New Mexico Alliance for Minority Participation (NM AMP)

2026 Summer Community College Opportunity for Research Experience (SCCORE) Mini Symposium Booklet

Program dates: MAY 26 - JULY 17, 2026

Program Sponsors:

New Mexico Alliance for Minority Participation

2026 SCCORE STUDENT RESEARCH MINI SYMPOSIUM July 16, 2026

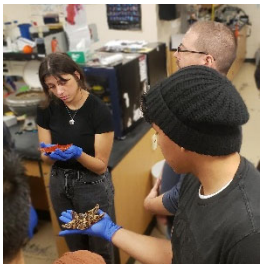
PERSONAL STATEMENTS AND RESEARCH ABSTRACTS

S p e c i a l T h a n k s

Special thanks to faculty mentors, graduate student mentors, parents and families, speakers and laboratory personnel for the time, energy, support, and encouragement you have provided to the students, whose research projects are represented in the document. A list of contributors is provided at the end of this document.

Pictures will be taken at all symposium activities. Students signed a Disclosure Contract to provide permission to use these pictures in appropriate publications as determined by NSF and New Mexico AMP.

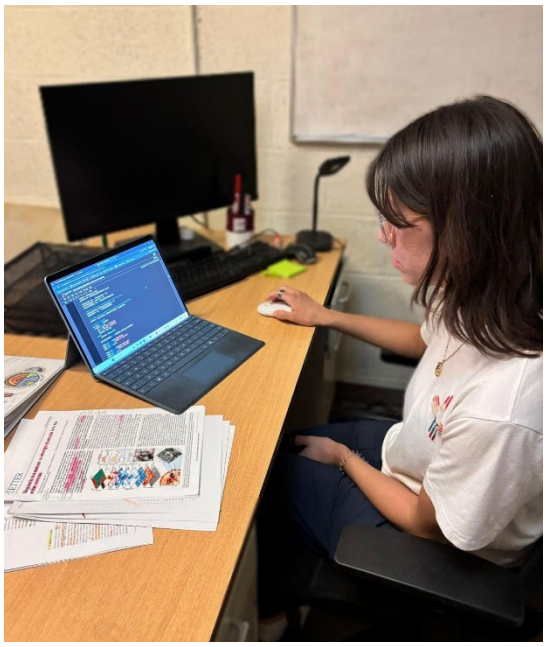
TABLE OF CONTENTS



Angelique Carrillo

Institution: NMSU – Alamogordo

Faculty Mentor: Dr. Juie Shetye, Department of Astronomy, New Mexico State University



Personal Statement:

My name is Angel Carillo. I grew up and live in Alamogordo, New Mexico, where I have developed a deep appreciation for its stunning sunsets and vast summer night skies. I have always been fascinated by the stars. One of my earliest and most favorite memories is looking up at the Milky Way while camping. That experience left a lasting impression on me.

I love the idea of balancing both artistic expression and quantifiable data. From learning to code HTML and CSS for the first time a few years ago, I started to develop an interest in coding and the computer science world. I soon began researching a career path that would consist of both art and using computer technology creatively. My curiosity for the stars coupled with my artistic inclinations led me to learn about quantum and scientific computing. Eventually, I realized that my long-standing interest in space technology was where I wanted to build my career. About two years ago, I decided to return to school at NMSU-Alamogordo to pursue an associate degree in computer science. In this field, I aspire to research satellites and be able to use my experience to help make sustainable choices within computing technology.

Participating in the SCCORE program has allowed me to explore these interests through hands-on research and has strengthened my desire to pursue a career in this field.

Project Title: Identifying Movements of G-band BP's in DKIST Telescope

Abstract: Magnetic Bright Points (MBPs) in the Sun's photosphere can be tracked using image data retrieved from the Daniel K. Inouye Solar telescope in Maui, Hawaii. A python algorithm that detects hundreds to thousands of pixel frame data is used to track gradient and intensity changes over a normalized frame, with a total of 1329 frames. This Python code aims to separate and define these MBPs from other surrounding brightness spots. This research can help researchers be closer at understanding behaviors of the Sun and possibly offer new insights into solar flare and space weather behaviors. Secondly, a visual detection of a single frame was done using the human eye. This was done to show the comparison and abilities of each method. The results showed that, although human eye is good at seeing broader bright points, there was no way to tell if I had detected false positives from the originals. There is room for improvement to make the time spent more efficient. The algorithm itself was beneficial and efficient, but the visual detection could lead to human error. The results show that the computer algorithm detection is at least 50 times more efficient than if the frame were processed through manual detection. The algorithm would take about 110 hours to track 1329 frames if it were to be manually done. This data shows the efficiency of supervised learning capabilities and can lead to a ground-truth dataset in the future.

