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## SGA Meeting Rundown: 10/20/20

- 1. NOTE: With the virus currently on campus, please make sure to use best practices when reading and sharing Paydirt to minimize the spread of COVID. Please keep in mind that articles are written many days before publishing.
- The SGA had its meeting online only, due to the campus shutdown.
   Consequences, including removal from office, were stated for SGA members who attended a party and did not report it by Wednesday October 21st.
- 4. Faculty members are looking for student representatives for several committees. Email SGA President Bradfield if you have questions or are interested: sga.president@npe.nmt.edu
- 5. There is a new app available to assist in contact tracing. There is GPS tracking, but you may turn that feature off if desired. More information will be available as presented.
- 6. A program to allow students to anonymously comment on their advisors was raised by faculty, although this is still an idea.
- 7. KTEK Radio Host auditions and technical training were suspended over the 2 week close-ofcampus.



## New Mexico Institute of Mining and Technology





Jasper: Moral Support/Model

4

Skyler Matteso

#### Meet the Staff





#### **Past and Present: A Look At Campus Life**



With all the changes that have been happening to college life in general, a look at the past may help us realize just how far we've come. Recently, several New Mexico Tech classes (1958-1962) hosted their class reunion over Zoom and were able to provide some insight as to what campus life was like back in the '60s.

Lester Welch (Class of '62 B.S., Physics) named some of the biggest highlights of his class' year, which included the opening of a new dorm, currently named West Hall, the arrival of five freshman girls, and passing freshman chemistry. School spirit was about the same as it is now, as was the graduation rate. In Welch's words, "[approximately one hundred freshmen came in... only [a fifth of those] would graduate." For James Church (Class of '60) it was a similar experience; "We knew everyone since there were only a couple hundred students including the grad school." In recent years, NMT's campus has experienced an upward trend in its student body, going from only a hundred or so students to slightly over 900 undergraduate students by Fall 2019. Unfortunately for the vast majority of students, however, males continue to reign supreme by a long shot on campus and thus the lack of a college formal also continues.

political and societal events, including the Space Race, the Cold War, and civil rights movement. For Tech students, however, the cutoff between politics and college life was fairly evident. Most, including James Church and Lester Welch, didn't pay much attention to politics and instead focused on the immediate events affecting their lives. That was the general attitude towards politics then, and it doesn't appear to have changed much in 2020.

Of the students interviewed, the vast majority were of the same opinion as the classes from the '60s, though for a slightly different reason: That politics are so messy and complicated that they feel as if at this point they can't get involved. However, there were certainly some students, such as one sophomore who politely stated his own opinion on the general political atmosphere on campus.

School spirit with the two sets of students is hugely divided. It must, of course, be taken into account the fact that the current set of students deal with a global pandemic and the past set did not. Not that there weren't global issues in the '60s, of course, but none which were so life-threatening that they all had to stay home or in their dorms and learn at a For many people, the '60s were marked by a number of great distance without being allowed to come into contact with

## Letter from the Editor: Regarding Submissions

Hello Paydirt readers. I hope you have all been doing well and Our most important requirement for articles is for them to be staying safe. With the virus going around, classes, events, and unbiased and avoid political topics. I have not included the meetings have been moved to online formats more and more. submissions I have gotten due to these reasons. My team and We were forced to do the same last semester; we ended up I try our very best to provide interesting content without such posting the rest of our bi-weekly issues on our website. Luck- biases in our own writing, although the irony of writing a Letily, we haven't reached that point just yet, but one facet of our ter-from-the-Editor while talking about bias is not lost on me. operation here is almost solely online: submissions.

If you write up an article, draw up some art, or take an awesome photo and send it to us, we can put it into Paydirt. In work something out. fact, should the submission be of sufficient length, quality, interest, etc., you can even charge us for your work! Due Contact me at paydirt@npe.nmt.edu if you have any questo the lack of in-person events and what not, we have been tions or are interested in working with us. We write Paydirt struggling to find article ideas as is, so this is the perfect time for students, so I think it only fitting to include student work to send in your pieces. within our pages. Thank you for your time, and as always, please read responsibly.

