

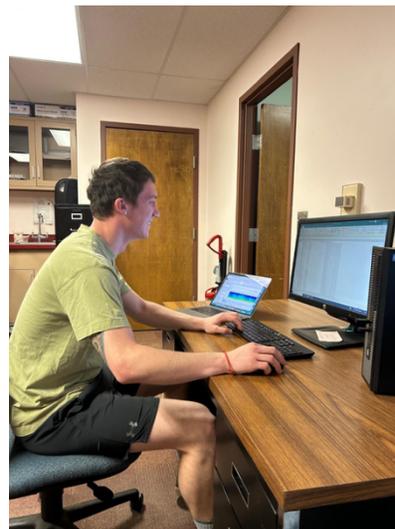
## **Assessing efficacy of autonomous recording units (ARUs) for surveying rare small mammals in New Mexico**

**UG Researcher:** Sebastien Comtois

**Faculty Mentor:** Dr. Jennifer Frey

This project explores the use of sound-recording technology and artificial intelligence (AI) to improve how rare small mammals are monitored in New Mexico. Many small mammal species are difficult to study using traditional methods because they are elusive, nocturnal, or sensitive to disturbance. By using acoustic recording units that passively collect sound data and AI programs that can recognize species-specific vocalizations, this project aims to develop a more efficient and non-invasive way to detect and monitor these animals in areas that can be hard to reach like White Sands Missile Range (WSMR).

The overall goal is to create a monitoring approach that is less disruptive, more cost-effective, and capable of covering larger areas than traditional field surveys. This work has the potential to benefit wildlife managers, researchers, and conservation organizations by providing better tools for tracking rare and vulnerable species and reducing reviewer time spent listening to files.



## **Effect of Three Degree Temperature Change on Sensory Properties of Ice Cream**

**UG Researcher:** Alejandro Schutte

**Faculty Mentor:** Dr. Sergio Martinez-Monteagudo

The food industry set  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) as the standard temperature for global transportation and storage of frozen goods. However, studies have shown that raising this temperature to  $-15^{\circ}\text{C}$  could reduce energy consumption and lower the industry's carbon footprint. While this adjustment offers environmental benefits, it may also compromise product quality by promoting ice and lactose crystal growth and texture degradation, ultimately leading to poor quality products. To prevent unnecessary energy consumption and reduce the risk of ice cream waste due to quality loss, we designed a study to better understand and address these effects. This project investigates the impact of storage on the sensory properties of two formulations, "Control" and "Premium", of vanilla ice cream. Samples have been stored under both constant ( $-18^{\circ}\text{C}$  and  $-15^{\circ}\text{C}$ ) and fluctuating temperatures to mimic transportation (single 45-minute refrigeration) and household freezer (three 45-minute refrigeration) abuse. During this six-month study, a trained sensory panel ( $n=10$ ) is monthly evaluating changes in body & texture and flavor, with a focus on defects such as icy, sandy, gummy, lacks freshness. Duplicate samples are simultaneously analyzed using texture profile analysis (TPA) for attributes including hardness, springiness, and adhesiveness.



Principal components analysis has revealed strong associations between sensory and TPA characteristics (e.g., sensory gummy and TPA resilience). To date (4 months of data analysis), mean scores for icy, greasy, and sandy texture defects and nonfat milk flavor have increased over time. However, neither temperature nor temperature abuse had a significant impact on sensory or TPA characteristics. If temperature and abuse continue to show little effect on ice cream quality, a 3°C increase in frozen storage temperature is justified.

## **Cracking the Code: Characterization of Cold-Pressed Pecan Oil**

**UG Researcher:** Diana M. Tapia

**Faculty Mentor:** Dr. Gonzalo Miyagusuku-Cruzado

The goal of this research is to develop a clear framework for producing high-quality, cold-pressed pecan oil for consumption. Because pecans are one of the most abundant crops in New Mexico, our primary audience is local pecan farmers. The data generated from this project will provide them with practical guidance on how to convert pecan byproducts into commercially viable pecan oil. This information will help farmers identify the processing steps needed to replicate our results, enabling them to produce a high-quality product suitable for both consumers and corporate buyers. Ultimately, this research has the potential to enhance the value of local pecan crops, improve productivity within the sector, and contribute to economic growth in New Mexico. Additionally, the project establishes a foundation for future students to explore and evaluate other specialty oils with similar potential.