Leiam Garnett

Institution: Clovis Community College

Faculty Mentor: Dr. Catherine Brewer, Department of Chemical and Materials Engineering, New Mexico State University

Personal Statement:

My name is Leiam Garnett, and I am a student at Clovis Community College. I plan to attend Utah State University to earn a degree in nuclear engineering. I chose this path because I want to work in a field where solving difficult problems can improve people's lives. I know it will take discipline, persistence, and years of hard work, and that challenge is exactly why I am interested in this career.

One of the biggest tests of that commitment came during my junior year while taking Calculus I and II. I was balancing work, school, and family responsibilities, and there were moments when it felt like I had a mountain on my back. Instead of giving up, I persisted. Today, I have completed both classes and am preparing for Calculus III. In addition to my studies, I enjoy cooking as a creative art, listening to music, and hiking trails.

The SCCORE program has given me insight into what a career in nuclear engineering looks like and has made me even more excited about pursuing it. When I walk across the graduation stage, I won't just see a diploma. I'll see the beginning of the future I've been working toward, and I'll know every challenge along the way was worth it.

Project Title: Phase Behavior of Super Critical CO_2 Systems: Organic Acid Chelation of Gadolinium

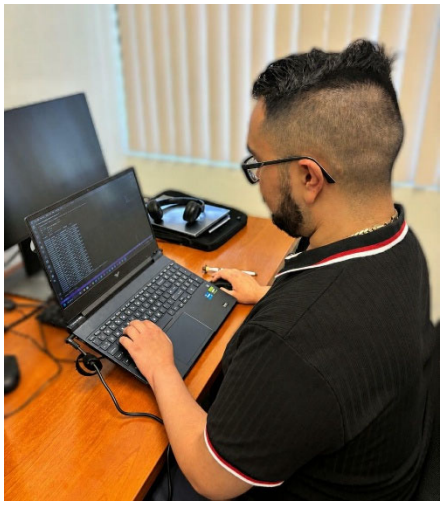
Abstract: Sandia Laboratories discovered a way to potentially extract gadolinium citrate from coal fly ash using chelation from citric acid under super critical conditions in CO_2. This is important because gadolinium is a rare earth metal that has multiple usages including in nuclear waste management. The problem is that we do not understand how organic acids like citric acids behave under those conditions. The objective of this research is to find out how organic acids behave in supercritical CO_2 conditions. A phase analyzer (Supercritical Fluid Tech, Phase Monitor II) is used to collect visual data under those conditions, where CO_2, water and organic acid are mixed in a system. Solutions of water and organic acid are mixed at 0%, 25%, 50%, and 100% (v/v) of each acid. The CO_2 conditions are tested at 35°, 45°, and 55°C, and 1300-8000 psi (89-551 bar).

The results show that acids with more than one carboxyl group tend to have phase changes at greater pressures than those with a single carboxyl group. Increases in temperature, acid concentration, dipole moment, and polarity, are also associated with an increase in pressure needed for the phase change, Indicating the acids with less carboxyl groups will not be able to become homogeneous phase better than those with more carboxyl groups.

Thomas Gloria

Institution: Doña Ana Community College

Faculty Mentor: Dr. Roopa Vishwanathan, Department of Computer Science, New Mexico State University



Personal Statement:

My name is Thomas Gloria, and my major is Information Technology. I graduated from New Mexico State University with a Bachelor of Science in Agriculture in Turfgrass Science and Management in 2021. At that point, I still needed some time to develop more and figure out what I wanted to do with my career. I eventually came to realize that I had the passion to work in the technology industry, and so I used my spare time to explore options that I never had considered before. I used to tinker with virtual machines during my free time in high school and that was the most fun I had with a computer. I liked being a service to my friends. I would test executable and pdf files that they did not feel too confident to test on their computers. Just doing this for the thrill of it was the best time of my life. I decided to pursue better opportunities and decided to make a change.

I applied to Doña Ana Community College and wanted to get into a profession that has job security, financial stability, and a pension. I thought about it for a couple more days. I said Information Tech is the answer. I started in Spring 2025. I decided that I wanted to communicate with others and share the information I have learned from my past undergraduate and current studies. So, that's when I applied to become a substitute teacher. Being around the students has taught me consistent leadership, communication, and hospitability. The needs of my students are more important than mine and I appreciate that. I like working around the students, and I want to make sure they are safe. I want to work in Information Technology for Children, Youth, and Family Department, or the National Center for Missing and Exploited Children.