I have already received several submissions this semester, so I want to make a note on how we evaluate your writing. We - Skyler Matteson desire grammatical proficiency, great word choice, good sentence structure, and interesting ideas, all while maintaining your individual voice. You don't have to be an award-winning author, however; we can edit out simple mistakes ourselves, and we will make sure to notify you of any major changes.



In the future, Paydirt might switch gears and accept opinion pieces, but for now, we do not. If you are not sure whether we might accept something, send it in anyways! I am sure we can

#### **Pumpkins**

Pumpkin pie this, pumpkin spice that. It's hard to escape pumpki n fever once October hits. But, there is one thing we can all agree on, pumpkin carving is an iconic fall activity.

Pumpkin carving did not start out as carving pumpkins, in fact, the Irish began the tradition with carving turnips and potatoes. These carved turnips and potatoes were called Jack O'Lanterns, based off the well known legend of "Stingy Jack." Now, there's nothing inherently wrong with being a little frugal with your money, but getting the Devil involved? The Devil explained that according to their deal, he could Not exactly Mr. Stingy Jack's best idea.

Legend says that one day Stingy Jack invited the Devil out to Heaven or Hell. The Devil said he would have to roam the some drinks at a tavern. They have a grand time, discussing Hell politics and such, up until it's time for Stingy Jack to pay. Since Stingy Jack is, well, stingy he asks the Devil to help get out of paying. The Devil agrees because he didn't want to pay either (Hell currency and the Euro don't conver easily). Stingy Jack has the Devil turn into a coin that he could pay for the drinks with. Instead of paying for the drinks, Stingy Jack pockets the Devil in his coin form in his jacket pocket where he also carried a silver cross. The silver cross prevented the Devil from turning back into himself, which to say the least, he wasn't a fan of. Stingy Jack his way. recognized that the Devil would likely try to kill him for this little stunt and struck up a deal with him, forcing the Devil to promise that he wouldn't harm Stingy Jack for 10 years nor collect his soul if he died. Now, Stingy Jack went along his way for 10 years, pretty proud of himself for outsmarting the Irish and Scottish began to immigrate to America they the Devil.

Once the 10 years were up, the Devil came to Stingy Jack once more to collect his soul as punishment for tricking him. The Devil found Stingy Jack walking down a back road and explained to Stingy Jack what was about to happen. Stingy Jack nodded solemnly, but asked one last favor of the Devil before he died. "Would you mind grabbing me an apple from that tree over there for my last worldly memory?" The Devil agreed, I mean it was just an apple and the Devil always had a fondness for the fruit. As the Devil climbed the tree, Stingy Jack carved a cross on the trunk of the tree, trapping the Devil once more. The Devil was furious but Stingy Jack offered the Devil a deal, leaving Stingy Jack alone for 10 years and not collecting his soul if he died. Stingy Jack walked away, even more proud of

himself for evading the Devil's wrath for the second time.

A few years later, Stingy Jack died. After death, he went to the gates of Heaven, hoping to be let in. Saint Peter took one look at Stingy Jack and laughed. He declined letting Stingy Jack due to multiple deals with the Devil and in general being a repugnant person. So, Stingy Jack made his way down to Hell, hoping his old pal the Devil would let him in. The Devil took one look at Stingy Jack and laughed. not let Stingy Jack in and instead turned him away. Stingy Jack pleaded with the Devil, where would his soul go if not Earth for the rest of eternity. Now, I'm not sure if you've ever been to Hell, but the way back from Hell to Earth is long and dark. Stingy Jack, sorrowfully, accepted his fate but asked the Devil to at least allow him a light for his journey back to Earth. The Devil gave Stingy Jack an ember straight from Hell and set him on his way. Now, like any good Irishman, Stingy Jack had a random turnip in his pocket. He carved a hole within the turnip and placed the ember inside to light his way. And for the rest of eternity, Jack roams the Earth with a carved turnip and an ember from Hell to light

This tale inspired the Irish and Scottish people to carve faces into turnips and potatoes and leave them outside their homes to help ward off evil spirits such as Stingy Jack. As found that pumpkins were a far better medium for carving. The Jack O'Lantern became a symbol of the season and eventually iconography for Halloween.

