot Plate Welding	Additive manufacturing has enabled the production of complex polymer components, however, joining these components remains a challenge when structural integrity is required. This research investigates welding methods for Nylon-12 (PA12) additively manufactured specimens to determine effective techniques for producing strong polymer joints. Two welding methods, hot plate welding and rotary friction welding, were evaluated using standardized tensile specimens fabricated from Nylon-12 material. Experimental testing was conducted to assess weld strength and failure behavior of the welded interfaces. Mechanical testing results indicated that both rotary friction welding and hot plate welding successfully produced bonded joints capable of sustaining significant tensile loads. Failure analysis provided insight into weld performance and the quality of the bonded interface. These findings contribute to the growing body of research on polymer joining techniques for additively manufactured materials and can highlight practical welding methods that may support the stuctural use of Nylon-12 components in engineering applications.
Charley Fletcher	Human Nutrition and Dietetics	Dr. Sarah Ruiz	Investigating the relationship between PCOS symptoms and the quality of diet and lifestyle	Polycystic ovarian syndrome (PCOS) is a hormonal disorder affecting women of reproductive age, often diagnosed from symptoms such as ovarian cysts, insulin resistance, and high androgen levels. It is accompanied by co-morbidities such as obesity, metabolic syndrome, and diabetes. Diet and lifestyle play integral roles in the management of PCOS symptoms. This study will aim to find the current association between diet quality and perceived symptom severity among women diagnosed with this condition. The research for this study will be completed using secondary data analysis. The findings will help inform the design of a future cross-sectional survey examining diet, lifestyle, and symptom management for women with PCOS. It is anticipated that the results will show a positive correlation between poor diet quality and a negative perception of PCOS symptom management. This research will provide an important foundation of information for possible interventions and nutrition recommendations for women diagnosed with PCOS.
Logan Flowers	Cybersecurity and Physics	Dr. Juie Shetye	Solar Weather Effects on Low Earth Orbiting Satellites	In May of 2024, the Sun unleashed a series of powerful solar flares and coronal mass ejections, resulting in powerful charged particles being hurled towards Earth at incredible speeds. The result was disastrous, with a major geomagnetic storm causing disturbances in the Earth's upper atmosphere affecting key satellite infrastructures. This project aims to investigate the impacts on a select of Low Earth Orbit (LEO) satellites that were affected by the storm with a focus on atmospheric drag, ionospheric disturbances, and loss of satellite signal. By integrating neutral and electron density data taken from Swarm, Cosmic-2, GNSS, and IONEX files via the CDDIS network, along with space weather measurements from the SDO, this study shows the interactions between space weather and atmospheric extremities which contributed to satellite orbital decay. Observed Starlink TLE data were analyzed alongside SP3xCOM products from the Swarm A, B, and C satellites which contain precise center-of-mass position and velocity time series for each satellite. With the number of LEO satellite operations increasing at a never ending rate, the need for real-time monitoring during each solar cycle and critical monitoring during solar maximums is a necessity to safeguard satellite infrastructure.

Caitlin Foster	Anthropology, minor Archaeology	Dr. Thomas Hart Honors Capstone	Preliminary Macro-botanical Analysis of Charcoal and Seed Remains from Aguada Lagunita Elusiva and Depression A of La Milpa East	Co-authors: Dr. Estella Krejci-Weiss (University of Vienna), Dr. Michael Brandl (Austrian Archaeological Institute), & Dr. Fred Valdez (University of Texas at Austin) This study contributes to paleoethnobotanical research within late Classic Maya (AD 900) archaeology by examining macro-botanical remains from Aguada Lagunita Elusiva and Depression A of La Milpa East. Aguada Lagunita Elusiva is located approximately 5km east of La Milpa Center in northwestern Belize. The sites are managed through the Programme for Belize Archaeological Project and are the focus of ongoing research directed by Dr. Estella Weiss-Krejci (University of Vienna, examining the function and use of depressions (manmade or naturally occurring). This study presents preliminary macro-botanical findings from 6 soil samples collected at Aguada Lagunita Elusiva during the 2008, 2009, and 2010 field seasons by Dr. Estella Weiss-Krejci with Dr. Michael Brandl. Analysis focuses on the quantity and distribution of charcoal and carbonized seeds recovered. While no definitive evidence of Capsicum spp. was identified at Aguada Lagunita Elusiva, eight unidentified seed types were recovered and are currently undergoing further analysis. Macro-botanical analysis from Depression A at La Milpa East remains ongoing and may provide additional evidence for the presence of Capsicum spp. and other plant taxa. These findings may contribute to broader discussions of Late Classic (AD 900) Maya diet and cultural continuity by exploring connections between ancient Maya foodways and those of contemporary Maya communities.
Carina Frisch	Environmental Science	Prof. Shawn Werner	Water right reconciliation within the Elephant Butte Irrigation District	Carina Frisch spent 9 months working as an intern for the Office of the State Engineer, District 4. During her time there Carina learned the different functions of the office and was given a project centered around combined water rights. Her work is collected here in this presentation.
Gabi Frost	English	Dr. Tracey Miller-Tomlinson Dr. Fabrizio Ciccione	The Politics of Words and How Language Reflects Contemporary Values	In this paper, I look at four different keywords that describe characteristics and values of contemporary society. I look at the words hyperconnectivity, efficiency, division, and power. I model the paper after Roland Barthes' short essays in Mythologies to show how the changing meaning of a word hides modern ideologies of contemporary society. I begin each section by looking at the etymology of each word. By considering the word's history, I show how language evolution exposes modern ideological structures that shape contemporary society. I show how a shift in a word's meaning exposes a shift in culture and ideologies. The language people use functions to conceal and normalize ideologies of contemporary society. Drawing from academic essays, philosophy, two novels, and one film, I analyze how these keywords operate within modern language and how their meanings reveal the values and assumptions that influence contemporary life.
Dante Gabriel Galaz and Marissa Montoya	Civil Engineering	Dr. Jorge Garcia Engineering Capstone Design Project	Water System Modeling, Pumping, and Fire Supply Planning for Spaceport America	This project water modeling system, pumping, and fire supply plan for the New Mexico Spaceport Authority (NMSA) Spaceport America located in Sierra Country, New Mexico. Spaceport America currently does not utilize a water modeling system, and is therefore unable to simulate different scenarios related to water demand. Providing a model will aid them in future expansion and predicting system behavior. Additionally, some pipelines on site are experiencing water hammer issues which can be better visualized through the use of a hydraulic model. This project will also include recommendations for a fire protection supply strategy including a fire storage tank, booster/fire pump station, dedicated fire loop, and specified separation of domestic and fire supply lines.
Shawn Galloway	Aerospace and Mechanical Engineering	Dr. Shabnam Mohammadshahi	Flow Characteristics of Free and Impinging	Fluidic oscillators generate self-sustained oscillating jets without moving parts by utilizing the Coanda effect with fixed geometries, making them attractive for flow control and

			Supersonic Oscillating Jets	mixing applications. While these devices have been widely studied in incompressible flows, their behavior under supersonic conditions and surface impingement remains largely unexplored. This work experimentally investigates free and impinging supersonic oscillating jets produced by a double-feedback fluidic oscillator. High-speed Schlieren imaging is used to visualize density gradients and unsteady shock structures over nozzle pressure ratios of 6–14 where is then used in Proper Orthogonal Decomposition (POD) is applied to identify dominant flow structures and oscillation characteristics. The results show that oscillation frequency remains nearly constant across varying pressure ratios, while shockwaves generated from the jet become more unstable from the impinging surfaces. These findings contribute to understanding compressible oscillating jets and their applications in high-speed propulsion and flow-control systems. This research work is supported by the NSWC Dahlgren Division under Grant No. N00178-25-1-0016.
Brandon Garcia-Arvizo	Civil Engineering	Dr. Zhe Wan Jannatul Ferdous NM AMP Undergraduate Research Scholars (URS)	Characterization of Portland Limestone Cement	Portland Limestone Cement (PLC) has seen increased use across the USA, with 5–15% replacement of typical Portland cement in accordance with ASTM C595. Replacing cement clinker with limestone reduces energy costs and promotes sustainability by lowering CO_2 emissions, aligning with the industry's environmental goals. As its use increases, issues such as durability, workability, and field performance have been identified. Research is underway to balance limestone with supplementary cementitious materials to increase limestone content without affecting performance. Using SEM and LDPA, the morphology and particle-size distribution of the cement will be analyzed to provide insight into the physical factors affecting concrete performance. EDS will analyze the chemical composition, XRD will determine mineralogical phases and crystalline structures, while XRF will analyze chemical oxides to provide insight into chemical factors affecting concrete performance. This research project aims to characterize the physical and chemical properties of Portland limestone cement to improve its application, optimize performance, and identify a strength cutoff.
Abigail Garcia-Serrano	Human Nutrition and Dietetic Sciences	Dr. Sarah Ruiz	The Role of Nutrition in Preventing Prediabetes	Prediabetes is a medical condition characterized by having an elevated blood glucose level that is higher than normal but not within the range of type 2 diabetes. Prediabetes is a growing public health concern because it significantly increases the risk of developing not only type 2 diabetes but also cardiovascular disease. Nutrition and lifestyle facts are critical in the prevention of not only prediabetes but also type 2 diabetes. Applied nutrition research focuses on how nutrient intake, dietary patterns, and lifestyle behaviors can help regulate blood glucose levels and reduce the progression of the disease. Diets such as the Mediterranean and DASH diets, as well as increased fiber intake, can help slow the progression of prediabetes. We need to understand the impact of nutrition not only on prediabetes but also on type 2 diabetes to guide prevention strategies and improve long-term health.
Genaro Garza	Industrial Engineering	Dr. Chaitanya Mahajan	Exploring Bolt Tolerances and Failures: A Proposed Investigation into Thread Clearances and Manufacturing Tolerances	The structural integrity of mechanical systems relies on the precise fit of threaded fasteners. However, the optimal balance between manufacturing tolerances and functional clearances remains a challenge. This research under Dr. Chaitanya Mahajan, proposes to evaluate how variations in thread geometry influence joint stability. The project will analyze the differences between high-precision tolerances, which increase manufacturing costs, and looser clearances that simplify assembly but risk premature wear. By identifying the gaps that lead to stress concentrations or fastener seizure, this study will

				contribute to optimizing thread design. Ultimately, this research aims to improve manufacturing standards, ensuring that industrial components maintain performance and safety under high-stress conditions, providing a foundation for more reliable and cost-effective engineering practices.
Emilio Gonzales	Range Science	Dr. Santiago Utsumi	Calibration of near infrared spectroscopy to predict forage quality of key desert grasses	This research contributes to rangeland livestock management by developing a calibration of near-infrared spectroscopy (NIRS) to determine nutritional quality of key forage species in arid rangelands. Traditional estimation of forage nutritional quality through wet chemistry analysis is expensive and time consuming. This project aims to apply the calibrated NIRS approach that will enable faster and cost-effective evaluations of forage nutritional value. The project is expected to support the development of an external service for livestock producers and land managers to monitor pasture quality. Many forage samples were collected throughout the year and prepared for scanning by NIRS equipment and a subset of the samples were used for wet chemistry and NIRS analysis. This method allows for the NIRS spectra to be integrated with the reference results to build and validate a calibration model. The project will contribute to new practical tools and technologies that enhance livestock production in arid rangelands.
Alyssa Granados	Agricultural Economics & Agricultural Business	Dr. Frannie Miller Honors Capstone & LEADING Program Project	Manure Shed in New Mexico	Manure management is a growing challenge in arid agricultural regions where high livestock density, limited land availability, and declining water resources intersect. The concept of a manureshed, the spatial and management system linking animal feeding operations to surrounding lands capable of utilizing manure nutrients offers a useful framework for understanding how nutrients move across landscapes. In New Mexico, manure management decisions are shaped not only by agronomic needs, but also by transportation costs, regulatory requirements, water scarcity, and market limitations. Stakeholder experiences suggest that while manure has agronomic value, the ability to move it efficiently and safely remains a central constraint. Understanding these logistical and policy challenges is critical for developing effective, regionally appropriate manure management strategies.
Frederick Guerrero and Bryanna Villalva	Biochemistry	Dr. Erik Yukl	The Effects of Metal Exposure on MDH2 Ability to Catalyze the Reversible Reaction of Malate to Oxaloacetate	Malate dehydrogenase 2 (MDH2) is an NAD-dependent oxidoreductase that catalyzes the reversible conversion of malate to oxaloacetate in the tricarboxylic acid cycle, producing NADH for oxidative phosphorylation. This study investigates how exposure to metal ions affects MDH2 catalytic activity in vitro. Purified E. Coli MDH2 will be incubated with environmentally relevant metals including arsenate (As5+), lead (Pb2+), and cadmium (Cd2+). Enzyme activity will be measured spectrophotometrically by monitoring NADH absorbance at 340 nm, with fluorescence assays used as a secondary method to confirm changes in NADH signal. Initial velocity data will be used to determine kinetic parameters and characterize potential inhibition mechanisms. Additionally, LC-MS/MS analysis will be performed to identify potential metal-binding or modification sites within MDH2 peptides. This work aims to determine whether metal exposure directly inhibits MDH2 activity and provide insight on molecular mechanisms linking environmental metal exposure to disruptions in cellular metabolism. (Research is still ongoing, abstract will be edited once conclusion is finalized)
Valerie Guha	Biochemistry	Dr. Ivette Guzman	Does milk choice affect how well we absorb plant nutrients?	Plants produce phytonutrients to protect themselves against environmental threats. These have various health benefits in humans. The phytonutrients studied in this project - carotenoids, chlorophylls and tocopherols – are all lipid-soluble. Our bodies use a micellarization process for absorption, which may be influenced by co-ingested fats and oils. The objective was to compare the bioaccessibility of phytonutrients in three Peach Melba recipe versions, prepared with evaporated, almond, and goat milks. It was hypothesized that differences in milk fat composition and structure alter