Project Title: Symmetric vs. Asymmetric Encryption

Abstract: Cryptography is the intricate process of taking text information and applying a protective barrier behind it during transmission. Many institutions make cryptography the foundation of data protection and use these methods to defend against malicious intentions, e.g., banks, private messaging applications, and databases. Efficiency is another key factor in cryptography methods. Companies prefer to have cryptography speed over cryptography power methods. Symmetric encryption involves the use of one private key, and asymmetric encryption works a public key and private key. Worldwide users can have access to the public key, but not everyone can have access to the private key. Typically, symmetric encryption is more efficient than asymmetric encryption. Asymmetric encryption requires stronger cryptographic mathematical and computational power. Current experimentation wants to know if symmetric encryption holds the value of efficiency. Two Python scripts were created for both test subjects, and each test subject was given four files: 1 KB, 10 KB, 100 KB, 1040 KB. Symmetric encryption ran AES-128, AES-256 bit, 3DES, and DES. Asymmetric encryption ran El Gamal and RSA encryption. Both test subjects required 1000 replications of each encryption and decryption process. RAM usage was also monitored regularly. 1000 replications were made to inhibit outliers in the data collection process. Measurements taken were the encryption and decryption averages and standard deviation of encryption and decryption averages.

Jose Pinales

Institution: Doña Ana Community College

Faculty Mentor: Dr. Borys Drach,
Department of Mechanical and Aerospace Engineering, New Mexico State University

Personal Statement:

As a child, I configured and assembled cardboard boxes to re-create fictional devices and tools that I had seen in video games and TV programs. Later, during my leisure time as a teen, I enjoyed developing data-driven programs, playing computer games that had a "design-build" essence, and learning to use three dimensional (3D) designing software. Mathematics quickly became my favorite subject in school. During that very transformative period of my life, I discovered my love for numbers and creating.

As a first-generation student, my academic career has come with some challenges. I left school for a few years due to financial situations, but when I returned to further my education at Doña Ana Community College (DACC), my interest in mathematics and design re-ignited as if I were fifteen again. The return of those feelings, to play, led me to pursue a degree in mechanical engineering. I pursued the SCCORE program to develop skills and gain engineering experience as early as possible because I cannot wait to work on larger projects such as designing electric cars, faster trains, or more fuel-efficient airplanes.

Project Title: Detection of Subsurface Defects Using Thermographic Testing

Abstract: There are multiple non-destructive testing methods used to detect defects such as air bubbles or delamination within engineered materials. One of these methods is Non-Destructive Thermography (NDT) testing. In laminated materials, air gaps heat up at a different rate than the successfully laminated material, and when imaged with a thermal or infrared camera the contrasts are apparent. By applying heat to the material and allowing the heat to propagate, thermal imaging can be used to identify defects within the material. This work aims to determine the maximum depth at which an air bubble can be detected within PLA (polylactic acid) using NDT. Specimens were designed to contain voids at varying depths and then 3D printed. The specimens were painted with matte black paint to prevent reflection, and halogen lights were used as a heat source. An infrared thermal camera was used to image the specimen as it was heated and cooled. Results showed that the maximum depth at which the defects could be detected was 5 mm.

Justin Milkovits

Institution: Doña Ana Community College

Faculty Mentor: Dr. Frank Ramos,
Department of Geological Sciences,
New Mexico State University

Personal Statement:

One of my earliest memories is playing a quiz game with my father during car rides. Every right answer was a dime and if you got ten correct answers in a row, you would win a dollar. I now realize that that quiz game was priming me for scientific thinking in the rest of my life. In high school, I founded a club for participation in the Team America Rocketry Challenge, taking us to the national competition in 2014. In addition to the STEM tasks of rocket design and simulation, the part that I really enjoyed was helping new members develop their technical skills and scientific mindset. After high school I was accepted to California State San Marcos where I began a degree in political science, one of my passions at the time. After 2 years I determined that the degree was no longer in line with my professional goals and pivoted to gaining experience as part of the workforce. After 4 years of customer-focused employment, I joined the US Army. My time in the service reinvigorated my inclination towards technical tasks and instruction. After leaving the service, I took some personal time to evaluate what I wanted to do with my professional focus. I asked myself, “if you could do anything right now, what would it be?” My answer: learn more. I re-enrolled in Doña Ana Community College, with a renewed focus on STEM. Returning to school after a long absence has represented a unique challenge, but also unique perspectives and experience. For example, math used to be one of my strengths, but by revisiting it now, I feel that I have an even stronger and more complete grasp of its concepts. I also love opportunities to relate what is learned in the classroom to real world events and phenomenon. I think that’s why Geology is such a perfect field for me, as it is inexorably linked to real world problems and opportunities. Moving forward, it is my hope to contribute to the body of work in the geology field.

