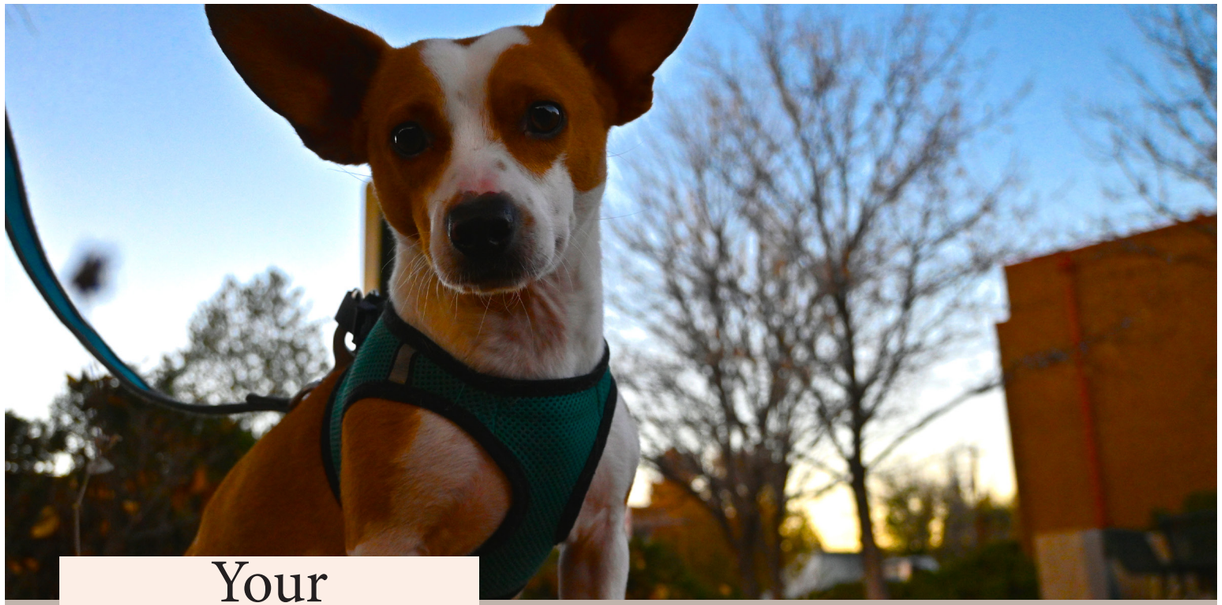


Your *Paydirt Staff:*

MEET THE STAFF

EDITOR IN CHIEF — Skyler Matteson - Senior in the Materials Engineering Department. He enjoys playing games and guitar and is worried his bio makes him look like a square.

JOURNALISTS — Alexandra Sartori - Geology and Physics, cool, lit, sick, awesome, critically acclaimed, one may daresay perfect.

PHOTOGRAPHER — Samuel Baca - Mechanical Engineering student whom do not know how to write he not only takes photographs for the paper but also seeks out images.

LAYOUT-EDITORS — Jaime Mendoza - Civil Engineering, Professional Climber, Professional Procrastinator. **Copy and Paste**

SPECIAL CONTRIBUTIONS

Zetong Li

Special thanks to Student Affairs for printing contributions!

Want to contribute or advertise? Send us an email at:
paydirt@npe.nmt.edu

@nmtpaydirt

In This Issue:

SGA Meeting Rundown: 11/16/21

1. **Paydirt has received word that none of the CLASS part-time professors are to be rehired next semester. According to our source, it was to 'save money.' Paydirt will be looking into this more thoroughly at the beginning of next semester.**
2. **Socorro Mayor Ravi Bhaskar has advocated for dropping the SoccoroFest event, claiming it fails to bring in enough visitors for its cost. Many Socorro residents have voiced their complaints regarding this notion. Visit Socorro City Council meetings if you'd like to voice your concerns on the matter.**
3. **Members of the Executive and Judicial Branches are working on finishing up their Standard Operating Procedures, which provide a reference document for their positions.**
4. **The NMT/SGA Discord is making steady progress. A recent meeting with ITC has been helpful in creating rules and guidelines for the server, ensuring smooth operation.**
5. **The SGA is looking to invite food/hosting clubs such as Tea Club or Waffle Club to SGA meetings in order to bring in more students and increase involvement.**
6. **SGA elections are coming up, be sure to watch your email.**
7. **An end-of-finals bonfire is planned. Feel free to join and burn your course notes!**
8. **A Wii in the SGA Hallway has been set up, but apparently the remote's batteries are not working. This is the most Tech thing ever.**