				phytonutrient bioaccessibility. Meals were digested using an in-vitro method. Eleven phytonutrients were extracted and measured using a High-Performance Liquid Chromatograph to calculate percent micellarization. The Peach Melba recipe containing almond milk showed the highest percent micellarization among the three tested versions, suggesting milk composition influences phytonutrient bioaccessibility in the human gut.
Eliha Hernandez	Microbiology	Dr. Graciela Unguez NIH Undergraduate Research Training Initiative for Student Enhancement (U-RISE) & McNair Scholars Program	Detection of transcript variants of tp63 in the skeletal muscle and electric organ of electric fishes	Co-Authors: Eliha M. Hernandez, Emily D. Earnest, Sandra Rios Alba, Franchesca Ortega, and Dr. Graciela A. Unguez *Sternopygus macrurus* contains a myogenic electric organ (EO) that creates an electric field, allowing environmental navigation and interactions. Studies comparing adult skeletal muscle (SM) and EO of *S. macrurus* unveiled few genes were differentially expressed between these tissues, despite different cellular structures and functions. How the EO derives and maintains its phenotype from its muscle precursors is unknown, but alternative splicing may take part. We investigate the disproportional usage of splicing variants between the SM and EO of *S. macrurus* and additional electric fishes, *Eigenmannia virescens* and *Brienomyrus brachyistius*. Published research demonstrates tp63 transcript variants, TAp63 and ΔNp63, have important roles in muscle development. In the EO and SM of these species, transcript variants were detected and qualitative PCR data shows tissue-specific expression patterns of these isoforms only in *S. macrurus*. Thus, post-transcriptional regulation may play a role in cell identity and functions differences between *S. macrurus* EO and SM.
Emma Hernandez	Elementary Education & Spanish Foreign Language	Ms. Rebekah Jaramillo, Dr. Phame Camarena Honors Capstone	I appreciate you…	This research was done as part of building classroom community in the classroom of my student residency. This has been over the course of the whole school year and has been a classroom project with my students and colleagues. Students are assigned someone else in the classroom to observe for a week and find something kind that they did to write it down and recognize them for. At the end of the week the notes are read out loud to the class and they get to keep them. This builds student accountability, a positive working environment, and motivates students to talk about the positive things they see their peers doing.
Julianna Hernandez	Anthropology, Culture & Language	Dra. Judith Flores-Carmona McNair Scholars Program, Professionalism and Practice in Anthropology (ANTH 399)	The Texas Miracle that Left Children Behind: A Retrospective on Standardized Testing and Linguistic Segregation in El Paso, Texas	I'm a Chicana at the intersection of identity. My cultural heritage drives my curiosity and pursuit to bring marginalized border students' stories to light. The adverse effects of standardized testing, particularly in El Paso, have affected the way the community views education within the city. While I did benefit as an English speaker, my ESL classmates were placed at a disadvantage by the people entrusted with their education. It is in my experience as a student with standardized testing from first grade in 2001 to my graduation in 2013 that my research examines and seeks to discuss.
Garrett Hitchcock	Kinesiology - Exercise Science	Dr. Katie Hirsch-Agnew	Investigating Intercollegiate Athletes' Preferences for Formal vs. Informal Leader Behaviors	Athlete leaders are athletes who influence their team members towards collective goals, including formal leaders (i.e., individuals elected or assigned to a leadership role) and informal leaders (i.e., individuals who influence teammates without an official leadership title; Loughead et al., 2006). The purpose of this study was to investigate athletes' preferences for the amount of leadership received from formal leaders and informal leaders. Participants included 238 intercollegiate athletes in North America. Participants reported how often they want formal leaders and informal leaders to exhibit 12 behaviors measured in the Differentiated Transformational Leadership Inventory (Callow et al., 2009) and Leadership Scale for Sports (Chelladurai & Saleh, 1980). Results will be presented comparing across leader type (e.g., preferences for formal leaders to exhibit social support more than informal leaders) and between behaviors (e.g., autocratic behavior is preferred least often). The findings can support athlete

				leadership development and inform decisions for selecting leaders.
Mariah C. Holmes-Martinez	Counseling and Community Psychology	Dr. Leah Barbati-Dajches McNair Scholars Program	Digital Self-Presentation, Sexualization, and Empowerment: Exploring Agency and Internalized Appearance Pressures Among College-Aged Gen Z Women	Social media platforms are digital environments where appearance-focused and self-sexualizing content is widely circulated and socially rewarded. Creating and engaging with such content is a prominent activity among young women (18-29 years old), which may increase self-objectification and upward social comparison, processes that can influence body image and emotional well-being in complex ways. The current cohort of young women (Gen Z) is the first generation raised alongside social media platforms. Thus, Gen Z women likely have had greater opportunities to experience and engage with appearance-focused and self-sexualizing behaviors on social media during critical developmental periods. However, limited research centers on Gen Z women's own interpretations of the relationship between these experiences, particularly online self-presentation, sexual agency, and internalized appearance-based pressures shaped by online communities. To address this gap, semi-structured interviews with 20-30 Gen Z young women will be conducted and analyzed using thematic analysis.
Lauren Hunter and Lily McMillan	Communication Disorders	Dr. Blake Rafferty Honors Capstone	Neural Oscillatory Responses to Code-Switching in Spanish–English Bilinguals	In this study, we investigated neural oscillations associated with code-switching in Spanish-English bilinguals. Participants listened to three short stories containing embedded code-switches while electroencephalography (EEG) data was recorded. We analyzed fluctuation in beta (14-30 Hz) bands, which have been linked to top-down prediction to help the brain process incoming information, and theta (3.5-7.5 Hz) bands, which have been linked to executive control. EEG data was segmented at individual word onsets, allowing us to examine oscillatory activity during the processing of switched and non-switched words. Non code-switched words were associated with stronger beta-band desynchronization compared to code-switched words, consistent with the idea that listeners generate stronger predictions when speech continues in a single language. When a code-switch occurred, these predictions appeared to be disrupted, resulting in reduced beta desynchronization. In contrast, theta sychronization was higher for switched words than non code-switched words suggesting increased processing demands.
Hank Hutcheson	Agricultural Biology	Dr. Caleb Hubbard Rion Nm Stem Fellows	Evaluating Pupal Parasitoid efficacy against Secondary Screwworm (*Cochliomyia macellaria*) as a Proxy for New World screwworm Management	The New World screwworm (NWS), *Cochliomyia hominivorax* (Coquerel, 1858), is an obligate parasite of vertebrates and one of the most destructive pests of livestock in the Americas, causing billions of dollars in damage annually. The sterile insect technique (SIT) was a major achievement for eradicating NWS, but recent incursions into Florida and movement toward Texas highlight ongoing vulnerabilities and the threat of reintroduction. Few resources exist for controlling NWS beyond SIT, and no natural predators have been identified. In this study, five commercially available fly pupal parasitoids were evaluated for effectiveness against the secondary screwworm (*Cochliomyia macellaria*), a native blow fly species used as a proxy for NWS. Emergence rates of secondary screwworms, parasitoid emergence, and true parasitism determined through pupal dissection were recorded. Findings may inform future NWS management and will be presented and discussed.
Emam Jiron	Food Science and Technology, minor Chemistry	Dr. Gonzalo Miyagusuku-Cruzado ACES Undergraduate Research Scholar Program	Sustainable food colorant production from winery agri-food waste.	Regulatory constraints and consumer demand have pushed the food industry to replace all synthetic food dyes with natural alternatives. Pyranoanthocyanins, pigments derived from anthocyanins, offer a promising solution due to their superior stability and desirable color properties. The purpose of this experiment was to evaluate pyranoanthocyanins formed from grape pomace anthocyanins in commercial food systems to replace synthetic red and yellow colorants. Results showed that anthocyanins were successfully transformed into pyranoanthcyanins. Pigment concentration was quantified at pH 1.0 and applied to commercial soft drinks. Colorimetric

				results showed that pyranoanthocyanins exhibited a hue that resembled a mixture of FD&C Red 40 and Yellow 6. Shelf-life studies are currently underway to evaluate the stability of pyranoanthocyanins compared to their anthocyanin precursors. This project provides a sustainable colorant alternative that reuses food waste and produces value-added colorants that can be used by the food industry.
Amanda Judge	Psychology	Dr. Julia Soares Honors Capstone	Generative AI is Affecting Children's Cognitive Functions	Generative AI is being implemented into schools to make education more personalized for young learners, but we don't know the long-term effects on human cognition and memory, especially not in children who are using this system during their critical periods of development. Current research looks at technology's influence on older populations, so I pulled relative research to make speculative judgments about how Generative AI will affect children's cognitive functions in the future. I looked specifically at working memory and attention-span/stamina with regards to classroom function and academic achievement to review if the risks do outweigh the benefits of using this new system with young learners.
Michelle Kass	Psychology, minor Human Biology	Dr. Michael Hout Dr. Giovanna Del Sordo Discovery Scholars	Mixed Signals: How feedback cues shape memory correction	In cognitive research, feedback has been shown to influence learning and memory. Error and corrective feedback can trigger processes of memory correction, whereby previously encoded information is updated or modified. However, little is known about how the perceptual properties of feedback, such as color, may influence memory correction processes. This study investigated matched and mismatched feedback on memory performance. Participants completed a computerized generative word task, in which they were given categories ("Animal") and generated a word that fit the presented category using a stated fill-in-the-blank cue ("_at"). Following each response, feedback was presented in a matched format (correct = green; incorrect = red) or a mismatched format (correct = red; incorrect = green). A recall test was given immediately after the task to measure memory retention of the words presented earlier. This study aims to understand whether learning and memory retrieval are impacted by the color of feedback.
MiKayla Klinger	Animal Science	Dr. Ryan Ashley, Stanley Cheng, and Amanda Madrid RIO-NM STEM Fellows Program	Effects of Treated Produced Water on Murine Food and Water Consumption	M. L. Klinger, S. J. Salopek, R. L. Ashley Water scarcity in New Mexico has increased interest in alternative water sources for agriculture. This study investigates whether treated produced water (TPW), a byproduct of oil and gas extraction, influences food and water consumption in a murine model. Mice were assigned to one of three groups: two receiving different types of TPW and a control group receiving RO water. Animals were maintained on their designated water source throughout the study, and food and water intake were monitored and recorded regularly. Preliminary observations suggest differences in consumption patterns is minimal. These findings provide insight of TPW on animal health and management, emphasizing the need for further investigation before its use in agricultural systems.
Mason Kokovay, Chantay Herrera, Quinn Marshall	Industrial Engineering Art & English Linguistics	Dr. Tracey Miller-Tomlinson	*The Agora* (2026)	*The Agora* is a student-edited, non-technical journal of undergraduate research and creative activity. It is a joint initiative of the Center for Undergraduate Research and Creative Activity (CURCA) and the NMSU Library.
Jose Lafon	Microbiology	Dr. Maria Castillo Undergraduate Research Training Initiative for Student Enhancement (URISE)	Comparative Analysis of Hemocyte Morphology and Behavior in Resistant and Susceptible Hemocytes from *Biomphalaria glabrata* upon Exposure to *Schistosoma mansoni*-Secreted Products	Schistosomiasis is a parasitic disease that affects ~200 million people and is caused by the flatworm *Schistosoma mansoni*. This parasite uses the freshwater snail *Biomphalaria glabrata* as intermediate host. In this study, we are investigating two strains of *B. glabrata* snails, BB02, which is susceptible to the parasite, and BS90, which is resistant. Blood cells in the snails (hemocytes) are an important immune components in response to infections. Our goal is to understand why hemocytes respond differently across strains using microscopy to count cells and their spreading behavior on glass. Our hypothesis is that BB02 hemocytes will be inhibited by *S. mansoni* products resulting in less spreading

