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PAYDIRT

White Sands
p. 11/12

New Year New Fun
February 1st, 2021



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SGA Meeting Rundown: 11/03/20

1. **NOTE:** 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 several days before publishing.
2. Career Fair will be online via Handshake.
3. Free on-campus COVID tests for students will begin on Thursdays again in the near future.
4. A club reopening plan that allows about 15 people to meet under certain restrictions is in the works. Read on to find out more about clubs under COVID.
5. The SGA budget will be increasing to accommodate the new state minimum wage of \$10.50.
6. Club fair is active right now! It will showcase rotating tables through Wednesday.
7. The SGA website should be updated in the future with correct information.
8. Both the SACD and SATD left their positions, meaning a lot of those event-planning and technical duties are up in the air. We are looking to have these positions filled within a month.
9. Contact sga.preseident@npe.nmt.edu if you are interested in working with the SGA. We have several open positions at the moment.

Sudoku

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



Letter from the Editor

Hello, and welcome back to another exciting semester at New Mexico Tech! I'm sure you are all just dying to get back to procrastinating and stressing, likely in that order. Oh ya, and COVID is still going around, so we have to continue to deal with pandemic restrictions and practises.

COVID has been an especially nasty stressor for us students. With so much to keep track of and adapt to as is, the addition of the pandemic resulted in lowered grades, mental breakdowns, and multiple existential crises. How do I know all this? Well, besides being the omnipotent narrator, I lived it. And I know many of you did too.

At least COVID was an equal opportunity offender, as my mom always says. It affected the lives of not only students, but faculty and administration. Everyone needed to adapt to the new situation. But after a semester of said adapting, and a Winter Break to refresh and recharge, hopefully we can all come back and use our experience to have a better Spring session.

For us at Paydirt, this also applies. We will continue striving for bringing you the best news possible, of all different kinds. Last semester, our readers asked that we don't focus on COVID, but don't entirely ignore it. We are going to continue that trend into this semester. In addition, we have an entire crew going into Spring, so we won't be struggling to get content as much as we were last semester.

As always, let us know what you want. Our readership has definitely taken a hit due to students living off-campus as a result of the pandemic, but that means that your voice means even more to us than it did before. We take your responses into account, and it influences what content we put on our pages. Contact me at paydirt@npe.nmt.edu.

Oh, and since we are still in COVID, I get to use this again: please, read responsibly.

- Skyler Matteson

Meet the Staff



Isaiah Padilla: Journalist

Skyler Matteson: Editor in Chief

Samuel Baca: Photographer

Jaime Mendoza: Layout Editor

Alexandra Sartori: Journalist

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Campus Life

"A college education shows a man how little other people know." - Thomas Chandler Haliburton

Adjusting to College Life: The Freshman Take



The high school-college transition is known for numerous positive and negative aspects, and this past year has been no exception. As discussed in previous articles, many older New Mexico Tech students have expressed their sadness not only at having lost their pre-COVID college lifestyle, but at the misfortune of the current class of freshmen, who have yet to experience such a pandemic-free lifestyle.

Most of the freshmen students interviewed for this article felt as though the greatest challenge to adjusting to the COVID-influenced environment was getting used to online classes. Nathaniel Serda was prominent among those expressing their appreciation of Tech's hybrid option allowing students to take in-person classes alongside their online courses. Despite this, the struggle to, "[not] go out," as so delicately phrased by one freshman, was a real challenge this past semester. Skeeter Lassiter, another student, agreed, adding that he felt as though the largest difficulty of it all was motivating himself to complete coursework for his online classes.

Another student put forth that the increased wi-fi demands have caused a number of problems with Zoom meetings, the most concerning of which is connectivity during exams, where Zoom attendance is much stricter. While this largely doesn't affect students participating in the face-to-face classes, many students living off campus struggle to consistently

attend classes with poor wi-fi connections.

Despite all the internal and external issues with online classes, many students agreed that the ability to watch the recorded lectures and class meetings was an incredibly helpful tool for correcting notes and reviewing materials for tests.