Sudoku

5		3			6			
			2				7	
		2		1		4		
	9		4		5		1	
		6	7			2		
								5
	7			8		9		6
9								
								8

Relax and Unwind

The New Loma Stadium Cinema

Written By: Alexandra Sartori

Going to the movies is always fun, whether it's for a date or with some friends. It has mildly overpriced but great snacks. The popcorn is never buttery enough but always scratches that movie theatre popcorn itch. So many parts of movie theatres, the good and the bad, is what makes them so enjoyable. Socorro is small (very small) but we're lucky enough to have our very own movie theatre, the New Loma Stadium Cinema.

The Loma Theatre first opened in 1937 but in a different part of town, the Plaza. It remained a popular part of Socorro for about 19 years before it caught on fire during a showing of "The Day the World Ended." The fire harmed no person but was catastrophic for the building itself. The Loma Theatre was officially out of business.

It took the owners about 4 years to reopen a theatre. This New Loma was built in the place that we all know it to exist today. This new building featured seating for upwards of 600 people. It had a 'crying room' for parents with children and a smoking room for people, both of which allowed for people to still watch the movie comfortably. The theatre even used to put on contests for children such as talent shows, where they would perform on the stage below the screen.

In 1986, the theatre took on a construction project that halved the number of seats and nixed the crying room and smoking room. Part of the building became a part of the First State Bank that now resides next to the theatre. Between 2008-2017 the theatre closed multiple times to undergo various renovations that resulted in the theatre we know and love today.

In 2017, the theatre reopened thanks to a joint effort of the First State Bank and President Stephen Wells. This meant that the theatre would also be used for NMT things as well, such as the free movie nights for students.

The theatre shows a wide variety of all the latest movies and even ones that are near and dear to New Mexican hearts. A popular showing of '12 Strong' was featured in 2018. The movie itself was filmed in Southern New Mexico near the Orogrande Mines. The New Loma was featured in El Defensor Chieftain for the showing.

The theatre also works with programs such as the NMT Outreach, the public library, SCOPE, SCJJB, and many more. New Loma paired up with the Socorro Public Library to feature Narnia as a free showing with free books and snacks for local kids. The theatre is always looking for ways to get involved with the Socorro community.

Love movies? Love the theatre? Make sure to keep up to date with what the New Loma Cinema is showing to have all your movie theatre needs fulfilled.

Letter from the Editor - End of Fall 2021

Greetings Paydirt readers! If you are a freshman, I hope this semester was at least a little similar to what you hoped college would be like. If you are a sophomore, I am deeply sorry for the horrendous introduction that was your first year here. And if you are an upperclassman like myself, I hope we can have a normal graduation!

This semester was refreshing for us at Paydirt. It was hard to gauge how we were doing with most of our audience stuck indoors or at home. However, now that many students are back on campus, we have seen our readership return to normal. Not only that, we have actually seen an increase in readership over the course of the semester! I'd like to thank you guys for that; not only is it good to see, but in addition to our occasional polls, it's incredibly helpful in determining what you want to see.

We have been up to other things as well. We have several articles planned for next semester. They might be longer than usual and a bit more heavy, but we think they will be an interesting start. We have recently updated our computers, and our new website is nearing publication. Oh, our rivals over at DIRT released their new issue today as well, so be sure to completely ignore their propaganda. Also, we're still looking for a journalist! Email me at paydirt@npe.nmt.edu if you're interested, and I'll answer all your questions. Consider applying! Please?