				compared to BS90 cells. Preliminary observations indicate that BS90 hemocytes exhibit greater spreading than BB02 hemocytes, suggesting that spreading may be related to a better immune response. Understanding host-parasite interactions could provide information to develop control measures for schistosomiasis.
Noel Lara	Animal Science	Dr. Jennifer Hernandez Gifford LEADING Program ACES UG Research Scholar Program	The effect of intra-ovarian WNT3A on circulating luteinizing hormone concentrations in beef heifers	Co-Authors: Noel Lara[1], Bahaa H. Aloqaily [2], Dr. Jennifer Hernandez Gifford[3] The WNT signaling pathway regulates ovarian follicular development and steroid hormone synthesis. This study evaluated whether intra-ovarian WNT3A administration during the follicular phase alters reproductive events in beef heifers. Fourteen Angus heifers were synchronized to estrus using a select sync plus CIDR and were assigned to control or WNT3A treatment groups and monitored for estrus behavior, ovulation timing, estrus intensity, and serum estradiol concentrations. WNT3A-treated heifers showed no significant difference in estradiol concentrations ($P = 0.34$), but had delayed onset of standing heat ($P = 0.003$), reduced estrus intensity ($P = 0.017$), and prolonged intervals to ovulation ($P = 0.008$) compared to controls. These findings suggest that intra-ovarian WNT3A alters reproductive timing in beef heifers. Ongoing radioimmunoassay analysis of LH will help determine whether these effects are associated with altered circulating luteinizing hormone concentrations.
Alejandro Lazo-Loya	Biochemistry	Dr. Kevin Houston	IGFBP4 mediates invasion in triple-negative breast cancer through regulation of TGF-β signaling	Metastatic progression in triple-negative breast cancer (TNBC) remains a major clinical challenge. Preliminary data indicate that siRNA-mediated knockdown of insulin-like growth factor binding protein 4 (IGFBP4) reduces TGF-β receptor 2 (TGFBR2) levels, suppresses downstream TGF-β signaling, and causes a reproducible decrease in invasive capacity in transwell invasion assays. TGF-β signaling is a well-established driver of breast cancer invasion and metastasis, yet the upstream mechanisms regulating this pathway in TNBC are not fully understood. To address this gap, quantitative PCR, western blotting, and IF microscopy will be used to determine how changes in IGFBP4 expression influence downstream TGF-β signaling and invasive behaviors. The highly invasive TNBC cell lines MDA-MB-231 and BT-549 will serve as model systems for this study. This project will define the mechanisms linking IGFBP4 to TGFBR2 regulation and invasion, providing clinically relevant mechanistic understanding of invasion-associated pathways in aggressive breast cancer.
Luis Diego Lazo Loya	Biochemistry	Dr. Amanda K. Ashley URISE	Evaluating the effects of cannabinoid derivatives on cell proliferation and toxicity	Cannabidiol (CBD) mediates inflammatory signaling. We synthesized biologically derived derivatives of the (+)-abnormal scaffold CBD (abnCBD) that, according to the literature and preliminary studies, may be more potent at mitigating inflammation. These derivatives were designed based with increasing carbon tail length mimicking that of the phytocannabinoids cannabidiol and cannabidiphorol, with the hope of producing an effect similar to that of naturally occurring CBD. Our objective is to assess if proliferation and motility are diminished in triple-negative breast cancer lines (TNBC). TNBC is a subtype of breast cancer that, although less frequently diagnosed, has a disproportionately high fatality rate. We expect that after assessing cellular proliferation, we will find LD50 values indicating toxicity in our derivatives is similar to naturally occurring CBD. Future studies will determine what receptor(s) drive phenotypes observed in our abnCBD derivatives.
Pierce Leachman	Physics	Dr. Jessica Houston Luke Sury	Optimizing Antibody/Fluorophore Concentration for Breast Cancer Cells Using Flow Cytometry	Breast cancer remains one of the most prevalent cancers worldwide, with estrogen receptor-positive breast cancer representing the most common subtype. Tamoxifen is widely used as a first-line treatment for ER+ breast cancer. However, many tumors develop resistance, reducing its therapeutic effectiveness. Identifying biomarkers associated with

				tamoxifen resistance has the potential to improve patient outcomes. Our lab aims to investigate cellular markers that may correlate with tamoxifen resistance by comparing MCF-7 and tamoxifen-resistant (MCF-7 TAMR) breast cancer cells. Flow cytometry is used to quantify receptor expression using fluorophore-conjugated antibodies targeting specific proteins, such as CD29, 44, and 221. By optimizing fluorescence intensity across varying concentrations, we aim to improve detection accuracy in multi-color flow cytometry.
Ruben Leanos	Psychology	Dr. Melissa Guynn Honors Capstone	Word or Non-Word	The study examines the prospective memory performance of participants when tasked with performing two tasks simultaneously following prior versions of the study. This means that they completed computerized lexical decision tasks in which they had to distinguish between strings of words or non-words while additionally having to remember either one or three syllables depending on which they had to respond by typing into the computer. Additionally, participants who were part of a modified version were provided with a box reminder with the purpose of reducing prospective memory load. Following that, it was expected of participants to have part of their performance impaired due to the load, and on the other hand, participants with the reminder support would demonstrate improvement over detecting the targets as a result of the reduced load on to their prospective memory compared to those in the conditions without supports.
Rodney Levendosky	Animation & VFX	Dr. Juie Shetye NASA MOSAICS Research Program	Revealing Greater Heights: Advancing Volcanology with GOES Satellite Observations and Twilight Photometry	Volcanic plumes play a crucial role in atmospheric chemistry, aviation safety, and climate dynamics. Accurate measurement of plume heights is essential, yet traditional methods often underestimate their vertical extent. This study focuses on the 2022 Hunga Tonga eruption, employing GOES satellite imagery and twilight photometry to monitor the evolution of volcanic plumes over time, providing continuous observations that track the plume's intensity and utilize the solar zenith angle to determine height. Results indicate plume heights significantly exceeding previous estimates, offering new insights into plume dynamics. These findings demonstrate the utility of twilight photometry as a robust tool for volcanology, improving understanding of how volcanic plumes evolve in height and structure over time.
Trae Leyva	Chemical Engineering, minor Nuclear Chemical Engineering	Dr. Houqian Li SURE Program	Planning and Assembly of a Fixed-Bed Reactor System for Ethanol Conversion	Ethanol is the most widely produced biomass derived molecule. Its catalytic conversion involves cascade reaction networks including dehydration, dehydrogenation, hydrogenation, oligomerization, and C–C coupling pathways. Advancing these processes requires deeper mechanistic understanding and catalyst design. This project proposes the development of a reactor system capable of systematically evaluating different catalysts under varied reaction conditions. The platform will enable active optimization of catalyst composition and reaction parameters, accelerating catalyst discovery. The approach aims to identify high-performance catalysts more efficiently than traditional methodologies.
Paola Lozano	Finance and Marketing	Dr. Carlos E. Carpio-Ochoa ACES UG Research Scholars Program	Assessing the Financial Viability of Hoop Houses for Small- to Medium-Scale Farmers in New Mexico	This study evaluates the financial viability of hoop houses as cost-effective and adaptable production systems for small-scale agricultural producers in New Mexico. The objective is to assess whether increased yields and extended harvest periods justify the initial capital investment and operating costs. Hoop houses create controlled environments that protect crops from climatic extremes while serving as a lower-cost alternative to traditional greenhouses. With an estimated construction cost of $1,800, they provide opportunities for additional harvest cycles and season extensions. Under the modeled framework, findings are derived from a 15-year financial evaluation of the investment. The analysis incorporates crop data, local pricing, and expert input to

				estimate performance. Crops such as heirloom tomatoes, Bloomsdale spinach, romaine lettuce, raspberries, and sugar snap peas were examined. Sensitivity results indicate that structural lifespan remains a key determinant of financial outcomes, as shorter service lives reduce returns while extended durability strengthens overall feasibility.
Noah Lundstrom	Chemistry Pre-Med	Dr. Kathryn Hanley NM-Rio STEM Fellows Program	Identifying black fly larvae species collected during the 2025-2026 winter outbreak of vesicular stomatitis virus	Vesicular Stomatitis Virus (VSV) is an arthropod-borne virus that causes disease in hoofed livestock. Black flies are an important vector of this virus. Although endemic in southern Mexico and Central America, sporadic VSV outbreaks occur in the United States. In October 2025, an unprecedented winter VSV outbreak occurred in southern Arizona. To investigate potential vectors involved in transmission, black fly larvae were collected from a county with VSV cases (Cochise County). To identify black fly larvae species, DNA extraction and Cytochrome Oxidase 1 (COI) gene amplification (endpoint PCR) was conducted for molecular barcoding. Amplification was confirmed with gel electrophoresis, and PCR products were sequenced using Sanger sequencing. Overall, 23 larval samples were identified as *Simulium argus*, and 1 sample as *Simulium bracteatum*. We have previously collected *S. argus* during a VSV outbreak in New Mexico in 2020, but to date we have not detected VSV in samples of this species.
Julian Martinez	Agricultural Business and Economics	Dr. Frannie Miller Honors Capstone Project	Economic Pressures and Market Challenges: Coffee Farmers in Puerto Rico	This project examines whether cooperative structures and vertical integration can help coffee producers reduce costs and secure higher prices through collective branding. The study draws on survey responses from farmers in Puerto Rico to provide local insight into production challenges and market constraints. To evaluate broader applicability, the project incorporates willingness-topay estimates derived from a -metaanalysis of prior research and synthesizes findings from existing literature on smallholder coffee systems worldwide. By comparing -realworld outcomes across regions, the study identifies organizational models that are feasible-, resilient, and most effective at helping growers capture greater value within the supply chain.
Lei Maslian	Bachelor of Fine Arts	Prof. Carissa Samaniego	Methods in 3D Fabrication: Integrating Emerging Technologies with Traditional Stone Carving	I am currently involved in a creative project to develop a new artwork in stone with traditional and emerging technologies. For URCAS 2026, I will present the visual and technical research that I am undertaking to prepare for an upcoming residency (Digital Stone Project in Italy), where I will realize this work with the assistance of robotic carving technology and finish the work by hand for public exhibition. The preliminary research and design development includes 3D scans, digital 3D models, and 3D printed maquettes that I plan on sharing during my URCAS 2026 presentation.
Leigh Mayers	Aerospace and Mechanical Engineering	Dr. Shabnam Mohammadshahi	Flow Characteristics of Supersonic Oscillating Jet Impinging on an Inclined Plate	Impinging supersonic jets are characterized by the formation of distinct flow regions, including primary jet flow, impingement zone, and wall jets. These flows generate strong aeroacoustic noise, standoff shocks, and unsteady pressure loads, making them relevant to high-speed propulsion systems. The dynamic interaction between the oscillating jet and the solid surface introduces additional flow instabilities and modifies shock formation. In this work, a double-feedback fluidic oscillator is employed to generate the supersonic oscillating jet. A high-pressure air supply drives the flow, and jet dynamics are captured via high-speed Schlieren imaging. The NPR, defined as the pressure ratio at the oscillator inlet to the outlet, is examined over the range of 5 to 8. This work provides new insights into the physics of supersonic oscillating jets. Key features from the Schlieren

				images show stand-off shocks, oblique shocks, and Mach disks.
Guinivere Mayse and Ivan Aragon	Art History and History Museum Conservation	Dr. Dr. Eowyn Kerr-Di Carlo Applied Projects in Museum Conservation	Recreating Medieval Panel Paintings from Egypt and Ethiopia	Reconstructing and copying artworks is a key practice in art conservation that extends beyond replication, serving as a research method, educational tool, and substitute for handling fragile originals. Close study of materials can challenge assumptions about where and how artworks were produced, while reconstruction provides art historians and conservators insight into historical artistic processes. Traditionally, artists extracted pigments, fashioned brushes and drawing tools, ground pigments into binding media, and applied tissue-thin layers of gold leaf. As this practical knowledge risks being lost, reconstructing paintings with historical techniques has become an important component of conservation training. This project examines the depth of material and technical knowledge characteristic of 14th-century artists. In Spring 2026, two students completed an apprentice-style directed study reconstructing paintings from different cultures with related techniques: Ivan Aragon copied a Mount Sinai icon, while Guinivere Mayse recreated an Ethiopian portable trifold painting using traditional woods, hand tools, and historical recipes.
Jaiden McClellan	Biology	Dr. Jacob Jaszczak	Measuring the effects of early acid exposure on *Drosophila* development	Development requires the precise timing and coordination of processes from cellular to organismal levels. How animals reestablish coordination after tissue damage that occurs during development remains unclear. In *Drosophila melanogaster* larvae, exposure to concentrated hydrochloric acid (HCl) damages the epidermis (skin). We found that exposing larvae to HCl reduces their growth. When measuring total larval growth, we find that acid exposed larvae might catch up to similar amounts as unexposed larvae. This growth pattern suggests that acid damaged larvae may delay development in response to damage. This is similar to the regeneration checkpoint that is activated when larvae are exposed to harmful radiation. This project examines whether larval acid exposure induces delayed development to allow larvae to recover from epidermal damage. These results may provide fundamental understanding the epidermal and neurological response to harmful stimuli throughout organismal development with applications to treatments for chronic pain and autism spectrum disorders.
Leonardo Medrano Garcia	Aerospace Engineering	Dr. Andreas Gross	Development and Validation of a Thermochemical Non-Equilibrium Extension for Large-Eddy Simulation of Hypersonic Flows	Thermochemical non-equilibrium effects strongly influence hypersonic flows by altering shock structure, temperature, species composition, and wall heat flux. In this study, a thermochemical non-equilibrium extension was added to an in-house large-eddy simulation (LES) code at New Mexico State University to improve predictive capability for high-enthalpy flows. The implementation uses finite-rate chemistry with the Gupta model within a two-temperature framework. The solver was validated for Mach 9 flow over a circular cylinder and Mach 20 flow over a cone. Results show good agreement with reference data, with surface heat flux within 10% of reported values, along with accurate temperature, pressure, and species mass fraction distributions. Wall heat flux shows weak sensitivity to the chemical model but strong dependence on catalytic conditions. An additional 180-degree cylinder case evaluated geometric effects, showing consistent trends. Large-eddy simulations of a Mach 5 turbulent