Whether you carve pumpkins to ward off evil spirits or to just blow off some semester steam by stabbing things, carved pumpkins are a fun way to get into the fall season and Halloween if you celebrate it. Get creative and find some joy in the simple things this season.

-Alexandra Sartori

anyone else. Several 2020 students described their classes' and resulted in the two week forestallment of all in-person school spirit as "downtrodden" and "nonexistent", for good classes. Beyond hosting parties and large gatherings, the reason, but nonetheless rather disheartening. Any college past students would often go to the recreation rooms to play pool or card games. Now, students still go to the game room student should remember what it felt like to finally leave for similar activities, but are now able to engage with other home and start life on their own, and for every one of those students this year, that college experience was completely members of the community over the Internet in video games throttled by COVID-19. Some choose to maintain a positive from the comfort of their own rooms. With COVID-19 attitude about it, pointing out that the social restrictions restrictions in place, students meeting up in the Fidel Center and minimized in-person classes allow for students to more or at outdoor tables have become a common sight across the easily access classes all from their dorm room, and many campus. Outdoor activities have also experienced something experienced some amount of pleasure at the fact that they of a renewed interest, as students seek an outlet from their didn't have to leave their rooms much or at all, which, given studies. It wasn't until recently that Tech's gymnasium the general tendency of the student population to be less underwent renovations and many students were pleased with outgoing than other colleges, has provided some relief to the exercise equipment and rooms that are now available to students with social anxiety. use.

For the students of the '60s, however, the story is completely All in all, the two sets of students bear a strong resemblance different. James Church recalls one story from the fall of in the political and entertainment categories, but when it his freshman year, "[where] a small group of us traveled to comes to social life and class unity they are vastly different. Albuquerque one fall evening and changed UNM's "U" to COVID-19 or not, several students who were interviewed an "M"... We blotted out the base of the U with 55 gallons pointed out that technology now plays a large role in many of used motor oil and made a V between the remaining students' social lives, thus causing them to stay in their legs to create an M." That sums up the school spirit of the rooms regardless of the social restrictions placed on them. sixties; plentiful to the point of challenging other colleges. Regardless of the positive and negative connotations to this In their downtown, students would hang out at "The trend, 2020 students have come a long way from the students Capitol Bar" located in Socorro, sometimes driving over to of the '60s, and at the same time, remain connected to the San Antonio to visit the Owl Bar for it's famed green chile fundamentals of what makes an NMT class unique; the cheeseburger. Lester Welch remembers frequent trips to the creativity in coming up with things to do in a small town, local drive-in movie theater, Shirley's Drive-In, at least as the cutoff from the larger outside world, and the technologyoften as funds would allow. School-funded events were also forward environment in which we live. greatly anticipated, most notably among them the week-- Isaiah Padilla

long 49ers event. This holiday previously involved the longstanding tradition of hiking up "M" Mountain to reapply the limestone dust on the "M" itself and the school dances which were typically held soon after. The 2020 49ers event, however, was brought completely online, and while the faculty did an amazing job of pulling together some entertaining virtual events for students to attend on Zoom video calls, was unable to fully compare to the normal 49ers events. Leading off of 49ers celebrations, the students of the '60s were able to engage in various unofficial events and parties surrounding the school's holiday, and in 2020, while there was an attempt to make something similar happen, the only outcome was that COVID-19 cases spiked on campus

#### **The Terrors of Waves**

Light is just a funky type of electromagnetic radiation that humans can actually see. Electromagnetic Radiation (EMR) are the waves that carry radiant energy through the electromagnetic field. Humans have come to find that there's a lot of EMR that we don't like, think gamma rays, but recently we've found that there's a form of EMR that we can actually see that we don't like, blue light. The discussion of the dreaded blue light has been on the rise due to the increase in the average person's screen time since the onslaught of stay-at-home orders and quarantines.