That's about it. Well, not really, you'll just have to stay tuned and find out! Besides, a little bit of mystery is healthy. Usually...

(P.S: You might see yellow lines across this issue. Printer mistakes. I can assure you the helpful folks over at Student Affairs, Residential Life, and Aux Services and I went through everything to try and get them gone. Thank you for your understanding.)

Airborne

Written By: Alexandra Sartori

If you're from New Mexico, it's easy to take the giant balloons in the sky for granted. They're there every year, riddling the sky during Balloon Fiesta. For some, balloons aren't just an annual fun trip at 4:00 in the morning though.

Savannah Bradley, a Mechanical Engineering major, has been influenced and inspired by balloons for a very large part of her life. A fourth generation pilot on one side and a third generation pilot on the other, Savannah has been ballooning since she was a child.

Ballooning has been around for centuries. The first manned balloon flight was in 1783 in France with the first manned free flight taking place only a few weeks later in 1783. Balloons rely a lot on basic physics principles to operate. It's all about buoyancy: as hot air enters the balloon, the air inside becomes less dense. As the air inside becomes less dense than the surrounding atmospheric air, the balloon rises; less dense fluids in a more dense fluid will rise.

Savannah's career with balloons began in ground crew. Ground crew assists in every part of the hot air balloon experience besides the actual flying. Then, as Savannah got older, she decided on evolving her engagement with ballooning into piloting. This was sparked by "a combination of my interest in aviation incidence investigations and my fear of being in the air," Savannah said. She had heard of a few ballooning accidents and had become terrified. Then, getting to see her brother's first solo balloon flight and her family buying a new balloon, she felt ready to pursue flying. Savannah took her first balloon flight when she was 13 with her father.

Becoming a pilot is a long process. It takes mounds of training and the ability to know about flying your aircraft of interest in and out. "I am currently rated as a private pilot in hot air balloons and I'm a student pilot in gliders." At 14 you can be a student pilot and can fly as signed off by your instructor, "I soloed on my 14th birthday," Savannah remembers. Then, at 16

Lava tunnels form when there is lava flow that is in contact with cool surrounding air. As the lava passes through this cool air, the outside of the lava begins to harden. This creates a channel for underlying lava to flow through. The Al-Badia cave system was chosen because it is already a well-researched and well-known lava tunnel in the area.

The team conducted this study in order to see if ERT could accurately predict the shape and dimensions of the Al-Badia cave. ERT is a geophysical technique that is used in creating images of sub-surface systems by seeing how readily an electric current will flow through the sub-surface medium. By doing this, scientists could predict where a cave system may be located without disturbing the upper layers of rock and soil. This could allow for construction sites to more readily know whether they are building on solid and dependable ground.

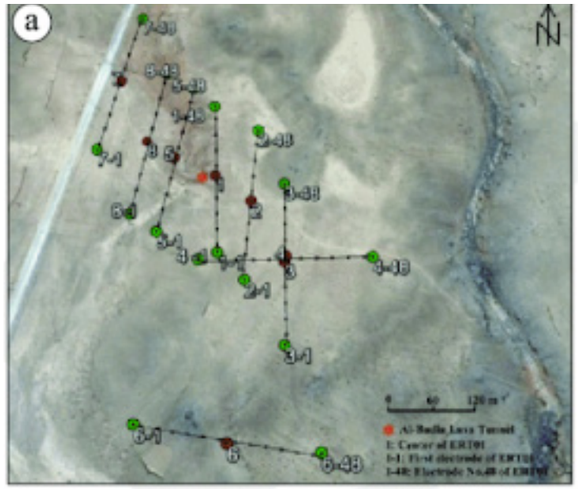
To test whether ERT could be accurate enough to predict locations and the extent of a cave, the team had to set up 8 different data collection stations around the Al-Badia cave system. The field data collection would have to obtain enough representative resistivity data of the subsurface tunnel by using enough profiles around the lava tunnel. This resistivity signal is measured by an instrument known as Syscal Junior Switch. To set up this device, the researchers had to take the Syscal Junior Switch into the desert where the tunnel is located. When the Switch was set up, they then had to deploy 48 electrodes in a specific manner that would create a 2D image of the area they were covering. The 48 electrodes were divided into two groups and were placed in line with the Switch going either North-South or East-West with the Switch placed in the middle. The electrodes were spaced every 5 m, making each set up 235 m long in total. This was repeated for the 8 different stations, "ERT01-ERT08."