				boundary layer demonstrates impact of non-equilibrium effects at high freestream temperature.
Daniel Alejandro Mejia	Biology and Secondary Education	Dr. Mindy Hébert-DeRouen	Treatment Receipt Among Rural and Urban Males Diagnosed with Prostate Cancer in the Southwestern United States: A Scoping Review Protocol	Prostate cancer is the most common cancer and second leading cause of cancer death among males in the United States. Rural populations face distinct barriers to cancer treatment, including greater distances to treatment and limited access to specialists. No evidence synthesis has examined rural/urban disparities in prostate cancer treatment receipt in the Southwestern United States. This scoping review will examine available evidence regarding treatment receipt among males diagnosed with prostate cancer in rural versus urban settings in the Southwestern United States (Arizona, Colorado, Nevada, New Mexico, Utah, West Texas, and Southern California) using the Population, Concept, Context (PCC) framework. We will include studies involving adult males (aged 18+) diagnosed with prostate cancer at any stage that report primary treatment receipt and location of their geographic residence. We will search PubMed, Google Scholar, Embase, Web of Science, and SCOPUS. Three reviewers will independently screen citations. Results will follow PRISMA-ScR guidelines.
Nicole Midgett	Horticulture	Dr. Ivette Guzmán	Cultivation of Clary Sage in the Southwest: Hydrosol Extraction	Clary sage (*salvia sclarea*) is known to contain many medicinal compounds. As microbes become resistant to current management routines, it is important to develop alternative treatments. Substitute products provide many routes to management and can reduce reliance on synthetic compounds. Is it possible to grow clary sage successfully in the Southwest? The objective was to cultivate clary sage in Las Cruces and test the hydrosol for bioactivity. It was hypothesized that clary sage would grow successfully and display antifungal properties. Plants were grown at Fabian Garcia Research Center for two years. The leaves were dried and distilled using a steam distillation system. The medium (88%) and high irrigation (83%) plots had the highest survivability, while the lowest irrigation plots only had (50%) survivability. Clary sage is a viable medicinal crop to grow in the Southwest and may offer microbial benefits.
Savannah Monroe	Animal Science and Agricultural Business Management	Dr. Jennifer Hernandez-Gifford Enchantment U-RISE	Effects of Peri-Conception Maternal Immune Activation on Wool Characteristics at Weaning	Immune challenges including infection can disrupt the maternal environment, potentially affecting fetal growth and long-term production traits. While maternal immune challenges are known to affect reproductive success and fetal development, their influence on lamb growth parameters, including wool follicle development and fiber production, during critical stages prior to conception remains unclear. Estrus-synchronized ewes received saline (CON), 1.5 µg/kg (LOW), or 3.0 µg/kg (HIGH) lipopolysaccharide injections on days 5, 10, and 15 of the estrous cycle before breeding. Wool samples collected at 60 days of age were analyzed using an Optical Fiber Diameter Analyzer. Average fiber diameter did not differ among treatments ($P = 0.14$). However, fiber uniformity tended to improve in high-dose lambs, with lower standard deviation and coefficient of variation ($P \leq 0.06$). Findings suggest peri-conception immune activation may influence wool uniformity, with implications for flock productivity and fiber quality.
Astrid Montanez	Psychology	Dr. Paulette Vincent-Ruz Mcnair Scholars Program	PRIDE: Supporting the STEM Identity Development of Queer Students	Queerness is more than sexuality or gender; it's an intrinsic identity that interacts with every facet of life. This research aims to understand the identity, border crossing, or intersectionality of queer students regarding their STEM identities. Using photo-elicitation methodology and focus group interviews, we aim to examine attitudes toward STEM fields among current and former queer STEM majors. Participants were asked to produce a photo or drawing representing a time they felt welcomed and unwelcome in their current or former major, alongside a short written description of what is being expressed in the provided photos. We designed the focus groups to contain two different phases.

				First, students were asked general questions about their majors and identities, allowing for open discussion between questions. Researchers shared personal anecdotes to build rapport with participants and encourage open communication. The last section of the focus group focused on an open discussion of the photos collected in a prior step.
Marissa Rae Montoyan and Dante Galaz	Civil Engineering	Dr. Jorge Garcia Engineering Capstone Project	Water System Modeling, Pumping, and Fire Supply Planning for Spaceport America	This project is for a water modeling system, pumping, and fire supply plan for the New Mexico Spaceport Authority (NMSA) Spaceport America located in Sierra Country, New Mexico. Spaceport America currently does not utilize a water modeling system, and is therefore unable to simulate different scenarios related to water demand. Providing a model will aid them in future expansion and predicting system behavior. Additionally, some pipelines on site are experiencing water hammer issues which can be better visualized through the use of a hydraulic model. This project will also include recommendations for a fire protection supply strategy including a fire storage tank, booster/fire pump station, dedicated fire loop, and specified separation of domestic and fire supply lines.
Coen Morales	Mechanical amd Aerospace Engineering	Dr. Abdessattar Abdelkefi SURE Program	Hybrid Savonius–Darrieus Vertical Axis Wind Turbine Design and Validation	Hybrid vertical axis wind turbines (VAWTs) combine the self-starting capability of Savonius rotors with the higher-speed efficiency of Darrieus rotors. This project supports the development and validation planning of a hybrid Savonius–Darrieus VAWT for small-scale wind energy applications. Current team goals include evaluating startup behavior, rotational speed, electrical output, structural stability, and testing feasibility. My contribution has focused on literature review, design discussion, prototype preparation, and planning experimental validation methods and instrumentation. Prototype fabrication is currently in progress through a collaborative capstone effort. Future work will use experimental results to refine the design and support further study of configuration variables such as axial overlap.
Anacristina Muniz	Chemical Engineering	Dr. Catie Brewer	Process Simulation for Modeling of Ionic Liquid Production for Chemical Engineering	Process simulation is a computational method of displaying a given chemical process in order to build, analyze, and optimize a model. As part of the NMSU ChME Department's capstone projects for this year, groups must model the industrial process of synthesizing the ionic liquid [HBet][Tf2N] from reactants betaine hydrochloride and lithium bis(trifluoromethanesulfonyl)imide. In my capstone group, I contributed to development a process model with my group, which utilizes two reactors in series for our synthesis reaction followed by product separation and purification. This presentation explores the modeling strategies used to build the reaction and separation sections and common limitations that were encountered while simulating the model in Aspen Plus. This work provided valuable insights into the challenges of process simulation, particularly for processes that are not well documented in scientific literature.
Melanie Munoz-Morales	Criminal Justice and Justice, Political Philosophy, and Law	Dr. Lori Keleher	Are Justice and Fairness Part of Our Legal System or Is There Another Reality for Some?	This research is a contribution to the field of Criminal Justice. I'll use the philosophical concepts of epistemic injustice, testimonial injustice, and systematic injustice to inform how women in Mexico and the United States are not treated justly within the legal system. I'll present an argumentative paper of all the injustice women suffer from in Mexico, while comparing it to how these three types of injustice are a significant problem in the U.S. too, not only to women, but to minorities. For my methods, I will use prior research made on the topic and implement media information that can help me to get more reliable results. I found in the case of research in Mexico that women are still underrepresented and suffer not just testimonial injustice, but they form a large part of daily homicides on Mexico. In the research on the U.S., the findings show a lot of epistemic/systematic injustice to minorities being

				a disproportionate large amount of the incarceration population.
Noah Murphy	Mechanical and Aerospace Engineer	Dr. Fangjun Shu Luke Vergeer NM-RIO STEM Fellows	Pyroelectric Heat Flux Sensor for Hypersonic Applications	Accurate heat flux measurements are integral for the design of thermal protection systems on hypersonic vehicles, which experience rapid changes in temperature during flight. Conventional heat flux reconstruction methods rely on temperature-based data reduction with a stabilization scheme for transient heating. Changing the data measurement space places the burden of data stabilization on the physical sensor rather than post-test data processing. This project focuses on the evaluation of a proof-of-concept pyroelectric heat flux sensor using lithium tantalate (LiTaO3) which generates electrical current directly proportional to the rate of temperature change. The sensor consists of nickel spray-coated electrodes and a 0.5mm thick LiTaO3 crystal. Controlled radiative heating was applied using a 1.5 kW continuous-wave laser (900-1080nm) which fully illuminates the sensor. Material properties obtained through a least-squares dynamic calibration led to an accurate heat flux reconstruction. This work supports efforts to improve high-bandwidth transient heat flux measurement for next-generation hypersonic systems.
Job Nava and Aadhav Sivakumar	Civil Engineering Mechanical Engineering	Dr. Bethuel Khamala	Launch Angle Lab	Launch Angle Lab. This was a project done for our calc-based physics course.
Mariana Navarrete	Physics	Dr. Juie Shetye Astronomy Department Undergraduate Research Program	Revealing Evening Oscillations in Desert Climate: A Multi-city Temperature Analysis Centered on Las Cruces	Understanding local weather patterns is key for us to interact with the environment we live in. The matter becomes relevant to our daily activities when they are affected by unexpected weather events or potential indicators of turbulence. This research investigates twilight temperature values at ground level in Las Cruces, New Mexico, using a theoretical energy balance model paired with real temperature data from weather stations. We identify consistent oscillations in temperature during evening twilight hours that deviate from the normal cooling curve, which could be related to the formation of atmospheric gravity waves in the upper layers of the atmosphere. To determine whether this behavior is unique to Las Cruces or part of a regional pattern, we compare the temperature trends of different cities with similar characteristics in the area, including El Paso, Texas; Amarillo, Texas; and Tucson, Arizona. Other factors considered in the analysis include air pressure, humidity, wind direction, altitude, and geographic features such as mountain proximity. Results show that Las Cruces experiences intensified evening oscillations in comparison to the other cities. This research aims to use the combination of a theoretical model and real data to improve our understanding of temperature dynamics in arid environments. These findings can support decision-making in agriculture, transportation, and aviation.
Athena Neeld	Physics	Dr. Nancy Chanover McNair Scholars Program	Analysis of the April 2025 Uranus Occultation Observations from Apache Point Observatory	On April 8, 2025, Uranus occulted a distant star, providing an opportunity to study the planet's atmosphere and rings. A campaign led by planetary scientists at NASA's Langley Research Center involved a team comprised of over 30 astronomers and 15 observatories. As part of this campaign, roughly 12,000 images were collected by Dr. Nancy Chanover using the Astrophysical Research Consortium (ARC) 3.5m telescope at Apache Point Observatory. We calibrated the images through bias subtraction and flat fielding, then performed aperture photometry to measure the star's brightness. Using these measurements, we created a light curve showing changes in stellar flux as Uranus and its rings passed in front of the star. The goal of this project is to analyze this light curve and better understand Uranus's atmospheric properties and ring structure.