The portion of EMR that humans can see is actually fractionally very small, less than 1%. This visible light lies within the ~400 nm to ~700 nm range for wavelengths. Light that we perceive as blue lies within the range of 380 nm to 500 nm. Now if you remember your physics, wavelength and energy are inversely proportional. This means that the blue light range within visible light, although having the shortest wavelengths, have the higher energy. This is why the blue light emitted from electronic devices is commonly referred to as High Energy Visible

#### (HEV) light.

Considering that blue light devices haven't been around for the longest time, there's not a substantial amount of research on the long term effects. Yet, there are a multitude of studies on what it can do in the short term.

One of the biggest impacts of staring at your electronic device for hours on end is the feeling of "Computer Vision Syndrome." This general term isn't actually a syndrome but more a set of symptoms one is likely to experience. Ever noticed how your eyes feel dry, itchy or just strained after a long day of Zoom classes? That's Computer Vision Syndrome (CVS). CVS hasn't shown to cause persistent issues or damage to the eye, but it's also not exactly something you should be embracing.

Another common side effect of prolonged blue light exposure is headaches and migraines. It's thought that people who are headache or migraine-prone tend to experience more intense headaches with higher uses of electronic devices. Harvard Medical conducted a study



known as acrylic or acrylic glass. To study this, she utilized (fracking) to see how fractures connect within bedrock schlieren imaging techniques to watch as the shockwaves when shockwaves are applied. spread through the medium.

Schlieren imaging makes use of the fact that light rays bend as they encounter changes in density of a fluid. Fo schlieren imaging, a setup consisting of a light source (such as a candle or mercury vapor lamp), a slit for the light source to pass through, mirrors to reflect and crea parallel light beams that will pass through the testing material, a razor's edge to focus the beams and then a recording device. Typically schlieren imaging is used with fluids but "it can be used for anything that is optically cl tracking any variations in pressure, temperature, density that will change the refractive index."

Graduate school can be a daunting decision for many students finishing up their undergraduate degrees. Sivana Sivnana, using both her Petroleum and Mechanical Torres took the leap and is now getting to pursue hands-Engineering knowledge, wants to correlate the fracturing on research she's passionate about. She thinks "everyone of the PMMA to rock mechanics. Rock mechanics is the should give grad school a chance, I think it's an amazing study of the mechanical behavior of rocks, specifically opportunity...you should never feel like you've been put in in response to forces within their physical environment. a box by your undergrad work, research is limitless." It applies the concepts of engineer mechanics to rock structures created by mining, fracking or other -Alexandra Sartori geolomechanic constructions. She's looking to apply the knowledge of PMMA fracturing, to hydraulic fracturing



	Sivana, in the future, is looking to bring variance into her experiments. She wants to observe how layers versus no
or	layers within the PMMA impacts the propagation of the
	shock waves. She's also looking to apply stress to different
	layers within the PMMA to see how the fractures differ
te	with respect to the stress. This is all in an effort to mimic
	the behavior of underground boreholes to see how she can
	best direct fractures and get them to "talk," meaning have
ith	the fractures connect and interact with each other.
lear,	



#### Sivana Torres

Going to college for an undergraduate degree is a big and sometimes scary commitment. Pursuing a graduate degree can be an even bigger challenge, even just making the decision on whether to go for graduate work can be terrifying. Sivana Torres, a Mechanical Engineering PhD student pushed through this boundary, taking her out-ofthe-box thinking and putting it towards her research.

Sivana, a New Mexican native, completed her undergraduate at NMT in Petroleum Engineering. In her last couple years at NMT as an undergraduate student, she took a Thermodynamics class with Dr. Hargather, saying she "really enjoyed the fluids but didn't realize how broad the applications could be." This was a foundational moment in her decision for graduate studies.