All in all, roughly half of the interviewed freshman felt as though their transition to college life at Tech during COVID-19 was a rough one given their preference for in-person classes and the greater motivation it presented them with putting effort into getting coursework done. The other half felt they were able to handle the adjustment fairly well; One such student, Lillian DeGroot, had spent most of high school attending a number of online classes already, so the transition was a fairly easy one given her experience with handling virtual courses. When asked whether or not they felt as though COVID had added to their overall stress level, most responded with a simple "no", although one student responded to our humble journalist with the statement, "No, but I feel you did," leading yours truly to conclude that, while the transition to college life was a difficult one in some respects, students' sarcasm levels have likely reached an all time high.

- Isaiah Padilla

is extra special, it's more specifically known as an endorheic basin. Endorheic basins retain water because they have no outflow to external water sources, meaning that once water flows into the basin, the only way out is evaporation.

During the last Pleistocene Ice Age, (12,000-24,000 years ago) New Mexico was experiencing considerably more rain and precipitation than what we might be used to now and the Tularosa Basin was slowly filling up with more and more runoff from the surrounding mountains and area. This runoff wasn't just water though, it was mineral rich water. But, as the last Ice Age began to end, the Earth began to heat up once more, evaporating all of the water collecting within the basin.

As the Tularosa Basin began to dry, the water might have left but the evaporites stayed behind. The most interesting of those evaporites being gypsum. Gypsum, ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$), is a soft mineral that is notably used in things such as writing chalk. Gypsum sand is especially rare due to its moderate water solubility, with White Sands NP being the largest gypsum dunefield in the world.

So when the weather finally warms up and you find you and your friends starting to think of White Sand as your next weekend day trip, remember the long history it took to produce the perfectly sled-able dunes.

- Alexandra Sartori

Relax and Unwind

"We know what we are, but know not what we may be." - William Shakespeare

White Sands

Everyone knows White Sands, the small oasis just south of NMT. Whether you see it plastered over your Instagram feed when the weather starts to get warm or if you've been there yourself, it's hard to avoid living in New Mexico and not knowing the scenic National Park (NP). What you might not know is the intricate geology and history behind White Sands NP.

Taking it back a few million years ago, say around 280 million years ago (280 Ma), the Permian period of the Paleozoic era was reigning. Now if you're already a little lost on what Permian or Paleozoic even means, no worries. The Paleozoic era was known for the burst of aquatic life (sorry no dinosaurs quite yet), commonly called the "Cambrian Explosion." This gave way to different life forms and evolutions such as the arthropods. This era also saw three different supercontinents in its time, Pannotia, Gondwana and, the far more famous, Pangaea.

The Paleozoic era was divided into six different periods: Cambrian, Ordovician, Silurian, Devonian, Carboniferous and the Permian. Fortunately, for the sake of White Sands, we're only interested in the Permian period. Now, the Permian period started with the joining of Pangaea. It also saw the rise and diversification of amniotes (mammals, birds and reptiles) due to the drier climate and more desert-esque areas that grew from the fall of the Carboniferous period rainforest. There was also a point in time where modern day New Mexico was covered by a sea. This sea rose and fell multiple times over the course of millions of years, leading to thick deposits of dissolved minerals on the seafloor.

Fast forward a bit, to around 30 Ma ago. The Earth is now officially in the present day era (Cenozoic) and the San Andres Mountains and the Sacramento Mountains began to form. Between those two new mountain ranges, the Tularosa Basin formed. No worries, if you don't know what a basin is; basins are large areas of low-lying land. But, the Tularosa Basin

A Top-Down Perspective: COVID and College

With our tenth month of coronavirus-induced quarantine well underway, let's take a look at how the higher educational institutions have been handling the lockdown.

Despite some setbacks during the Fall 2020 semester, we here at New Mexico Tech have kept our case count down to fifty confirmed cases, with only nine of those being currently active at the time of writing. Social distancing and self-sanitizing regulations are still in place, however, and as a result we must continue, as professors and students, to navigate the hybrid and distance learning options for education. Fortunately for those students who participate in hybrid classes, numerous upgrades have been made to the cameras while the number of on-site workstation monitors has increased from one to two, allowing students to engage with their partners and any digital course material simultaneously.

Moving on to financial aid within the COVID-19 setting, options have been made for those students who were especially impacted by the transition to COVID-learning and are now trying to meet financial obligations under a great stress load. More opportunities for scholarships will be made available throughout the remainder of the school year. For more information on maintaining scholarships despite a lack of credits due to COVID-related circumstances, please contact the Office of Financial Aid at financial_aid@nmt.edu.