Nadya Neparko	Electrical Engineering and Genetics and Biotechnology	Dr. Olga Lavrova Ms. Amanda Madrid Mr. Stanley Cheng	Double Pulse Testing of MOSFET Devices	Silicon Carbide (SiC) MOSFETs are an attractive choice for modern power electronics that enable highly efficient, high-voltage, and high-frequency power conversion, but require carefully designed gate-driver systems. This project aims to develop double pulse testing infrastructure and regimens to measure the switching parameters and evaluate the dynamic behaviors of different power devices under controlled voltage, current and temperature conditions. Circuit designs and signal paths are currently being developed in Simulink before physical prototyping is conducted. Pulses are used to limit self-heating of the DUT and maintain a stable junction temperature. This test is performed to guarantee specifications of power devices like MOSFETs and IGBTs; confirm actual value or deviation of power devices or power modules; and to measure switching parameters under various load conditions and validate performance across many devices. This work will support future studies aimed at optimizing gate-driver architectures for 1200 V SiC half-bridge power modules.
Nadya Neparko, Mia Apodaca, Shayla Milian, James Centola	Electrical Engineering & Genetics Pre-Pharmacy Journalism Mathematics (Actuarial Science) & Economics	Prof. Shawn Werner Dean Phame Camarena Honors 388V. Leadership and Society	Choosing experiential learning activities for leadership development: Assessing tradeoffs for the 1888 Leadership Camp	Experiential learning activities play a crucial role in student leadership development. Still, the success of any given set of activities depends on learning goals, program structure, student body, and a variety of practical constraints. Drawing from feedback from the first 1888 Leadership Camp offering, we are redesigning key elements of the program to enhance active learning with a special emphasis on group activities to be implemented on the second day of camp. These activities should be accessible to as large an audience as possible. To assess possible strategies for this camp, our project combines research on leadership development activities with available resources at the NMSU Activity Center and within the camp's constraints to offer recommendations for activities that promote leadership, cooperation, and core AGGIES values among participants, with intentionality.
Nathan Nevarez and Oscar Guerra	Mechanical Engineering	Dr. Borys Drach NM AMP Los Alamos National Laboratories Plutonium Workforce Development Initiative	Evaluation of Dimensional Deviations in Additive and Subtractive Manufacturing Using 3D Scanning	Co-Authors: Nathan Nevarez, Oscar Guerra, Dr. Borys Drach All manufacturing processes have accuracy limits that result in deviations from design dimensions. Various inspection processes are used in industry to evaluate these dimensional deviations, enabling quality control and rejection of parts that fall outside acceptable tolerances. Structured light 3D scanning, a technique that reconstructs a digital model by capturing deformations of projected light patterns on a surface, is a versatile tool for metrology and reverse engineering. An Artec Micro II desktop 3D scanner is employed to acquire scan data for evaluating feature-based dimensional deviations from parts produced by various manufacturing techniques. Benchmark specimens designed based on to National Aerospace Standard 979 for high-precision tolerance requirements were manufactured via fused filament fabrication, computer numerical control machining, and polymer powder bed fusion to compare the dimensional accuracy of these processes. Reconstructed scan data were overlaid onto original computer-aided designs to evaluate surface flatness, geometric feature dimensions, and tolerances.
Vu Ha Nguyen	Electrical Engineering	Dr. Olga Lavrova	A De-Embedding-Based Framework for Accurate High-Frequency Impedance Modeling of Passive Components	S-parameters are widely used to characterize RF and high-speed electronic components. However, measured data often include parasitic effects from test fixtures, reducing accuracy. This study aims to improve measurement precision through the application of de-embedding techniques. S-parameters were obtained using a spectrum analyzer, and the Short-Open-Load method was used to de-embed the fixture. The results demonstrate improved accuracy and more reliable representation of the device under test. These improvements enable better characterization of power electronic behavior in high frequency applications

Madeline Nielsen	Government, Supplemental Major in Law and Society	Dr. Seong Kang	The Onslaught of Overconsumption: Examining American Consumer Culture and Environmental Policymaking	Consumer culture is a crucial part of American cultural identity, shaping the way that the average citizen behaves—from their behavior at the checkout line to the ballot box, access to goods and services are a crucial part of how the country operates. However, the rise of social media, shifting cultural norms, and resistance to regulation have made it so that a culture of consumption has had irrevocable effects on the environment. This paper examines the recent history of attempts to regulate consumer behavior, specifically with regards to nonrenewable resources such as oils, natural gas, and other energy sources and the potential future of environmental policymaking to reflect current cultural climates. The research found that while the efforts that have been made to regulate the consumption of natural resources, they are slow to be implemented.
Joel Adrian Olivas	Chemical Engineering	Dr. Houqian Li	Automated Chemisorption System for Characterizing Solid Surface Properties	Chemisorption is an important technique for characterizing the surface properties of solid materials. These systems characterize the structure of solid materials by titrating surface sites via probe molecules. In this work, we assembled an automated chemisorption system that enables efficient characterization of solid materials. We addressed several key challenges, including developing Python code to automate system operation, building a relay controller to control valves, and assembling the overall chemisorption setup.
Hubert Quintana III and Rayce Becerra	Engineering Physics-Aerospace	Dr. Francisco Torres Herrador	Tomography And Lattice Boltzmann Exploration (I): Image Segmentation	Co-Authors: Hubert Quintana III, Rayce Becerra, Andres Ibarra Gonzalez Computed tomography (CT) imaging enables characterization of porous material microstructures that influence the performance of thermal protection systems (TPS). In this work, we investigate deep learning approaches for automated segmentation of CT datasets containing fiber-based materials. Two segmentation frameworks are evaluated: a commercial workflow using Dragonfly and a custom deep learning pipeline in PyTorch based on a U-Net architecture. The model distinguishes fiber and void regions within CT scans, enabling reconstruction of realistic digital geometries for computational analysis. Training converged with a validation loss of 0.0108 and achieved Dice and intersection-over-union (IoU) scores of 0.9656 and 0.9602, demonstrating strong segmentation performance. These structures will be reconstructed using the PuMA framework and placed in simulated flow environments using lattice Boltzmann methods to study permeability and flow behavior in porous TPS materials. As an alternative to these computationally expensive simulations, we evaluate the suitability of Physics-Informed Neural Networks (PINNs) for this problem.
Uriel Quintero Ornelas	Mechanical and Aerospace Engineering	Dr. Abdessattar Abdelkefi	Structural Dynamics of an Instrumented, Balloon Dropped Flight Test Vehicle	During free fall, flight vehicle structures experience external forcing from turbulent boundary layer effects and transonic airflow. The project aims to develop and evaluate a balloon-drop experimental platform to measure internal structural excitations of a blunt nose-cone flight vehicle during transonic descent. The final objective is a 100,000-ft balloon drop test of an aluminum nose cone instrumented with an internal data acquisition system. Prior to full-scale testing, a scaled 3D printed flight vehicle was developed to verify subsystem requirements and validate system performance. A 2,000-ft drone drop test was conducted, revealing issues with flight static stability and the data acquisition system. As a result, subsystem pass/fail criteria were established to guide design iteration and prepare for a planned 20,000-ft balloon drop test.
Emma Padilla	Nutrition Education and Dietetic Sciences	Dr. Shadai Martin HNDS Nutrition Education	Protein Intake Aligned with Dietary Guidelines and How it Affects	The new Dietary Guidelines of America differ from previous ones. The recommended protein intake is more than usual at 1.2-1.6g/kg/day as they usually are 0.8g/kg/day. Although this is controversial, a high intake of protein can be beneficial for

			Americans with Overweight and Obesity	healthy people, and even people with overweight or obesity. The goals of dietary guidelines are to reduce the rates of chronic disease, and so if you are a healthy individual, you could follow these guidelines for this outcome. According to PubMed, high protein diets provide benefits for achieving weight loss in individuals with obesity. Glucagon, an intestinal peptide hormone, can be found in protein and this is what makes it satiating, therefore making you feel fuller and satisfied longer. For these reasons, adding more protein to your diet when you are trying to achieve weight loss can be beneficial and should be considered if there are no other underlying health conditions.
Sarette Patrick	Chemistry	Dr. Ivette Guzman	Bioaccessibility of Cancer Preventative Compounds in Black Bean Salad Using Different Cooking Oils	Carotenoids, tocopherols, and chlorophylls are fat-soluble compounds produced naturally by plants that our body uses to protect us from chronic disease when consumed. They are absorbed by our digestive system's mucous membranes with the help of mixed micelles, composed of bile salts, lipids, and other compounds. The objective was to compare the bioaccessibility of a plant-based meal with different sources of fat (avocado oil, olive oil, and avocado). I hypothesized that avocado had the highest micellarization of compounds compared to the other oils. Using an in-vitro digestion and high-performance liquid chromatography, we measured concentrations of compounds in a bean salad recipe made with the different oils. Results showed that the olive oil variation micellarized the most chlorophylls. The avocado oil variation was the only version containing micellarized alpha-tocopherols but had the least lutein. The avocado variation was the only one with zeaxanthin micellarization and had the most carotenoids micellarized.
Ben Pautz & Cecilia Sanchez	Kinesiology	Kehinde Obidele Dr. Chris Aiken	How Does Task Complexity Moderate the Effects of Practice Variability on Motor Skill Acquisition, Retention, and Transfer? A Scoping Review	Co-Authors: Ben Pautz, Cecilia Sanchez, Kehinde Obidele, and Dr. Christopher Aiken Practice variability is the systematic manipulation of task parameters during motor skill acquisition, is theorized to promote broader motor schemas facilitating retention and transfer, yet empirical evidence remains inconsistent. Ten empirical studies were retained from 16 articles using predefined inclusion criteria following Arksey and O'Malley (2005). Each task was classified as Low or High complexity via Gentile's (1972) and Newell's (1986) frameworks, and a narrative synthesis was conducted. In Low complexity tasks (n = 8), variable practice conferred no consistent retention advantage, and high variability loads actively impaired learning in two studies. Where advantages emerged, they were consistently moderated by initial learner variability rather than practice schedule alone. In the sole High complexity study, high-variability methods significantly outperformed low-variability practice across all kinematic and kinetic outcomes. These findings suggest task complexity and individual learner characteristics jointly moderate the practice variability learning relationship, with existing theoretical frameworks providing only partial accounts.
Sofia Pellegrino	Psychology	Dr. Jesse Grabman McNair Scholars Program	Can people remember others' emotional intensity?	Emotion plays an important role in memory. Emotional states influence recollection of autobiographical events (Ottenstein & Lischetzke, 2020), and emotional expressions affect face recognition memory (D'Argembeau & Van der Linden, 2011). However, to our knowledge, no studies have examined individuals' memory for perceived emotional intensity in others. This study addresses that gap in two phases. Phase 1 will validate variability in perceived intensity ratings for angry, happy, and neutral expressions in the RADIATE facial expression database (Conley et al., 2018). In Phase 2, participants will encode 50 facial images: 10 extremely happy, 10 happy, 10 extremely angry, 10 angry, and 10 neutral. During encoding, they will either rate the emotion's intensity or assign a random intensity rating. After a five-minute delay, an old–new recognition test will measure memory for identity, emotion, and intensity. We predict that more

				emotionally intense faces will be remembered more accurately than neutral facial expressions.
Daniela Perez	Biochemistry	Dr. Amanda Ashley NM AMP URS Program	Analyzing transcriptional regulation of R-Loop regulatory factors by DNA-PKcs	R-loops are naturally occurring DNA:RNA hybrids that regulate nucleotide metabolism, including gene expression. R-loop accumulation is linked to various maladies such as cancer and neurological diseases. Our preliminary data indicate that a DNA double-strand break repair protein, DNA-PKcs, may diminish R-loop abundance, and we are investigating if gene expression is also impacted. We identified genes that are known to be regulated by R-loops, and are evaluating whether or not the expression of these genes is impacted by (1) DNA-PKcs and/or (2) treatment with camptothecin. We expect that DNA-PK will affect the expression of some genes, and that this regulation will be exacerbated by camptothecin exposure, consistent with our preliminary data. In the future, we hope to elucidate how DNA-PK and related proteins impact the formation, stability, and resolution of R-loops.
Ashley Pham	Chemical Engineering	Dr. Jessica Houston	Modeling of a Hollow-Fiber Bioreactor	Co-Authors: Samuel T. Orozco, Janeth Carrasco, Dr. Jessica P. Houston Extracellular vesicles (EVs) are small lipid membrane bound particles (100-600 nm) released by all cells and are involved in cellular communication and cellular cargo delivery. EVs have commercial importance as reference material and delivery vehicles, but large-scale production has engineering challenges. In a hollow-fiber bioreactor (HFB), cells are maintained on permeable fibers within a secondary chamber, allowing long term production without the need for passaging and increasing long-term production rate. In this work we compare the glucose consumption during the start-up of the reactor through our model and experimentally via daily glucose measurements. We found that aspects of our model correctly correlate consumption experimentally. We also determined key considerations that should be included in future models, such as the reactor's dependency on regular maintenance. This work collects experimental data to support a simulated hollow-fiber bioreactor from start-up to steady state operation, establishing a baseline for future models to reference.
Vestine Pfeiffer	Computer Science, minor Physics	Dr. Christabel Wayllace CS CI 4999 Senior Thesis	Performance of Quantum AI Algorithms vs Classical AI Algorithms in the Case of Minesweeper	Quantum computers are the cutting edge technology when it comes to computational devices, allowing logic and algorithms unseen in classical computers. But how well do these algorithms actually perform when compared to the modern classical algorithms? This thesis consists of comparing a classical algorithm against a quantum algorithm that both attempt to solve Minesweeper. Both algorithms are tested against a set of Minesweeper boards with different complexities, this complexity denoting the size of the board and the number of 'bombs', and are compared by the time it takes to solve a board and the win percentage for each difficulty. In theory quantum algorithms are expected to have a time complexity of O(√(2^n)) where the classical algorithm has a time complexity of O(2^n). Should these time complexities prove to be accurate the usage of quantum algorithms may become common place when quantum computers are readily available.
Ryan C. Phillips	Geological Sciences	Kenneth C. Carroll, Plant & Environmental Sciences	Monitoring Seasonal and Fluctuating Groundwater Elevation Using Time Lapse Electrical Resistivity Method	In 2018, a gasoline pipeline ruptured in Anthony, New Mexico, releasing thousands of barrels of gasoline into a major drainage ditch near residences and agricultural land. The site is currently entering its final stage of remediation. Monitoring relies on groundwater observation wells, leaving large areas of the subsurface to interpretation through extrapolation. This study will evaluate supplementing groundwater well-based monitoring with addition of Electrical Resistivity Tomography as a complementary subsurface imaging technique using an