She decided on staying at NMT for her graduate work because of how different Tech can be from other graduate schools. "New Mexico Tech was a great option for me, the opportunities here are just so much more hands-on than other research schools instead of just all theoretical study. I Sivana is currently putting her research towards even get to be more in control of my research, running my understanding how PMMA (Polymethyl Methacrylate) own experiments and procedures." She's even found that as fractures and how shock waves propagate through the a female researcher, she's treated with the same respect and solid. PMMA is an industrial produced resin, synthesized regard as her male counterparts. "I was nervous at first,

entering a field that was almost exclusively male but the NMT graduate program has made me feel welcome and apart of the team."

Sivana even took a different approach to her graduate discipline than most students, she deviated from her undergraduate concentration. "I think it's important to know that just because you got your undergrad in something does not mean you're stuck in that box." Most Petroleum Engineers, if pursuing graduate work, will typically just further their degree in Petroleum Engineering. Sivana decided to pursue her PhD to be in Mechanical Engineering, and despite both being engineering degrees they can have stark differences in education. Yet, Sivana found a way to harmoniously bring together the two disciplines. "I really liked the rock mechanics aspect of Petroleum Engineering but I also really loved the fluids of Mechanical Engineering. My research has been the perfect marrying of the two for me."

using the polymerization of Methyl Methacrylate. It's better

in 2016, where they exposed migraine-prone people to or headaches are to make sure you're limiting your device different wavelengths of visible light. They found that time as much as possible, switching on the "Night Mode" blue light had a tendency to increase the individual's pain, on your phone, blue light glasses and even just breaks "blue...lights generate the largest signals in both the retina from the computer when you feel your eyes starting to and the cortex." The stress in the eye from the HEV light is strain. thought to worsen the pain due to overstimulation.

One of the widest discussed issues with blue light is the sleep problems that seem to come along with it. Blue light has been shown to inhibit the production of melatonin within the body. Which at 10 in the morning, might not be a problem but when you're up late with an online assignment, it can prevent you from being able to fall asleep later. It's no surprise that our sleep cycle is a delica thing, and even small amounts of use of electronic devic can impact how and when we fall asleep. The National Sleep Foundation recommends putting away your phone at least 30 minutes before you go to sleep.

Despite all these negative effects of blue light from our devices, it's hard to escape it in between online school an social media. Some great ways to reduce the effects CVS





-Alexandra Sartori

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#### NMT Project Spotlight: Dr. Andrei Zagrai

With most of the exciting events this year being grounded by COVID-19, there are still some interesting programs available that are still taking off, several of them literally. Dr. Andrei Zagrai, one of our Mechanical Engineering professors here at New Mexico Tech, is working on three separate research projects concerning the increase of safety of space vehicles.

Zagrai, a professor of Mechanical Engineering at NMT who is currently on sabbatical, specializes in the integration of damage assessment systems into the overall structure of vehicles, specifically spacecraft. For him and his team, this is bit of data to be immediately stored in every single part of generally accomplished by using sensors installed on vehicle the black box. In other words, if one portion of the black components to communicate with the internal vehicle systems. This in turn informs the system about any cracks in the components, improperly welded pieces, loose bolts, or just any problems with the vehicle structure in general which need to be resolved. This will even go so far as to keep prepared for a suborbital flight launch. spacecraft from launching should a problem come up.

The overall goal of Zagrai's research is to eventually create an is devoted to the assessment of structural health in the intelligent system that is not only able to gather information to gauge the structural health of vehicles but is also able to discern the flight environment around the vehicle. In many ways, the spacecraft which Zagrai works to improve can be compared to a human being; We can learn things about our environments just from our own senses, such as temperature, sensors is studied. The payload was launched in November pressure, material texture, movement, etc. Zagrai hopes to get his integrated sensors to enable vehicles to do the same thing. "The concept here is the same, is that a system which you have is an intelligent system which can discern the environment, and it also can discern its structural condition."