On a statewide level, coronavirus cases have begun to drop steadily since Thanksgiving. As the New Mexico Department of Health's "Red to Green" Framework regulation was

supposed to end as of December 30th, 2020, no new actions have yet been announced. To quickly recap, the "Red to Green" regulation presented a three stage action plan in which every single level of the economy from a state to a local level was addressed as to what the respective restrictions would be for each category of the COVID situation, with the "Red" stage being equivalent to high rates of COVID cases and the "Green" stage equating to low rates and increased recovery cases. Most restaurants have remained closed to indoor seating while allowing customers to enter their lobbies to pick up and, in some cases, order food to-go. Much to the general public's relief, socially distanced lines outside supermarkets have largely died down, though in some cases these are still in effect. In terms of other states, California, New York, and Texas remain at the top of the list of states struggling to get their cases under control.

On a national level, however, the case rate is consistently dropping. As yet another round of COVID-19 relief from the federal government is prepared for release, coronavirus vaccines continue to roll out in the thousands to frontline workers and high-risk Americans. The expectation is that around one billion vaccines should be available as of this coming June to the general public, with the vaccine being administered in several stages every two weeks. Citizens remain largely hopeful when it comes to "beating the curve" and look forward to the light at the end of the tunnel sometime by the end of 2021 or beginning of 2022.

- Isaiah Padilla



Clubs and COVID: Useful Information



One of the more drastically affected aspects of college life on this campus has been events. Due to proximity, numbers, and contact concerns, events on campus are a shell of their former self. Even the iconic M-Mountain Run was cancelled due to COVID. These restrictions are carried over to clubs and their gatherings as well, muddling up what's okay, and what's not. I talked to Dallin Sobers, Vice President of the Student Government Association to learn more about how clubs are functioning in the current climate.

"These regulations are in constant flux," Dallin said. "Between the governor's orders and what Tech decides, there are a lot of moving pieces that factor into the [final] outcome. Hopefully things will become less strict

throughout the semester, but I can't guarantee that."

I then asked about current regulations: "Right now, clubs are only virtual, but we are looking at writing a proposal that hopefully will allow clubs to meet again. I am looking to push the number of people, regulations permitting, to hopefully 15." I will make sure to follow up on this, should the proposal ever go through, so look for that in upcoming Paydirt issues.

As for how club funding looks like, Dallin said that "it still is a big part of our budget. Because it looks, as of now, that clubs will not be traveling, clubs can repurpose these funds into things like on-campus materials. They can also still use funds for events provided they are COVID-



3. Learn from others; One of the best ways to learn without doing something yourself is from others' mistakes (or hopefully lack thereof). Try to go to other thesis defenses, preferably ones involving similar fields of study to your own. Ask questions afterward if you can, and take notes on the kinds of questions asked by the defense panel.

4. Be ready to explain anything and everything; Part of this can be covered by knowing your thesis backward and forwards (and part of that can come from simply having written it). However, be sure to stay on your toes when it comes to being asked specific questions, as they are sure to pop up. If there's any small detail, some little-known fact, or something along those lines that you didn't cover in the presentation, assume that the defense panel will question you on it.

5. Simplify if you can; Unless necessary, spend the majority of your time explaining the concepts or analyses that wouldn't make sense to the average person. Additionally, it's a great idea to be able to sum up your thesis in a single sentence; it's direct, gets to the point, and minces no words in explaining the essentials of your research. This also helps with maintaining focus when describing how research ties in or adds to your thesis.

6. Be flexible with your structuring; That way, if at any point you need to break away to explain some other topic or answer an important question, you can come back and immediately pick up the thread from where you left off without wasting time recapping how you got there.

7. Practice; This cannot be stressed enough. Get some friends together, maybe even colleagues or co-workers, and have them act as panel members. Get used to discussing your thesis in front of a group of people, and you'll be that much closer to being fully prepared to defend your work in front of the actual panel.

As might be inferred, it is also advisable to conduct some of your own research into thesis defense. The strategies and tips discussed here are some of the most basic ones out there; Everyone has their own personal preferences when it comes to presenting. The most important thing is to remember that this is your contribution to your field of study; therefore, treat it accordingly and do your best to do it justice.

- Isaiah Padilla

Thesis Defense: Preparation, Strategies, and Tips

Senior theses: The words alone fill many students' hearts with dread and anxiety. Fortunately, as with many academics-related, this can be lessened with some proper preparation.