				electrode array installed between two existing rows of monitoring wells within an already remediated area of the site over a 90-day period. The derived resistivity data will be used for two purposes: 1) to map the variability in the sedimentary layers of the aquifer system and 2) as a comparison to the well data to predict fluctuations in groundwater elevation. The project will develop a nondestructive groundwater monitoring method that can be used to support groundwater remediation and other water resource operations.
Axton Pollard, Severa Gonzalez, Hezekiel Kaemingk Flores, Ja-B Bustamante	Political Science Political Science Environmental Science Electrical Engineering	Prof. Shawn Werner Honors 388V, Leadership and Society	Creating a University Club to Develop Online Capability: A Leadership Initiative	Our project involves the creation of an NMSU organization out of the HNRS 388V Leadership Project. This group will serve to grow the online and social media capabilities of its members. Too many students jeopardize their future due to unfavorable depictions of themselves online. Beyond that, other organizations aren't meeting their full potential due to inefficient online promotion. Our organization will equip students with the competencies necessary to excel in social media through innovation and professionalism. To do this, we will have meetings every other week to encourage good social media practices and host presentations that teach relevant online skills. Through this work, we hope to develop both the student and NMSU club culture to be more deliberate in their operations online. At URCAs, we will demonstrate the thought that goes into creating a club at NMSU and the impact we aim to bring, supported by our early performance.
Desirae Price	Anthropology and Linguistics	Dr. Mark Waltermire McNair Scholars Program	Relational resonance and linguistic visibility across Aotearoa	This research explores how language is shared, made visible, and made accessible in public spaces across the three largest cities, Christchurch (Ōtautahi), Auckland (Tāmaki Makaurau), and Wellington (Pōneke), in New Zealand (Aotearoa), focusing on etic engagement and connection. By using methods of linguistic landscaping (Landry & Bourhis, 1970), geosemiotics (Scollon & Scollon, 2003), and reflective autoethnography (Ellis & Bochner, 2000), this project looks to assess the dynamic relationship between New Zealand (NZE) English and te reo Māori in their respected spaces by collecting side-by-side language conveyance in public, such as public art galleries, museums, and other public cultural spaces. It engages with curated language as an outsider, asking if language may contribute to relational sustainability including compassion and care for cross-cultural relationships.
Jessica I. Pulgarin	Biochemistry, minors Astronomy & Physics	Dr. Teri J Orr	Sparse Studies to Rapid Expansion: Tracking Research on Reproductive Trade-Offs	Reproductive trade-offs are a central concept in life-history theory, describing how organisms allocate limited resources between competing tasks such as growth, survival, and reproduction. Given their importance in evolutionary biology, we asked how scientific attention to reproductive trade-offs has changed over the last century. Using Google Scholar we conducted a literature search using the search terms "reproductive AND trade-off" and quantified publications per decade from the 1900s to 2025. Early publications were sparse, followed by an increase in the 1970s. Publications rose steadily and peaked between 2010 and 2020. A pivotal shift in the 1970s marks the emergence of reproductive trade-offs as a central framework and most importantly the incorporation of modeling approaches to the study of trade-offs. Understanding what species are being studied in research is also imperative. Historically, studies have relied on a narrow range of species, such as lab mice and a subset of birds, limiting the generalizability of findings across taxa. This study reviews the history of how trade-offs have been studied and outlines key gaps in the taxa that have been studied and thereby provides a foundation for future work.
Kristen Ramos	Horticulture	Dr. Ivette Guzmán	Organically Grown Za'atar in the Arid Southwest: Hydrosol Extraction	Za'atar (*Origanum syriacum*) is widely valued for its aromatic, culinary, and medicinal properties. However, less is known about how organically grown za'atar cultivated in the arid Southwest influences essential oil bioactivity. The objective of this research was to organically cultivate za'atar and measure hydrosol bioactivity. It is hypothesized that za'atar could be grown in hot and dry conditions and yield anti-fungal properties. Za'atar was cultivated in Las Cruces, New Mexico

				at Fabian Garcia Research Center in the organic medicinal herb plot. The leaves and stems were harvested and dehydrated at 36 °C for approximately 48 hours prior to essential oil extraction by steam distillation for about 4 hours. Before drying the plant matter contained 73% of water. This research proves that za'atar can successfully be cultivated in the Southwest.
Micaela Roacho	Biology	Dr. Jacob Jaszczak Honors Capstone	Examining Nociception in *Drosophila* Larva After Acid Damage	Co-Authors: Micaela Roacho, Kaitlin Victorian, Jacob Jaszczak What happens to sensory function when the epidermis (skin) is damaged? We use the nociceptive sensory system of Drosophila melanogaster larva to determine how damage alters sensory responses to different types of sensation. Nociception is the nervous systems response to noxious stimuli. Nociception is conserved from worms to humans, and can respond to thermal, mechanical, or acid stimuli. Exposure of larvae to acid has been shown to induce a nociceptive response. We find that when larvae have already been exposed to acid once, and are then re-exposed, their nociceptive responsiveness decreases. This suggests that the nociception becomes desensitized by repeated acid exposure. Other labs have found that repeated thermal stimuli exposure can make larva hypersensitive. We are now testing whether acid exposure reduces thermal sensitivity. Understanding how damage alters sensory responses will help improve designing treatments for patients with wounds or burns.
Karla Robles-Guzman	Counseling & Community Psychology/Spanish	Dr. Jessica Lopez-Harder Honors Capstone Research Internship in Counseling & Community Psychology	Mental Healthcare Experiences of Transgender & Gender-Diverse Individuals in Southern New Mexico	Research on the lived experiences of transgender and gender-diverse (TGD) individuals in counseling remains scarce. In New Mexico, where most counties are Mental Health Professional Shortage Areas, little research has examined TGD experiences in mental healthcare, particularly in the southern region. This phenomenological study investigated how trans and gender-expansive individuals in southern New Mexico experience seeking and receiving mental health services. Seven focus groups were conducted using semi-structured interviews lasting 60–120 minutes. Interviews were transcribed and analyzed using reflexive thematic analysis to identify recurring patterns. Analysis revealed several key themes, including experiences of invalidation through misgendering and deadnaming, limited clinician competency and awareness regarding TGD experiences, and therapists' imposed assumptions or ideological frameworks. Findings suggest that gaps in provider knowledge and gender-affirming practice contribute to negative therapeutic experiences and barriers to care. The study highlights both individual and systemic opportunities to improve gender-affirming mental health services in southern New Mexico.
Shylah Romero	Kinesiology, Performance Psychology & Human Nutrition, Dietetic Science	Dr. Katie Hirsch-Agnew	Leader Fairness in Sport Scoping Review: Preliminary Findings	Leader fairness in sport refers to followers' (athletes) judgments of the of their leaders' (coaches or athlete leaders) treatment as appropriate based on individualized and team expectations (Hirsch-Agnew & Loughead, 2025). The purpose of this study is to summarize the literature on sport leader fairness by exploring how fairness is defined, studied, and measured and to identify gaps to guide future research. Using Arksey and O'Malley's (2005) scoping review framework, peer-reviewed research was identified, screened, and systematically reviewed. A search of peer-reviewed articles identified 1,215 potential articles which were screened for inclusion criteria. A total of 67 articles were retained. Data were extracted on populations studied, theoretical frameworks, conceptual definitions, measurement approaches, and correlates of fairness. Data analysis is ongoing and preliminary findings will be presented. This work will strengthen theoretical understanding of leader fairness, support development of measurement tools, and inform applied practices for coach and athlete leadership development.

Colin Ross	Aerospace and Mechanical Engineering	Dr. Andreas Gross	Experimental Investigation of Fin-Junction Flow Unsteadiness in Mach 5 Laminar and Turbulent Configurations	Fins play a critical role in providing stability and control for high-speed flight vehicles. However, inherent fin-junction flow unsteadiness may negatively affect vehicle performance. The origin and nature of the unsteadiness remains an area of active research interest. This abstract reports on laminar and turbulent fin-induced junction flow experiments in the Mach 5 shock tunnel at New Mexico State University. The experiments are for leading edge fin sweep angles of 0°, 15°, and 30°. The junction flow behavior was investigated for three different time intervals during which the freestream conditions were nearly constant. Proper Orthogonal Mode Decomposition (POD) techniques will be implemented to qualitatively examine the separation shock region in the fin-junction. An extended POD algorithm will be implemented to correlate pressure data with mode shapes.
Kelsey Sanchez, Wyatt MacGregor, and Luis Diaz	Aerospace Engineering Mechanical Engineering	Dr. Francisco Torres Herrador Engineering Capstone	Tomography and Lattice Boltzmann Exploration (II): Flow Through Porous Media Using LBM	Permeability of porous materials strongly influences pyrolysis gas transport in TPS. The Lattice–Boltzmann Method (LBM) provides an alternative for simulating low-speed flows in complex geometries, including porous media~\cite{eshghinejadfard_calculation_2016}. In LBM, the velocity space is discretized (e.g., 9 for 2D or 27 for 3D), which reduces computational cost compared to DSMC. LBM calculates an equilibrium distribution function to stream particles to neighboring lattice nodes. Bounce-back conditions simulate collisions. The purpose of this project is to derive the permeability tensor for porous media, such as carbon fiber preforms. The geometries will be obtained from micro-computed tomography measurements. Permeability is treated as an effective property in Darcy's law, enabling macroscopic modeling of flow. Verification was conducted on a lid-driven cavity, showing excellent agreement with benchmark data from Hou et al. Moving towards simulating porous media, flow through periodic cylinder arrays was simulated
Morgan Lee Sanchez and Alivia Romero	Kinesiology	Dr. Kehinde Obidele, Ph.D. (c), & Dr. Christopher Aiken	Self-Controlled Feedback and Task Complexity in Motor Learning: A Scoping Review	Self-controlled (SC) feedback allows learners to determine when to receive augmented feedback during practice, contrasting with externally imposed yoked schedules. Despite evidence that SC feedback enhances motor learning, the literature has predominantly used simple, discrete tasks with few degrees of freedom. Whether task complexity moderates SC feedback benefits on retention and transfer remains insufficiently understood. This scoping review mapped the SC feedback literature to examine how task complexity defined by movement structure, coordination demands, environmental constraints, and information processing requirements moderates SC feedback effects relative to yoked comparator controls. Five databases were searched for peer-reviewed experimental and quasi-experimental studies published from 2010-2025 including at least one retention or transfer test and a yoked comparator. Preliminary findings suggest SC feedback advantages are most consistent for retention across task complexity levels, with transfer benefits more pronounced for serial and high-complexity skills. Future research should explicitly manipulate task complexity within SC feedback paradigms.
Jaedyn Sanchez, Jakob Green, and Makenzi Fitzsimmons	Kinesiology, minor Psychology Kinesiology, minor Biology Kinesiology, minor Psychology	Dr. Alyssa Vanderlinden	Biomechanical Differences in Anticipated vs. Unanticipated Sport Movements in Virtual Reality	Non-contact injuries frequently occur during reactive sport movements rather than pre-planned actions. Virtual reality (VR) allows simulations of real sport environments to be used in controlled laboratory settings. Prior research shows unanticipated tasks increase biomechanical risk factors, but most studies lack a realistic sporting environment (Kiefer et al., 2017). This study will examine whether unexpected movements in VR produce greater biomechanical risks than planned movements. We hypothesize that unanticipated tasks will exhibit increased knee valgus, higher joint loading, and reduced knee flexion. 30 college soccer players with no current lower extremity injuries will complete 10 planned and 10 unexpected cutting trials. Kinematic and kinetic data will