The first project focuses on Assessment with a focus on structural composites. This project, funded by the National Aeronautics and Space Administration (NASA), seeks to create a "smart" composite which will already contain the sensors mentioned previously. Unlike the other two projects, the smart composite project is led by Dr. Donghyeon Ryu and is a joint project collaboration with the University of New Mexico and New Mexico State University. So while this project may not be entirely unique to NMT, Zagrai believes that the method of the unifying theme of sensor technology development is important for the state. For the professor, the quality which sets Tech apart from other schools for this project is that NMT is the only college to offer students

the opportunity to participate in real-life launches, not just simulations like the other schools.

The second project is part of an ongoing collaboration between NMT and the Federal Aviation Administration Center for Commercial Space Transportation to assess space vehicles during flight. This is accomplished by using high-frequency vibration through the electro-mechanical impedance method. In this project, NMT collaborates with Immortal Data, a company working to develop a distributed black box for space vehicles. This approach allows every box is destroyed, it won't matter, since all of the same data will be available in what remains. At the moment, Zagrai and his team have several prototypes fully built and ready to be subjected to experimentation. One is currently being

The third and final project which is nearing completion orbital environment on board of International Space Station (ISS). NMT developed a payload that explores elastic wave propagation in a spaceship's structure in space and uses ultrasonic waves to assess the integrity of bolted joints. In addition, the effect of the space environment on piezoelectric 2019 on an NG-12 ISS resupply mission and is currently on an experimental platform outside ISS. The payload is scheduled to return with the SpaceX Dragon capsule sometime this winter.



Needless to say, all of this work is a huge jump forward in space All this research is being done by Tech students. Each of the teams working on these projects recruits both undergraduate and graduate students. Zagrai wants to be able to give students a chance to really get themselves involved with important research. In general, students join a project through either the Junior/Senior Design classes offered to engineering students or will join through a research assistant program. Joining a project not only affords students the opportunity of getting some hands-or experience but also to do a bit of traveling, as Zagrai enjoy taking his students to various project-related events. "This what education is about," Zagrai says. "The goal is to show them what research looks like, and maybe they decide to s in this area or maybe... they decide to become grad students or Ph.D. students." Zagrai went on to describe his personal goals in helping students gain research experience and therefore get a better idea of what it is they want to do. In terms of travel, students are given the opportunity to travel with Zagrai to payload launches and space conferences, with the latter affording them the chance to have some input on real research papers that will later be published.

When asked about his desired qualifications in Tech students looking to join the teams working on these projects, Zagrai surprisingly enumerated that he wasn't so much interested in what majors students were studying, but more what kind of person you are. In Zagrai's words, it doesn't matter so much what your GPA is or if you're a mechanical engineer. It matters most that you are honest, able to trust your team, and care about the research you do. Sure, a high GPA is desirable, but if someone with a low GPA has a deep fascination with the research the team is doing, then they are more likely to actually put quite a bit of time and effort into putting out substantial research. Zagrai himself said that he has a fairly diverse set of students working for him, in terms of majors and in terms of skill sets. When a student is brought onto a team, he pays attention to which interests or personal strengths they have in order to place them into the best position available.

For students who are interested in joining any of Zagrai's three projects, or even just getting a better idea of what research projects are available to join, they can contact any of the following faculty members or groups via email and respective websites.

	Michael Voegerl: michael.voegerl@nmt.edu
	Student Career Services: Careerservices@nmt.edu
	Handshake: Joinhandshake@nmt.edu
h	National Science Foundation: https://www.nsf.gov/funding/
	education.jsp?fund_type=1 (Undergraduate)
1	https://www.nsf.gov/funding/education.jsp?fund_type=2
/S	(Graduate)
s is	Financial Aid: financial_aid@nmt.edu
7	Job Opportunities at Tech: https://www.nmt.edu/hr/
stay	employment.php
nte	

- Isaiah Padilla