## **Evaluation of the influence of CXCL12 signaling on inflammatory cytokines during gestation in an ovine model**

**UG Researcher:** Ema Alvarez

**Faculty Mentor:** Dr. Ryan Ashley

The goal of this research project is to investigate how manipulation of the CXCL12/CXCR4 signaling axis influences chemokine and cytokine expression within reproductive and immunoregulatory tissues that are essential for successful implantation and placental development. Proper regulation of immune signaling at the fetal-maternal interface is critical for establishing and maintaining pregnancy. Disruptions in cytokine and chemokine balance have been associated with reproductive complications, including implantation failure, pregnancy loss, and impaired fetal development. By evaluating how modulating the CXCL12/CXCR4 axis affect pro-inflammatory and anti-inflammatory signaling pathways, this study aims to improve understanding mechanisms within gestation. Improving pregnancy outcomes is essential for maintaining herd productivity and sustainability within the livestock industry. Overall, this research has the potential to contribute to the development of management strategies or techniques that reduce the occurrence of abortions and stillbirths in livestock. Enhancing reproductive success not only supports animal health and welfare but also strengthens agricultural production systems that are vital to meeting global food demands.

## **Calibration of near infrared spectroscopy to predict forage quality of key desert grasses**

**UG Researcher:** Emilio Gonzalez

**Faculty Mentor:** Dr. Santiago Utsumi

The goal of this project is to calibrate near-infrared spectroscopy (NIRS) as an accessible, low-cost method for rapidly assessing forage quality, providing an alternative to traditional wet chemistry analyses. Conventional methods are often expensive and time-consuming, limiting their routine use for timely management decisions. By contrast, the calibrated NIRS approach will enable faster and more cost-effective evaluations of forage nutritional value. Upon completion, the project is expected to support the development of an external service for livestock producers and land managers to monitor pasture quality. This capability will allow users to make timely, informed decisions regarding grazing management and livestock nutrition. More broadly, the project will contribute to the adoption of practical tools and technologies that enhance livestock production in arid and semiarid rangeland environments.



Clipping Samples



Preparing Samples



Scanning Samples

## **Effects of Treated Produced Water on Female Reproductive Behavior, Ovarian Weight, and Fertility in Mice**

**UG Researcher:** Flavia Gabaldon Asunsolo

**Faculty Mentor:** Dr. Ryan Ashley

Treated produced water is a by-product of oil and gas extraction and is increasingly considered a potential alternative water source in arid agricultural regions. However, its safety for animal and human exposure is not well understood. This project examines how two types of treated produced water affect reproduction and health in Swiss mice. By comparing animals that drink control water (RO water without remineralization), with those receiving TPW-1 or TPW-2, we can evaluate whether these waters influence body weight, organ development, fertility, or gene expression.

So far, male mice have shown no major differences in body or organ weight, but early results suggest that reproductive success may vary between groups. If TPW-2 proves to have little or no negative impact, it could become a valuable resource for livestock producers facing water shortages. This research will help scientists, producers, and students better understand the risks and benefits of treated produced water reuse, contributing to evidence-based decisions about sustainable water management.

## **Effect of Different Storage Temperatures on Melting Behavior of Ice Cream**

**UG Researcher:** Johanna Gebbia

**Faculty Mentor:** Dr. Sergio Martinez-Monteagudo

The standard temperature for storage and transportation of frozen goods is  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ).

Nevertheless, research has shown that increasing the temperature to  $-15^{\circ}\text{C}$  could reduce energy consumption and lower the industry's carbon footprint. Although this modification has advantages for the environment, it may also lower product quality by changing the melting properties of ice cream in a negative way that can lead to consumer rejection. We conducted a study to measure ice cream melt properties changes over time, aiming to provide concrete data for the food industry to make informed decisions about frozen storage temperatures.