Project Title: Evaluating Crystal/Melt Equilibrium Using Isotope Ratios

Abstract: Dating crystal formation within lava flows can be a difficult task to perform accurately, but establishing accurate estimates of crystal formation can yield unique information about sub-surface materials or future lava flow compositions. Crystals are in equilibrium with the surrounding melt if they formed from that material. Through the isolation and differentiation of isotope ratios, crystal/melt equilibrium can be evaluated. Crystal/melt equilibrium can be used to inform future attempts at isotope decay dating. This research serves to determine crystal/melt equilibrium in a specific sample from the C11 eruption from the Azores Islands through sequential digestion and then dissolution, element isolation using column chromatography, and finally isotope ratio examination using Thermal Ionization Mass Spectrometry (TIMS). At the end of this study, it was determined that the crystals were not in equilibrium with the melt. This finding informs researchers that focus should be on crystal- or melt-specific examination for future dating research.

Javier Rincon-Troitiño

Institution: Doña Ana Community College

Faculty Mentor: Dr. Sarada Kuravi, Department of Mechanical and Aerospace Engineering, New Mexico State University

Personal Statement:

My name is Javier Rincon, and I am a DACC student planning to transfer to NMSU in pursuit of a degree in mechanical engineering. I have always thought of engineering as a means to change the world. We can only have so many good intentions before we must look at our material capabilities and realize what our limitations are. Engineering is the tool that helps transcend such limitations. My goal is to develop the tools from which I can enact the change I would like to see in the world. I have always had a curious spirit that has pushed me to dive deep into anything I come across. This has all motivated me to pursue engineering, its complexity, intriguing nature, and ability to change people's lives for the better. The SCCORE program has given me the opportunity to engage myself within my field and experience what I was looking forward to in my career.

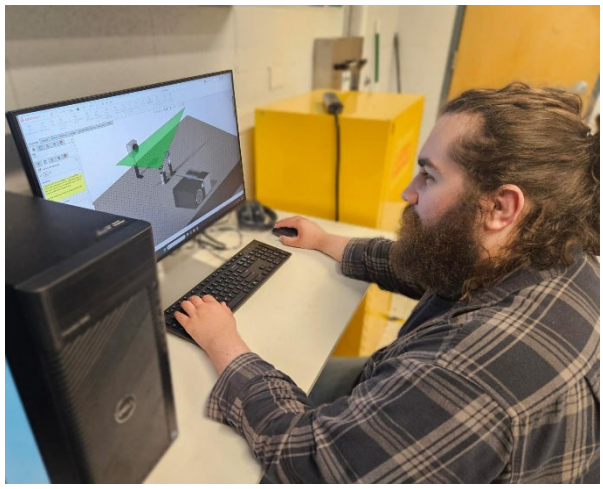
Project Title: Efficiency of Corrugated Channels in HDH Systems

Abstract: As fracking continues to become a more prominent oil extraction method, its harmful byproducts such as wastewater continue to increase in the same capacity. Traditional treatment methods like filtration and chemical solutions prove to be lacking or economically unviable when scaled. Humidifier-Dehumidifier (HDH) systems can be used to create a more scalable and economically efficient method for water treatment. The challenge within these systems resides within their dependency in going away with the heat through heat convection to condense the now purified water. Employing new geometric systems to maximize the convection of heat in the most economically efficient way can help remove harmful waste from fracking and other water contaminating industries. The goal of this project was to test the efficiency of heat transfer of corrugated condensing plates compared with flat panels in a scaled HDH model. An HDH system was constructed with two main chambers, the humidifier chamber equipped with a misting nozzle. Once the air is humidified, it travels to the dehumidifier chamber which houses a condenser. Modifications to key features of the scaled HDH were identified for future work.

Ennis Shanley

Institution: Doña Ana Community College

Faculty Mentor: Dr. Shabnam Mohammadshahi, Department of Mechanical and Aerospace Engineering, New Mexico State University



Personal Statement:

I believe for the further advancement of our species and civilization, humanity must explore; therefore, aerospace engineering is one of the most important disciplines to accomplish this goal. I have worked towards understanding technology that would help me be involved with the continued exploration of our universe. My interest in the universe stems from watching the program NOVA, which also helped me find the career path to continue learning about the world around us. I am also fascinated with the AC-130 Spectre aircraft. In addition to these interests, my father has always encouraged me to pursue engineering and research. These passions have guided my academic career and future plans even though I had to face challenges. My first attempt at college was interrupted due to a global pandemic, which led me to believe that I was not cut out for academia. However, after stepping out of school and working in a variety of jobs, I have come to realize that I truly have a knack for academics. After returning to school five years later, I now have a clear path and goal. Since my return to school, I have greatly improved my academics, and I am well on track to completing the associate's degree and transferring to New Mexico State University College of Engineering to pursue the bachelor's degrees in mechanical and aerospace engineering.