The team concluded that ERT was a very effective way to image a cave from the surface. The resistivity models created from the data collected showed that the lava tunnel had a varying ellipsoidal to rectangular shape with a diameter from 3-7 m and a depth of 3-13 m. The ERT model was even able to predict previously unknown lava tunnels in the surrounding area of the al-Badia lava tunnel.

Geology is fundamental in predicting potential hazards in construction and building infrastructures. This experiment shows that ERT could be an integral factor in cave prediction and characterization. Using ERT, the al-Badia lava tunnel in Northeastern Jordan was able to be accurately imaged. This could allow the ERT technique to begin being used in other non-academic applications, such as cave prediction for public safety. ERT could ensure that the sub-surface of a construction area is durable enough to hold against the weight of the infrastructure.

Using Sub-Surfaces to Predict Lava Caves

Written By: Alexandra Sartori



You can build homes and infrastructures anywhere. That doesn't mean that they will last a long time just anywhere. Planning on where to conduct a build is an integral part of the construction process. Building on slopes, building on soft and loose dirt, building on areas that are prone to flooding: all of this can lead to structure failure. The St. Francis Dam incident of 1926 was a dam that failed because it was built on unsustainable bedrock, killing over 400 people. Without proper geologic consultation, structures that are intended to protect life become deadly.

A less obvious aspect of where buildings can be constructed is located in the sub-surface. Caves pose the possibility of sinkholes and ground collapse but if the cave doesn't have an obvious access point it can easily be overlooked. In a recent study conducted by researchers Hani Al-Amoush and Jafar Abu Rajab from the Al al-Bayt University of Jordan, Electrical Resistivity Tomography (ERT) is used to characterize and image a known cave in Jordan. The cave of interest, Al-Badia, is a special type of cave that is formed by volcanic activity known as a lava tunnel.

you can test to receive your private pilot license, which involves a written exam, an oral exam, and a practical flight test. “I actually could fly before I could drive.”

Savannah’s love for piloting is further by her passion for aviation accident investigation. Aviation accident investigation monitors developments in accident investigation and works to prevent more in the future. Armed with her soon-to-be Mechanical Engineer degree, she will be able to work towards making aircrafts much safer for everyone.

Savannah Bradley is senior in the Mechanical Engineering department. She has many passions ranging from violin to piloting. Her love for aviation has driven her through her years and has inspired her to pursue a career in the field.

Dr. Mark Samuels

Written By: Skyler Matteson

Last issue, Paydirt interviewed Dr. Steve Simpson, the head of the CLASS department. A known but often overlooked section of NMT, CLASS stands for Communication, Liberal Arts, and Social Sciences. Continuing our dive from our last issue into less strictly science/engineering related subjects, I recently interviewed one of the CLASS professors, Dr. Mark Samuels of the Psychology department, and asked him about himself and his research.

Dr. Samuels described that although he double majored in psychology and anthropology at the State University of New York at Albany, his focus "was more on psychology from the beginning." He got his anthropology credits from studying in Guatemala during a revolution. When I asked about that experience, he said: "Let's put it this way, I never felt comfortable with a machine gun at my back." After getting a Masters in human development at the University of Chicago, Dr. Samuels started researching malaria at the Sloan and Kettering Cancer Institute. He then got his PhD in Experimental Psychology at NYU, all while still growing malaria at Sloan and Kettering, since he was "one of the few people that knew how to grow malaria and culture." Since the malaria had to be fed everyday with human blood, his friends "thought [he] was a vampire." He eventually wound up at NMT, a school he "had never heard of" before he saw the position's ad and became "enamored by the science background at the school."