"Control" and "Premium" formulations of vanilla ice cream were frozen and stored at both constant ( $-18^{\circ}\text{C}$  and  $-15^{\circ}\text{C}$ ) and fluctuating temperatures to mimic transportation (a single 45-minute refrigeration cycle) and household freezer (three 45-minute refrigeration cycles) abuse. The onset of melt was measured by the time at which the first drop of melted ice cream was observed. The rate of melt was determined from the slope of the linear portion of the melting curve, representing the percentage of melted ice cream every 5 seconds.

Data have been collected and analyzed for months zero through four. Analysis of variance was conducted to determine if main effects (temperature (2), formulation (2), abuse (3 conditions), and time (5)) had an impact on the onset or rate. The data indicated a trend for abuse affecting onset ( $p=0.10$ ), temperature affecting onset ( $p=0.06$ ), and temperature affecting rate ( $p=0.09$ ). Evaluating six-months of storage data will provide evidence for how frozen storage temperature and fluctuations affect ice cream quality, enabling quality maximization through better cold chain management.

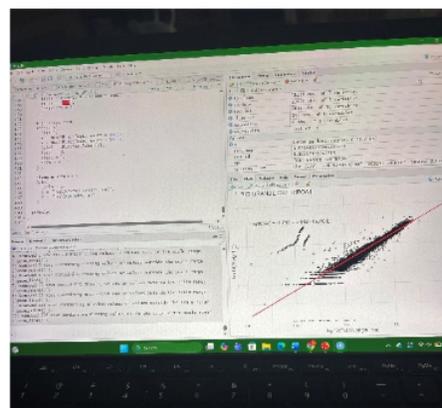
## Development of Standard Weight Equations for Six Southwestern Fishes

**UG Researcher:** Kylie Rubrecht

**Faculty Mentor:** Dr. Zachary Klein

First developments of standard weight equations for six southwestern fish species have been completed. Species data were acquired from regional partners from Colorado, Arizona, and New Mexico. Using program R, the data were cleaned and organized by removing incomplete observations and ensuring labeling of datum was uniform across all entries.

Once the data were cleaned, analysis began. The slope and intercept for standard weight equations were then estimated using the regression-line-percentile (RLP) technique. I created a poster highlighting my research and presented the results at the American Fisheries Society Joint Annual Meeting on February 6, 2026. Standard weight equations are a practical method that allows managers to assess relative weight and overall body condition of a fish by comparing the observed weight of an individual to a species-specific “standard” weight. Standard weight equations are commonly developed and widely available for sport fish but are rarely developed for native non-game species. Development of standard weight equations is critical for native fisheries management because it allows managers to use relative weight to accurately assess and monitor body condition of ecologically relevant species. Reliable body condition metrics is a tool that can be used to identify and evaluate potential factors affecting population health such as prey availability, environment and habitat quality, and competition. The goals and impacts of the project are to help fill a knowledge gap for native fisheries across the Southwest and provide data-supported resources for managers to make informed decisions for long-term conservation for these important species.

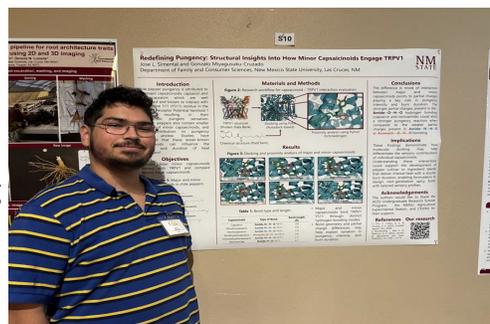


## Beyond the burn: Understanding how “less spicy” capsaicinoids interact in our mouth

**UG Researcher:** Jose Simental

**Faculty Mentor:** Dr. Gonzalo Miyagusuku-Cruzado

Chile pepper pungency arises from a diverse family of chemical compounds known as capsaicinoids, interacting with pain receptors known as TRPV1 (Transient Receptor Potential Vanilloid 1) with each interacting in a slightly different way. While major capsaicinoids such as capsaicin and dihydrocapsaicin are well studied, many minor capsaicinoids remain poorly understood despite their potential influence on heat perception. Gaining deeper insight into how these lesser-known molecules interact with TRPV1 receptors can help explain why different peppers produce distinct sensations of heat. This knowledge can guide food developers in designing products with heat levels that are enjoyable rather than overwhelming, allowing them to fine-tune flavor profiles. It can also assist agricultural producers in selecting or breeding pepper cultivars with more predictable pungency characteristics, ultimately improving consistency for both growers and consumers. By examining these subtle chemical differences, the research has the potential to enhance culinary experiences and support more informed pepper production practices.