For those who may be still in the earlier stages of deciding whether or not to engage in a lengthy but rewarding process to procure a Master's degree in their respective fields, a brief definition of a senior thesis is necessary to set the stage. As usual, saying is far easier than doing; a senior thesis is the culmination of as few as three to four years of a graduate student's efforts and is the primary obstacle to obtaining one's Master's degree. Call it a book report of sorts; you first need to spend time reading the book to understand the material; those are your undergraduate years. Of course, you don't have to write a report on the book as you may already have gotten all you needed out of simply reading the book. But if you were to go above and beyond just grasping and applying the material, then you need to spend more time working on and compiling a major application of what that book taught you to present it to others and potentially publish it to share with people worldwide. Those are your graduate years, the extra amount of time you spend taking what you got out of the book and synthesizing its' application into one big report.

Now, where to start? Before you can dive in and start writing, you first need to make sure you have selected a topic in which you are engaged and several advisors to help you out. It is important to remember that while the topic may have already been covered countless times, as long as you have something new to focus on, perhaps some new, previously unthought-of perspective or evidence, then there is substance to your paper. A paper that only refreshes the memories of those reading your report serves no greater purpose than to waste everyone's time, especially yours.

With your topic selected, finding the appropriate advisors is the next step. These are typically staff members from your school, and should naturally be knowledgeable in the areas in which your topic is concerned.

Next up is the writing itself; First and foremost comes your thesis body. At this point in your academic career,

you should have written a thesis statement at least once or twice. This is slightly different since a well-written thesis body not only presents the thesis but also the background, application potential, and any other relevant but basic introductory information. For now, the most important priority to keep in mind is to worry less about structure and style, focusing instead on writing the bulk of what will become your paper. It should be noted that this is not equivalent to an abstract, which is usually required for these sorts of papers; An abstract is around half a page to a page long. Your thesis body is, well, the meat and potatoes of your paper for lack of a better phrase.

As mentioned previously, the body should contain background information in addition to your analysis of the topic, applications, and, where applicable, arguments and counterarguments. You may find that it is necessary to devote an entire section or two to debunking misconceptions about your topic, or simply clarifying what makes your paper stand out from other theses on the subject.

From there, the remainder of the writing process is (or should be, at this point in your education) virtually an instinct: Revising and editing your paper. This is where your advisors will especially come in handy, as their experience in writing papers for research or otherwise will shine. Once that entire phase is finished, give yourself a pat on the back and get straight back into preparing for the second (albeit blessedly shorter) half of your thesis defense: Defending your paper. This is possibly the more challenging and anxiety-inducing portion of the project as a whole, although some colleges do not require a defense. Unless you are one of those lucky few, here are a few tips for preparing yourself:

1. Think positively; Don't think of the defense as a challenge, but rather an opportunity. This is a chance, your chance, to introduce your work to the world and give them a look at something which is not only important to you but potentially incredibly important to the world as a whole.
2. Don't start preparing after you've finished writing; Cramming for this defense won't work nearly as well as any cram sessions you've pulled off in the past. The early you start preparing yourself for the defense, the better.

safe. The primary source of club funding comes from the [initial] budget submitted in club packets. Outside of the packets, clubs can submit bills to the student senate for funds pertaining to events/travel." Again, these submissions must abide by COVID restrictions at this time.

Some active clubs at the moment include AISES, the American Indian Science and Engineering Society, QuASAR, the Queer Association of Socorro Area Residents, Chess Club, Stich and Bitch, Intervarsity, and Tribeta. Of course, there are many more smaller or less known clubs that exist, so make sure to reach out to them at the current Club Fair or email Dallin himself. (email listed further below)