I then asked Dr. Samuels why he had such interest in psychology. He said it was "the big questions of life. Why do we think the way we do? How does consciousness work? Why do people do things in groups that they would never do alone? These [are] central questions to existence. I can name three or four if not more Nobel prize winners that spent the rest of their lives studying consciousness and failing miserably. It's such a complex question." He also placed emphasis on the studying of biases, saying "biases are really central to science itself in terms of how we test hypotheses. We try to confirm our hypotheses, we don't try to disconfirm our hypotheses. In any kind of experimental methodology, we really need to test something to try to disconfirm it, but that's not typically how our brains work. People become more and more sure of their ideas because they never test their ideas in a way to prove them wrong."

Dr. Samuels went on to describe his current research: "It's about biases and how we think. Looking at the development of those biases and looking at how we come to believe the things we do. How people solve problems, and how you might be able to teach skills to improve problem solving. If you teach children these skills, can they learn [them?] Is it possible to improve their hypothesis testing abilities? I see myself as an experimental psychologist studying how people think, and you discover [that] the deeper you go the more complex it gets. We are at the infancy of learning how people think."

"I developed this study [where] if you ask [children] questions that are completely nonsensical, and they know they might not make sense, how do they respond? For example: 'which is spicier, a circle or a tricycle?' Not only do they answer these, they answer based on which comes first. The answer is different from 'which is spicier, a tricycle or a circle?' [I wonder] as a strange adult who is asking 3 year olds questions, are they really understanding what I'm asking? " Dr. Samuels described the study further, stating that the results he received depended on not only age and development, but whether or not the question is a yes/no question or a forced choice question. A yes/no question would be 'is a circle spicier than a tricycle?' whereas a forced choice question is more like the previously mentioned questions. People through 10th grade still answer these silly questions.

Another point he made was about his previous postdoctoral research with stroke patient rehabilitation at NYU. "I was working on recovery from strokes and how people understand that their brains work differently. It's akin to how kids learn how our brains work. You really have to learn that your brain can't do what it normally did. You really can't predict how much someone will recover from a stroke, besides age, but [by] finding your limitations, you can recover to a greater degree. In the one difference working with kids vs stroke patients, it's magical vs depressing. "

He also briefly talked about how COVID has affected the psychology of people: "With this pandemic, the majority of people are anxious or depressed. It's really hard to know where this pandemic is going. Unpredictability is what people have a hard time with for sure. If you were to tell me what you believed the numbers for the pandemic would be in the next 6 months, I would believe anything you could tell me."

After hearing about his research, I asked Dr. Samuels what the goal or purpose of his work was: "Turns out you can get the answers you are looking for from a child depending on how you ask the questions. 3 year olds have a yes bias, and 4 year olds have a no bias. They are sensical questions they understand, but they are answering based on a pattern. This is important [research] as in a court you ask questions, and the way you ask can change the result. You're talking about years of people's lives depending on this information. Biases affect everything. Whether or not the jury has had lunch before a decision is made [has an impact.]"

Sam, our photographer, and myself were subject to several of Dr. Samuels experiments, in which he showed us several boxes containing expected items, such as crayons in a crayon box, or an animal whose tail was sticking out of the box. He would then bring out an identical box with the same signals, and ask us what was inside, to which we would guess the same items. Of course, the crayon box now had buttons, and the animal was now entirely different, despite having the same tail. He informed us that children would lie, saying that they thought there were buttons in the second crayon box, even though they had, seconds earlier, said there would be crayons. They would also state that their friends would guess there were buttons in the second crayon box, with confidence.

Dr. Samuels wrapped up the interview stating that "the basic idea is the relevance of the field. Most people that take psychology courses here aren't in psychology, but we get people that come here not for psychology that go into psychology. It is so important to communicate things to other people, [which is] how we all need to work together." He also mentioned Frank Etscorn, a now retired NMT professor who developed the original nicotine patch, giving NMT much fame. He was in the psychology department.

So, as Dr. Samuels effectively put it, the next time you think "Is this stuff what my grandmother could've told me?" when you hear 'psychology,' give it another shot. You can contact Dr. Samuels at mark.samuels@nmt.edu.