				be collected using retroreflective markers placed on the participant's lower extremities and recorded using a 10-camera three-dimensional motion capture system and three force plates (Vicon Motion Systems, Ltd., Oxford, UK). Understanding these differences can help develop injury prevention strategies and may improve VR-based screening, and movement assessments.
Disany Y. Sandoval	Human Nutrition and Dietetics	Dr. Sarah Ruiz ACES Undergraduate Research Program	Perceived Importance of High School Cooking and Nutrition Classes in Preventing Malnutrition Among Young Adults	Malnutrition is the under- or over consumption of essential nutrients and is associated with an increased risk of chronic disease. Studies indicate that approximately 40% of children with obesity and 80% of adolescents with obesity continue to experience obesity in adulthood (Byrd-Bredbenner, 2021, pp. 642-683). Upon arriving at college and balancing newfound independence, eating out often becomes convenient rather than learning how to prepare nutritious meals or navigating grocery budgeting. The purpose of this study is to identify knowledge and skill gaps related to nutrition and cooking education during high school and examine whether these gaps are associated with malnutrition risk in young adulthood among college students. This study will use a cross-sectional, anonymous survey design to collect quantitative data from approximately 50 currently enrolled NMSU students. The study will assess whether prior exposure to nutrition or cooking education in high school is associated with malnutrition risk among young adults.
Christian Savelle	Human Nutrition and Dietetics Science	Dr. Shadai Martin NUTR 4565 – Field Experience Community Nutrition	Dietary Guidelines for Americans, 2025-2030	The Dietary Guidelines for Americans (2025–2030) provide evidence-based recommendations to promote health and prevent chronic disease; however, translating national guidelines into practical tools for clinical and community use remains a challenge. This project summarizes key recommendations related to protein, fruits and vegetables, whole grains, healthy fats, and overall dietary patterns, and converts them into concise, patient-friendly educational materials. Clinic-ready visuals and handouts were developed to support brief nutrition counseling encounters and improve patient understanding of evidence-based dietary guidance. The materials emphasize whole-food dietary patterns and practical strategies to reduce risk for common chronic conditions such as heart disease, hypertension, type 2 diabetes, and obesity. This presentation highlights the development process, key content areas, and implications for improving the accessibility and application of national nutrition guidelines in real-world healthcare settings.
Catherine Scott	Aerospace and Mechanical Engineering	Dr. Sarada Kuravi	Where Heat Goes: Mapping Renewable Energy Systems that Depend on Heat Exchangers	Heat exchangers use the rules of thermodynamics to transfer heat between different fluids or gases without mixing them. It leads to the cooler substance to heat up and the hotter substance to get colder and it is an efficient and cost-effective way to heat a substance. Databases use heat exchangers and cold plates to keep the computers from overheating. These findings can help improve the heat exchangers and cold plates to be more efficient and better for the environment in the long term. Currently, research focuses on different ways to make the databases energy-efficient and figuring out energy produced by databases. Future steps include analyzing energy wasted across US-based datacenters and developing recommendations to improve waste expenditure across each data center. This research contributes to Mechanical Engineering Theory by identifying boundary conditions of heat exchanger effectiveness and provides actionable insights for designing resilient and efficient heat exchangers in data centers.
Gracia Abigail Serrano	Human Nutrition Pre-Dietetics	Dr. Sarah Ruiz	Association between corticosteroid therapy and vitamin D deficiency related bone loss in pediatric patients with acute lymphoblastic leukemia	Children undergoing treatment for Acute Lymphoblastic Leukemia (ALL) have an increased risk of osteoporosis and fractures after prolonged corticosteroid therapy. This research investigates how corticosteroids can induce vitamin D deficiency, leading to decreased osteoblast activity and increased bone resorption independently of hyperthyroidism. Through observational, hormonal and biochemical studies, comparisons between pediatric patients and healthy siblings

				were done to examine the effects of prolonged corticosteroid therapy in vitamin D levels and bone density. Supplements were used to treat deficiencies but proved to be ineffective due to the decreased absorption of these micronutrients in small intestine. The main study findings included a higher prevalence of vitamin D deficiency (70%) than their healthy siblings. Addressing the side effects of corticosteroid therapy is essential to improve the long-term life quality of patients. These findings can help in the field of clinical dietetics to screen for additional nutritional needs in pediatric patients undergoing cancer treatments.
Tiara Sibley	Environmental Science	Dr. Omar Holguin	Establishing an Aroma Fingerprint for Sotol: Volatile Profiling to Support Sustainable Crop Diversification and Value-Added Distilling	This work generates an initial "aroma fingerprint" for sotol, a distilled spirit produced from a native desert plant (Dasylirion spp.). Distilled spirits from Dasylirion spp. are culturally and economically significant in Mexico, and the plant species is distributed throughout the southern and southwestern United States. While agave-derived spirits such as tequila and mezcal have been extensively characterized, the volatile organic compound (VOC) profile of sotol remains largely unexplored. Establishing this chemical baseline is an important step toward validating sotol as a sustainable, low-water-use crop and a high-value product for the emerging craft distilling industry in New Mexico. To address this knowledge gap, HS-SPME-GC-MS was used to characterize volatile compounds in commercial sotol spirits, while FTIR spectroscopy provided complementary chemical signatures of the plant-derived matrix and distillation products. Preliminary HS-SPME-GC-MS analysis indicates that the volatile profile is dominated by fruity ethyl esters, particularly ethyl decanoate, ethyl octanoate, ethyl hexanoate, and ethyl dodecanoate. Odor annotation suggests that fruity notes dominate the aroma profile, followed by citrus, green/herbal, floral, and spicy/phenolic sensory attributes.
Jose Luis Simental	Food Science and Technology	Dr. Gonzalo Miyagusuku-Cruzado ACES UG Research Scholars Program	Redefining the Kick: Why Some Chiles Burn Brighter and Longer than Others	The spicy sensation of chile peppers arises from capsaicinoids interacting with the Y511 residue of the TRPV1 receptor. While capsaicin produces strong pungency, lesserstudied- capsaicinoids vary in intensity and pungency duration. This research investigates how these minor capsaicinoids engage TRPV1. Molecular docking simulations were conducted using AutoDock Tools and PyRx/Vina, with visualization and proximity analyses performed in PyMOL. Capsaicin and dihydrocapsaicin served as controls to validate the workflow. Results indicate that differences in pungency stem from variations in bond strength. Capsaicin and nonivamide form an Amide–O–H–O bond with Y511, whereas dihydrocapsaicin and nordihydrocapsaicin interact through an Amide–N–H–O or aromatic–O–H–O bonds. The stronger Amide–O–H–O bond explains the heightened and longer duration of pungency of capsaicin relative to minor capsaicinoids. These insights have applications in cultivar development and ingredient formulation, enabling tailored pungency profiles for growers and food manufacturers.
Mia Perez and Camille-Loya Smith	Kinesiology-Exercise Science	Dr. Christopher Aiken & Kehinde Obidele, PhD (c)	Timing Matters: A Scoping Review of How Transfer of Learning is Operationalized and Measured in Motor Skill Research	Co-Authors: Mia Perez, Camille Loya-Smith, Kehinde Obidele. Dr. Christopher Aiken Transfer of learning where prior practice improves performance on novel or modified tasks is a central criterion for learning in motor skill research. Despite its theoretical importance, its operationalization and measurement vary widely, particularly with respect to transfer timing. This scoping review examined how transfer has been assessed in motor learning studies comparing immediate or within-24-hour transfer to delayed transfer beyond 24 hours. A systematic search of Web of Science, PubMed, and Google Scholar (2015–2025) yielded 19 eligible studies. Results revealed that most studies assessed transfer within 24 hours of practice, with only five studies employing delayed intervals exceeding 24 hours. Task types ranged from discrete laboratory movements to sport-specific skills. Key gaps

				include inconsistent operationalization of transfer tasks and limited investigation of delayed transfer. Future research should standardize transfer test definitions and incorporate longer follow-up intervals to clarify the durability of motor skill learning.
Estefania Solano Calderon	Mechanical and Aerospace Engineering	Dr. Shabnam Mohammadshahi	Surface Roughness Effects on Static Ice Adhesion in Nanoparticle-Coated Superhydrophobic Surfaces	Ice accumulation on engineered surfaces poses significant challenges to the reliability and safety of energy infrastructure and transportation systems. Superhydrophobic surfaces (SHSs) have emerged as a passive strategy for reducing ice adhesion by trapping air pockets (plastron) at the solid-liquid interface, thereby limiting the contact area between ice and the substrate. In this study, SHSs were fabricated by depositing hydrophobic nanoparticle coatings onto sandpaper substrates with grit sizes of 240, 400, and 1000, producing surfaces with varying micro-scale roughness. Ice adhesion strength was evaluated under static freezing conditions by measuring the peak detachment force required to remove ice from each surface. Results suggest that coarser textures require higher removal, as the increased ice-adhesion outweighs the benefit of enlarged plastron predicted by the Cassie-Baxter model.
Damian Soriano	Human Nutrition and Dietetic Sciences	Dr. Shadai Martin	Impact of community nutrition education in fruit and vegetable intake in southern New Mexico	Low fruit and vegetable intake remains a public health concern in Southern New Mexico, particularly in underserved communities with limited access to nutrition education and healthy food options. Inadequate consumption is associated with increased risk of obesity, diabetes, and cardiovascular disease. This study examined the impact of a brief community-based nutrition education session on fruit and vegetable intake among adults in Southern New Mexico. A pre–post survey design was used with 30 adult participants attending a community health workshop. Participants reported average daily fruit and vegetable intake before the session and two weeks after the intervention. A paired samples t-test conducted using SPSS revealed a statistically significant increase in mean daily servings following the session ($p < 0.05$). Findings suggest that short, community-based nutrition education programs may positively influence dietary behaviors and support improved diet quality in Southern New Mexico communities.
Madeleine Sterling	Psychology	Dr. Michael Hout Dr. Giovanna Del Sordo	Enhancing Sustained Attention Through Non-Invasive Brain Stimulation	Research using transcranial direct current stimulation (tDCS), a non-invasive brain stimulation technique, has demonstrated its role in enhancing cognitive functions, such as attention, memory, and learning. However, only a few studies have investigated the effect of tDCS on sustained attention, the ability to maintain focus over extended periods. In this experiment, the effects of tDCS on sustained attention are measured using pupillometry (the measurement of pupil size) as a proxy for cognitive activity. Pupil dilation patterns will be compared before and during stimulation while participants complete several sustained attention tasks. Three stimulation conditions are used: frontal, parietal, and sham. The first two conditions are intended to target different attentional networks and the third to control for placebo effects. Findings from this study may contribute to a deeper understanding of how tDCS can enhance sustained attention and may have implications for both general and clinical populations.
Molly Streich	Biochemistry, biology	Dr. Christopher Baker	Development of High Sensitivity Quantitative Methods for Short Oligonucleotides in Biological Samples	Short oligonucleotides (<100 bases), including microRNA (miRNA) and cell-free DNA (cfDNA), play an important role in normal and disease-state biology. While quantitative PCR (qPCR) is widely used, its limitations at these short lengths necessitate alternative amplification methods. Rolling circle amplification (RCA) stands out for its simplicity and linear amplification profile. Most RCA advancements focus on accelerating reaction times to mimic PCR, with less emphasis on leveraging its quantitative capabilities. Here, we present two complementary approaches to quantitative RCA. First, we apply machine-learning algorithms, such as principal component regression and uniform manifold approximation and projection UMAP, to build calibration models predicting

				oligonucleotide concentrations using real-time RCA with SYBR-Gold dye. Second, we develop a microfluidic droplet generator to adapt RCA into a digital droplet format. We describe the principles behind both methods and provide proof-of-concept experimental results, demonstrating their potential for accurate and scalable short oligonucleotide quantification.
Karen Suarez	Psychology	Dr. Timothy Ketelaar	Who Joins a Twitter Mob?: Inter-Elite Competition, Moral Outrage, and the Dynamics of Digital Collective Action	Over the past decades, public controversies within academic and professional communities have increasingly migrated onto social media platforms such as Twitter/X. These online conflicts—often described as "Twitter mobs" or instances of "cancel culture"—typically involve members of a social group using digital platforms to coordinate public criticism or calls for accountability against a targeted person believed to have violated community norms or values (Lukianoff & Schlott, 2023; Tegrarian, 2023). Despite their growing influence on academic discourse, little is known about who participates in these coordinated campaigns. This project examines participation in a widely circulated 2022 academic petition that originated on social media and was later submitted to organizational leadership. Drawing on Turchin's (2016) structural-demographic theory of inter-elite competition, we analyze whether participation varies across positions in the academic status hierarchy. The study presents an initial descriptive portrait of participation in "cancel culture" by academic status (Elite, Aspiring Elite, Non-Elite).
Elizabeth Swenson	Museum Conservation, minor Chemistry	Dr. Eowyn Kerr-Di Carlo	Bringing a 19th century Mexican Devotional Painting Back to Life	How do you restore a 150+ year-old painting that can no longer be displayed? This project presents a case study on the conservation of one of the earliest objects donated to the University Art Museum, the Madonna and Child (UAM 1964.04.03), from the museum's significant collection of Mexican devotional paintings. The procedure required nearly a year of treatment after the initial examination revealed severe deterioration, including historic water damage that compromised structural integrity, multiple tears and holes, contamination from rodent urine and flies, and damage resulting from unstable humidity and earlier improper treatment, which left the painting unexhibitable. As outlined in this poster, conservation treatment involved UV examination, solvent testing for cleaning, consolidation of friable paint, repair of complex tears, humidity treatments, traditional lining, filling of losses, and inpainting. This project brings new clarity to its meaning, preserves an important cultural object within the NMSU collection, and enables future research and exhibition.
Diana Marie Tapia	Food science and technology	Dr. Gonzalo Miyagusuku - Cruzado ACES Undergraduate Research Program	Cracking the code: Chemical and physical Characterization of Mechanically Pressed Pecan Oil	Co-Author: Elora N. Roberts New Mexico is the second largest pecan producer in the US with potential for various value-added applications. However, there is limited research on the optimization of high-quality mechanically pressed pecan oil. The objective of our study was to characterize the quality of pressed pecan oil and establish quality parameters. Mechanical extraction was performed under different temperatures and screw speeds. The oil collected was filtered and stored under nitrogen at -80 °C for further analysis. Characterization analyses included yield, free-fatty acid content, p-anisidine value, and antioxidant activity. This information will assess the impact of processing parameters on oil quality and potential bioactivity. We are currently collecting data, but we expect to see a correlation between processing parameters like temperature and screw speed on yield, quality, and bioactivity. Results will provide guidance to pecan producers for an effective extraction of pecan oil that does not compromise quality and maximize value.