## **Flores de la Revolución: Reimagining the Legacy of the Adelitas through Wearable Art**

**UG Researcher:** Nadia Leanos

**Faculty Mentor:** Dr. Insook Ahn

This research aims to reinterpret history and highlight women's strength and resilience through fashion and textile art. Showing how textile practices can express themes of identity, resistance, and empowerment by using fashion as a way to tell stories and comment on society. This project pays tribute to the Adelitas as lasting symbols of bravery and cultural strength by combining design with historical context. The final garment will function as a "woven memory" that connects the courage of the past with modern fashion, social justice, and cultural pride. Raising awareness of the important but often overlooked role of women in the Mexican Revolution and informs the public about the true history behind the myth. This piece will honor the legacy of the Soldaderas by changing their image from a romanticized or sexualized stereotype, known as the "Adelita" persona, to a symbol of strength, resilience, and significant contributions to the Mexican Revolution. Since the Adelitas were mainly peasant women, this research highlights the history of the working class. The expected outcome of this research is to show that the fashion of the Adelitas was a clear reflection of their important roles as soldiers, nurses, spies, and leaders; often challenging the limits set by a male-dominated society. Demonstrating that fashion history includes not just the elite, it also emphasizes the strength of ordinary people. By connecting history, sociology, and textile design, this project examines how clothing serves as a tool for survival, resistance, and identity.

## **Developing and validating a luteinizing hormone radioimmunoassay**

**UG Researcher:** Noel Lara

**Faculty Mentor:** Dr. Jennifer Gifford

The overall goal of this research project is to better understand how reproductive hormones control fertility in beef cattle and how changes in these hormones can affect breeding success. For cattle producers to be successful, cows must reproduce efficiently. When reproduction is delayed or inconsistent, producers lose time, resources, and potential profit. By improving our understanding of the hormonal signals that regulate estrus and ovulation, this research aims to support more effective reproductive management in beef herds.

This project focuses on luteinizing hormone (LH), a key hormone responsible for triggering ovulation. Previous research showed that delivering WNT3A directly into the ovary delayed estrus and ovulation, but the reason for this delay is not fully understood. By measuring LH concentrations in treated animals, this study will help determine whether WNT3A alters communication between the ovary and the hypothalamus, which could explain changes in reproductive timing.

The results of this research may help improve estrus synchronization programs and breeding efficiency, benefiting producers through more predictable reproduction and improved herd productivity. Increased efficiency at the production level can also benefit consumers by supporting a stable food supply. In addition, this project provides valuable hands-on training for students by combining animal handling, laboratory techniques, and data analysis, helping prepare future professionals in animal science and veterinary medicine.



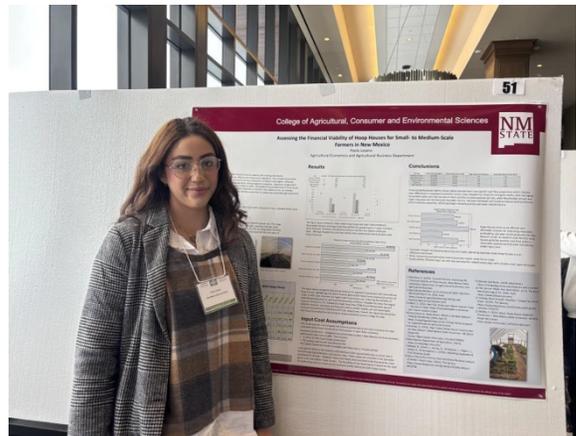
## **The Financial Viability of hoop houses**

**UG Researcher:** Paola Lozano

**Faculty Mentor:** Dr. Carlos Carpio

This research evaluates whether investing in a hoop house is financially beneficial for small- and medium-scale farmers in New Mexico. Hoop houses extend the growing season by protecting crops from extreme temperatures, allowing farmers to plant earlier in the spring and harvest later into the fall or winter. While these structures can increase total production and revenue, they also require upfront construction costs and ongoing operating expenses.