Project Title: Design and Experimental Planning of a Supersonic Convergent-Divergent Nozzle

Abstract: Convergent-divergent nozzles are widely used in aerospace propulsion, supersonic wind-tunnel facilities, high-speed jet experiments, and compressible-flow research because they can accelerate gas from subsonic to supersonic conditions through controlled area variation. The present work focuses on the preliminary design of a laboratory-scale convergent-divergent nozzle with a nominal design Mach number of 2.8. The nozzle geometry was developed based on compressible-flow relations, with attention to the throat, divergent section, and area ratio required for the design condition. A three-dimensional nozzle model was then generated for future fabrication and experimental testing. Due to facility limitations, the nozzle will be operated at a maximum nozzle pressure ratio of approximately 9, which is lower than the ideal pressure ratio required for fully expanded Mach 2.8 flow. Therefore, the experiment will examine the resulting off-design supersonic jet behavior, including expansion structure, shock-cell formation, and nozzle performance under the available operating conditions. Particle Image Velocimetry (PIV) measurements are planned to evaluate the velocity field and assess the jet structure. This project provides a preliminary design and experimental framework for studying facility-limited operation of a high-Mach-number convergent-divergent nozzle.

Special thanks to the following:

Juanita Miller, College of Engineering

Meg Eastwood, Institutional Scholarship Librarian

Dr. Salim Bawazir, Department of Civil and Environmental Engineering

Dr. Rene Guillaume, Department of Education

Marisa Vialpando, Aggie Career Studio

Dr. Juie Shetye and Heidi Sanchez, Department of Astronomy

Dr. Andrew Flynn, Department of Geology

The Unmanned Systems Laboratory: Diego Chavez Arana, Gandhi Alexis Sinhue Contreras Torres, Hengameh Mirhajianmoghadam, Omar Alejandro Garcia Alcantara, and Fabian Talavera; Department of Electrical Engineering

Dr. Amy Marion, Reya Padilla, Noor Allataifih, Taylor Landfair, Isaac Pineda, Avellana Vigil-Villalobos, Poorni De Silva Wickramarathne, Alana Pedersen Kamaka, and Alexis Ortiz; Department of Biology

Dr. Miranda van Iersel, Stefan Zamurovic, Rasika Kumarasinghe, and Rohan Thakur; Department of Electrical Engineering

Dr. Eric Ferre, Department of Geology

Dr. John Lommler and Chiky, Department of Civil and Environmental Engineering

Debbie Lee, University of New Mexico

Marko Mohlenhoff, TRIO McNair

Dr. Phame Camarena, Dean of Honors College

Bernadine Booky and Erica Mosely, TRIO Student Support Services

Emerald Davis, Department of Mechanical and Aerospace Engineering

Kayden Robey, Department of Biology

Dr. Borys Drach, Department of Mechanical and Aerospace Engineering

The Non-Destructive Evaluation (NDE) Laboratory: Fidel Baez Avila and Oscar Guerra

Kellianne Taynor, University Financial Aid and Scholarship Services

Jimmi Ickes, College of Engineering

Amy Bingham, Civil and Environmental Engineering

We also appreciate immensely:

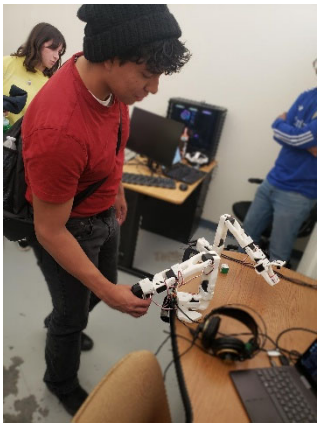
Jeanne Garland, former NM AMP Director, for her guidance and wisdom in planning and executing the SCCORE Program

Vladimir Avina, Media Specialist Senior of the College of Engineering, for supporting NM AMP and providing excellent photography of our conference last year and this event.

Dr. Joann Latorre for her recruitment of students for the SCCORE Program and support of NM AMP

Salvador Valenzuela Chávez for his continued support of NM AMP

Cyrena Ridgeway, 2026 SCCORE Program Coordinator, for her outstanding efforts planning and directing the program with dedication and enthusiasm, for developing an excellent curriculum for SCCORE 2026, and for providing a positive learning environment for the student participants




2026 Summer Community College Opportunity for Research Experience