John Tellez Jr.	Mechanical and Aerospace Engineering	Dr. Mahdi Haghshenas-Jaryani	Controlling a Soft Robotic Exoskeleton for Human-Robot Interaction	Soft wearable robots have inherent compliance suited for rehabilitation and physical therapy, but require stabler controlling abilities for safe use. This research has developed a foundational control system to control a soft robot for human-robot interaction. First, the soft robot was programmed to a set motion to imitate the desired action while processing signals from integrated sensors that determined the relationship between air pressure; sensor variables included the angular position and force. Comparing the results of each variable, a fixed relationship was found between them and air pressure. As result, two control systems were developed as proofs of concept, each using either force or angular position to control the air pressure inside the soft robot. This research could help further develop a comprehensive control system for such rehabilitative robotic systems that add new variables for more precise and safer interaction with human fingers.
Aneesa Thompson	Human Nutrition/Pre-Dietetics	Dr. Sarah Ruiz	Prevalence of Hypertension in Black Americans: The Role of DASH Diet Adherence in Reducing Racial Disparities	Hypertension continues to disproportionately affect Black Americans, often appearing earlier in life and causing more severe complications than in any other racial or ethnic group. This synthesis examines the social, biological, and structural factors behind these disparities and highlights the role of DASH diet adherence as a key yet underused intervention. While the DASH diet is proven to significantly lower blood pressure, Black Americans still face ongoing barriers to following it, including food insecurity, limited access to fresh produce, cultural differences in dietary guidance, and chronic exposure to structural inequalities. Recent studies show that culturally tailored DASH programs and increased food access can effectively lower blood pressure in Black adults, emphasizing the importance of nutrition strategies that address both individual habits and systemic challenges. Understanding how DASH adherence interacts with racism, neighborhood conditions, and healthcare disparities offers a clearer pathway to reducing hypertension gaps and improving long-term cardiovascular health.
Sarrah Trujillo	Anthropology and Sociology	Dr. Lois Stanford Tri-CEA Research Team (NSF award No. 2418345)	Controlled Environment Agriculture on the Navajo Reservation	This project, Collaborative Research: RII FEC: Harnessing Controlled Environment Agriculture to Secure Sustainability and Economic Growth, is intended to introduce, and potentially implement, hydroponics to Native American farmers about Controlled Environment Agriculture (CEA) systems on Native American reservations. The objectives are to 1: advance the fundamental understanding of CEA (interact, experiment and understand how the systems work as well as record the plant's outcome), 2: assess the social and economic impacts of CEA (environment, nutrition, and economic changes) and 3: enhance and develop the workforce (give tribal communities training and knowledge to become stronger and have a more long term agriculture practice. This is done through research into Hydroponic systems such as the NFT (Nutrient Film Technique) and the DWC (Deep Water Culture) which are water sustainable farming methods.
Grafton Urbatsch	Electrical Engineering	Dr. Alyssa Vanderlinden	Virtual Reality Effects on Gait, Balance, and Gaze in Children with Autism Spectrum Disorder	Background: Autism Spectrum Disorder (ASD) affects 1 in 36 U.S. children and is associated with atypical gait and balance deficits. Prior research has focused on behavioral symptoms, while motor impairments remain underexplored. Virtual reality (VR) improves engagement in ASD interventions, yet its effects on gait, postural control, and visual-motor integration are poorly understood. Gap: Few studies examine functional locomotion and gaze behavior in VR among children with ASD. Understanding natural motor responses in immersive environments is critical before developing VR-based interventions. Research Question: Do children with ASD demonstrate altered gait, postural sway, and gaze patterns in VR compared to real-world tasks and neurotypical peers? Hypothesis: Children with ASD will show decreased lower-extremity range of motion and increased sway in VR. Methods:

				Participants: 25 ASD and 25 neurotypical children (8–17 years), free of orthopedic or seizure disorders. Instrumentation: Vicon motion capture, AMTI force plates, VR headset with eye-tracking. Protocol: Real and VR walking, standing, and obstacle tasks (12 randomized trials per condition). Significance: Findings will inform development of targeted VR-based motor interventions for ASD.
Samyra Valenzuela	Psychology, minor Nutrition	Dr. Sarah Ruiz Applied Nutrition Research Course	Anorexia Nervosa and Hypophosphatemia in Adolescents	Refeeding Hypophosphatemia (RH) is a potentially life-threatening metabolic complication that may occur during nutritional rehabilitation in adolescents with anorexia nervosa (AN). This research synthesis examines the physiological mechanisms underlying RH and its clinical relevance during the refeeding process. When nutrition is reintroduced after prolonged periods of malnutrition, metabolic and hormonal shifts alter the distribution of phosphorus in the body, potentially disrupting energy production on a cellular level and impairing organ function. As phosphorus plays a critical role in cellular metabolism and energy pathways, depletion during refeeding may lead to significant medical complications in the patient. This project reviews current literature on the topic to explain the relationship between malnutrition and refeeding, metabolic adaptation, and phosphorus imbalance in adolescents with AN. Understanding these mechanisms is essential for healthcare professionals, such as dietitians, to support safe nutritional rehabilitation and reduce patient risk during treatment.
Alex Verduzco	Chemical Engineering	Dr. Alejandro Gallegos	Interfacial Charge Regulation Drives Weak Polyelectrolyte Adsorption	The adsorption of weak polyelectrolytes to charged surfaces is governed by a balance between electrostatic attraction and pH-dependent chemical equilibria, mediated by polymer connectivity and conformational constraints. Unlike strong polyelectrolytes, weak polyelectrolytes undergo charge regulation and can exhibit spatially heterogeneous ionization near interfaces, which leads to non-monotonic adsorption as a function of pH. Here we employ Ising density functional theory (iDFT), which explicitly couples ionization equilibria, electrostatic interactions, and polymer conformational statistics, to study adsorption of weak polyelectrolytes onto an oppositely charged planar surfaces as a function of pH, salt concentration, polymer concentration, and surface charge. We find that adsorption is typically maximized at pH values below the intrinsic equilibrium constant, and is strongly modulated by salt concentration. While the magnitude of adsorption increases with surface charge, the pH at which maximum adsorption occurs is largely insensitive to surface charge. Both salt and surface charge act primarily through their influence on interfacial charge regulation: increasing salt suppresses the surface-induced enhancement of ionization via electrostatic screening, whereas increasing surface charge promotes ionization near the interface such that the effective charge of the adsorbed polymer layer approaches that of the surface.

Celeste Villasenor	Environmental Science	Dr. Martha Desmond	Ectoparasites of the American Kestrel (*Falco sparverius*) in the Mesilla Valley and Desert Scrub environments	The decline of the American kestrel in the Southwest presents significant concerns with the general decline of birds worldwide. It is reported that these raptors are declining at a rate of -1.4% per year, nationwide (Lawson, A. 2023). The main cause of their decline is yet unknown; many causes have been suggested, such as urbanization, pesticides, climate change, habitat loss, predation by increasing Cooper's Hawk populations, and West Nile virus (Smallwood et al. 2009). With changing global climates, parasite types and loads may differ across different environments. Agricultural lands often have higher humidity levels and resources for insect species, where ectoparasite loads are estimated to be higher than in desert scrub environments. This study focuses on the quantification and identification of ecto-parasites on adult American Kestrels in both agricultural areas and desert scrub environments, in correlation with body condition. Dust-ruffling, a method of ecto-parasite removal, will be used to remove and quantify the parasites. Involving the application of a flea and tick powder onto the bird's body, and the preservation of ecto-parasite specimens for identification (Koop, J. A., & Clayton, D. H., 2013).
Liliana Vizcarra, Santiago Diaz, Alexander Alvarez, and Elisa Araiza	Electrical Engineering	Dr. Bethuel Khamala	Experimental and Field Analysis of Projectile Motion in Undergraduate Physics Research	This study explores projectile motion through controlled lab experiments and field activities. Inspired by Calculus-Based Physics, research for the Course for Undergraduate Research in Physics examined how launch angle affects maximum height, horizontal range, and time of flight. Using a PASCO mini ball launcher and video measurements, projectiles were launched at angles from 30° to 60°. Model rockets were also launched in the field to observe real-world behavior. Experimental data were compared with theoretical predictions from calculus-based kinematic equations. Results showed the maximum horizontal range near 45°, matching theory. As angles increased beyond 45°, range decreased while flight time increased. Percent errors ranged from 2% to 60% for range and 26% to 72% for flight time, mainly due to air resistance and measurement limits. These findings confirm the accuracy of calculus-based models while emphasizing real-world factors. The study highlights the value of undergraduate research in linking theory with experimental and field applications.
Summer Herrod and Allison Wilson	Kinesiology-Exercise Science	Dr. Christopher Aiken and Kehinde Obidele, PhD (c)	Cue Quality in Attentional Focus Research: A Systematic Disparity Between Internal and External Instructions	Attentional focus research consistently reports external focus advantages for motor learning and performance (Wulf, 2013; Wulf & Lewthwaite, 2016). Yet the instructional quality of cues used to induce each focus condition remains unexamined. Herrebrøden (2022) identified an information quality confound suggesting cue construction independent of focus direction may partly account for reported external focus advantages. This scoping review evaluated the structural quality of internal and external attentional focus cues across empirical motor learning studies using a four-criterion framework: specificity, action-effect mapping, singularity, and clarity. Analysis of 68 code able cues across 28 studies reveals external focus cues more frequently fail action-effect mapping, directing performers toward referents without specifying movement relationships. Internal focus cues predominantly failed on specificity and singularity. These asymmetric failure patterns represent a plausible confound warranting re-evaluation of whether reported external focus advantages reflect attentional direction or differential instructional quality.

Lauren Wong	Genetics and Biotechnology, minors Biology and Biochemistry	Dr. Amanda Ashley NM AMP URS Program	Investigating the ability of DNA-PKcs to regulate R-loop accumulation	R-loops are a natural phenomenon that form between double-stranded DNA and single-stranded RNA. Aberrant accumulation is associated with genomic instability and DNA damage, eventually leading to cancer and neurological diseases. Previous data suggest that DNA-PKcs decreases R-loop accumulation and increases cell survival, making it a potential cancer treatment. Our research focuses on how the presence of a DNA damage response kinase, DNA-PKcs, may mitigate R-loop homeostasis in cells. We treated M059K and M059J cell lines, which differentially express DNA-PKcs, with camptothecin, a chemical known to induce R-loops. R-loop presence was measured using immunofluorescence and quantified in ImageJ. Future research can investigate the specific regulatory mechanisms by which DNA-PKcs interacts with DHX9 and uncover additional potential therapeutic targets for both cancer and neurological diseases.
Richard Anthony Ybarra	Civil Engineering	Stanley Cheng Amanda Madrid	Fluoride in the Environment: What can we learn from Excel & Public Data	Inorganic fluoride is a naturally occurring component of groundwater and surface water, and understanding its behavior is important for interpreting water quality in New Mexico, where water is increasingly scarce and environmentally significant. Guided by Professor Runwei Li, this study focuses on fluoride levels using publicly available WaterQualityData and organizes the dataset through Excel to identify clear, interpretable patterns.New Mexico samples were filtered by environmental media using the ActivityMediaSubdivisionName field, allowing comparisons across groundwater, surface water, and sediment. Patterns in fluoride concentration, sampling frequency, units, and detection limits were examined to understand how fluoride behaves differently across these media. By building a basic, data-driven picture of inorganic fluoride in New Mexico, this project demonstrates how simple analytical tools can help general audiences interpret environmental datasets and lays a foundation for more advanced water-quality research in the future.
Karmen Yousif	Biology	Dr. Charles Shuster RIO-STEM Program	Probing the changes in cytoskeletal organization during oocyte growth	Oocytes develop from germ cell progenitors and must increase in cell size before completing meiosis. Previous work in our lab, has demonstrated that fully grown oocytes (arrested in G2 of Meiosis I) have some of the highest levels of cortical tension measured for any cell type. In sea stars, this tension drops rapidly following resumption of meiosis, due to changes in cortical actin and myosin II. And while we have successfully identified the pathways that lead to these changes, their functional significance remains unknown. Moreover, we don't know when during oocyte development increased tension is first manifested. Toward these ends, we are immunolabeling sea star oocytes of different sizes with probes for contractility (phospho-myosin II) or viscoelasticity (Arp2/3), and then imaging samples using confocal microscopy. By defining when oocytes acquire this elevated contractile state, we hope to better understand how the changes during meiosis contribute to fertilization and development.