The purpose of this project is to provide growers with a clearer understanding of whether the potential increase in yields and extended harvest periods outweigh the financial costs. By updating yield assumptions, refining cost estimates, and incorporating long-term investment measures such as net present value and payback period, this research offers a more complete assessment of profitability. The development of a financial calculator further translates the analysis into a practical tool that can assist producers in making informed investment decisions. Overall, this work supports improved farm-level planning and contributes to the economic sustainability of agricultural producers in New Mexico.



## **Perceived Importance of High School Cooking and Nutrition Classes in Preventing Malnutrition Among Young Adults**

**UG Researcher:** Disany Sandoval

**Faculty Researcher:** Sarah Ruiz

The goal of this project is to determine if young adults (college students) face a risk of malnutrition and how implementing Cooking and nutrition classes may be beneficial to reduce and prevent malnutrition in young adults. It can potentially highlight or provide insight into barriers young adults (college students) may face with overall health during their transition to adulthood and open up opportunities to implement Nutrition and cooking classes at the High School level to minimize malnutrition risks. This project will benefit students in increasing awareness and knowledge regarding. Macronutrients (protein, carbohydrates, fats), MyPlate, cooking, and their effects on overall health. Pending results from research may lead to more resources on the college campus, education on balanced meals, and available cooking courses. This study could provide students with awareness of malnutrition risks and relation between nutrition knowledge and cooking access.

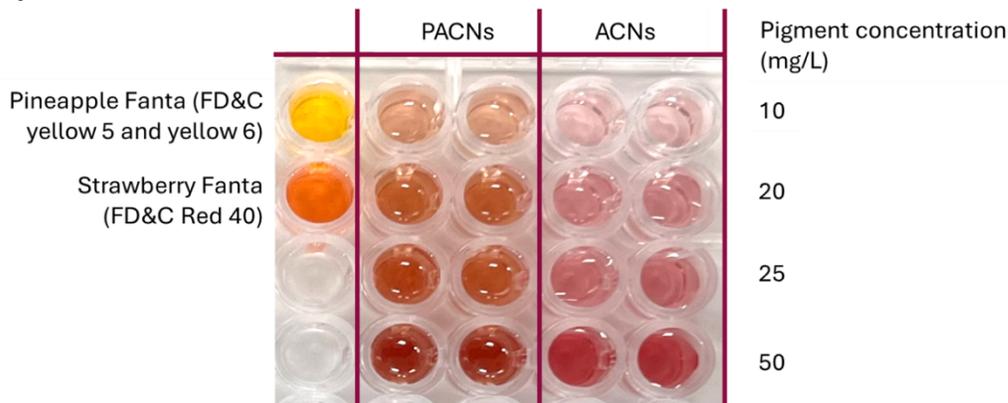


## From Waste to Color: Developing Natural Food Colorants from Winery Agri-Food Waste

**UG Researcher:** Emma Jiron

**Faculty Mentor:** Dr. Gonzalo Miyagusuku-Cruzado

Synthetic colorants are being replaced/removed completely from the food supply by 2027, and current natural alternatives, such as betalains from beet or carotenoids from paprika, lack the stability or color hues necessary for industrial adoption. Our research provides a natural alternative to synthetic colorants that can be used in food products, with a similar color appeal that the CPGs and consumers want. Additionally, our project revalorizes winemaking grape pomace, an abundant agri-food waste readily available in New Mexico. This project will provide a sustainable alternative that reuses food waste and produces colorants that can be used by the food industry. Our research has shown that our colorants have a hue that resembles a mixture of FD&C Red 40 and FD&C Yellow 6 (Figure 2). This research kickstarts colorant research in the Food Science program at NMSU and is beneficial for future students interested in product development and color analysis, as it provides relevant hands-on experience desirable by the food industry.



Colorant comparison against commercial beverages

## Designing the Future of Fashion: Sustainable Methods through Zero-Waste and Traditional Patternmaking

**UG Researcher:** Hai Chau Le

**Faculty Mentor:** Lizette Arenas

The ultimate goal in this research paper is to experience sustainable fashion design for the future development of the industry. At the same time, the conclusions from the process will be considered for the industry's shift in fashion production and raise consumer awareness with the promotion of sustainable fashion. Using sustainable materials, with two designs applying two different techniques, the outcome of the research is practical evaluation based on learned experience about applicability, convenience in communication with the manufacturers, environmental impacts, creative satisfaction, consumer perception and education of two directions of sustainable fashion development: zero-waste pattern and traditional pattern making on sustainable materials.

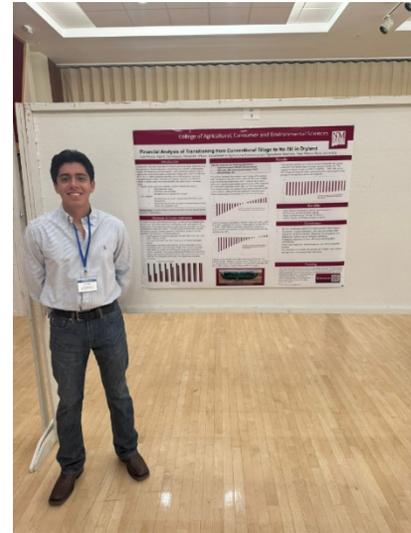


## Financial Analysis of Transitioning from Conventional Tillage to No-Till in Dryland

**UG Researcher:** Luis Ponce

**Faculty Mentor:** Dr. Carlos Carpio

This project evaluates whether adopting no-till practices is financially viable for dryland wheat production in New Mexico. No-till systems are recognized for agronomic benefits such as improved soil structure, better moisture retention, and reduced erosion. However, transitioning to no-till often requires changes in equipment, cost structure, and management, which can create financial uncertainty for producers. The analysis uses an Excel-based economic model to compare conventional tillage and no till systems over a 20-year period for a 500-acre dryland wheat farm. The model accounts for differences in operating costs, capital investment, and yield adjustments, including a temporary yield reduction during the transition years. Under baseline assumptions, the results show that no-till adoption can be financially feasible, with a positive net present value, an internal rate of return above the discount rate, and a reasonable discounted payback period. Additional scenarios indicate that returns remain positive even when nutrient savings are excluded. The analysis also shows that labor savings have a significant impact on investment performance. Overall, the study provides a clearer understanding of how machinery decisions and cost considerations influence the economic feasibility of adopting no-till practices.



## Pollen Project

**UG Researcher:** Ryan Benevidez

**Faculty Mentor:** Dr. Steven Hanson

The overall goal of this project is to determine if native pollinators in and around onion fields have the same, if not, similar pollinating capacity and efficiency as managed honeybees used by these farms for commercial pollination. This is beneficial for producers and farmers, both commercial and private, because it lowers costs and increases sustainability for both the farmers and the bees. Trucking in commercial honeybees is very expensive for farmers and very unsustainable for these farmers to be doing this every year. It's also unsustainable for the bees themselves as the stress of moving around and poor nutrition from monocultured crops often leads to great colony losses. The ecosystem and conservationists also benefit by reducing the need for non-native honeybees and increasing the populations of native bees and other pollinators.



## **Impact of maternal immune activation on wool quality in lambs**

**UG Researcher:** Savannah Monroe

**Faculty Researcher:** Dr. Jennifer Gifford

The main goal of this research was to understand how a mother's health around breeding time can affect her offspring's traits. Specifically, this project looked at whether sickness or inflammation in the mother sheep near the time of conception could influence the quality of the lamb's wool. By understanding this, we can better see how a mother's health during pregnancy can shape the traits and development of her offspring, whether in animals or in humans. This information can also help sheep producers see the importance of keeping their flock healthy during breeding season, which can make a difference in wool quality and overall profitability.