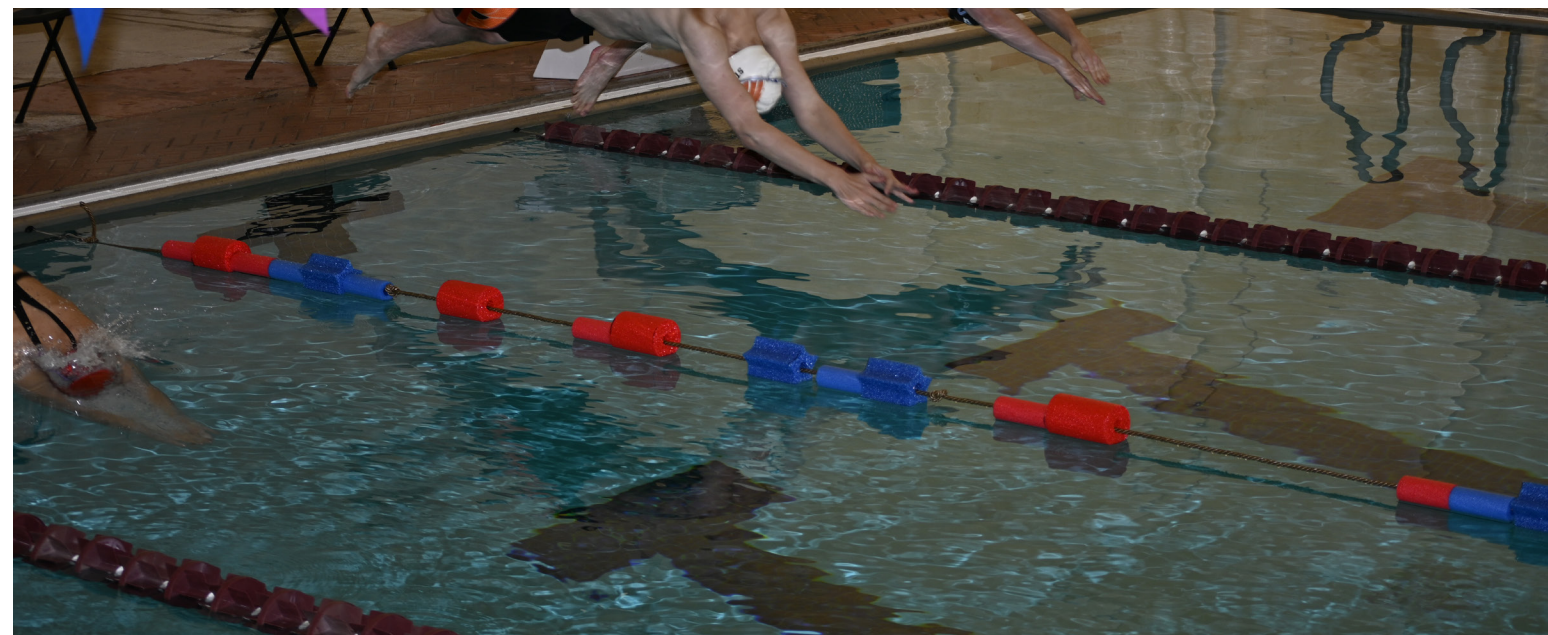
When asked about what clubs are inactive or disbanded at the moment, Dallin's first response was: "there's so many. The first that comes to my head is Cigar Club, which used to be advised by Dr. Altig. [Others include] Anime Club, Sushi Club, Minecraft Club, Whovian Associates Club, and Fencing Club."

Following this, I asked how students could go about restoring or making clubs of their own, and how they could find clubs. As a note, this article was written before the Club Fair in anticipation. "This semester, I am going to combine past practises, and we are going to have an

extended Club Fair with rotating clubs active on each day. To become a club, base minimum, you need an advisor, 3 executive officers, 15 student members, and a constitution that covers your election process, conflict resolution process, and mission statement. We will hopefully update the website to have the club packet, but [for now] email sga.vp@npe.nmt.edu for the packet."

Despite the current scenario, things to be looking up for clubs and events. Again, everything is subject to COVID restrictions at the moment and any further changes brought by the pandemic. I will continue to update you on any advancements regarding clubs in the future as information presents itself. Please email Dallin at the address above if you have any questions or interest in forming a club.

- Skyler Matteson



Science and Research

"A rainbow is the product of physics working for your appreciation of beauty." - Kyle Hill

Jason Falls: Graduate Research

Research can sometimes be monotonous, spending long hours in a lab trying to get calculations and simulations just right. Research can also be getting to shoot a .50 caliber gun. And .50 caliber guns are no joke, with the most well known one being the .50 Browning Machine Gun.

For Jason Falls, a Mechanical Engineering graduate student, this is his day to day life. Falls works under Dr. Hargather, pursuing his Masters in the field, with his current research project centered around the, "free flight density fields around ballistically launched projectiles." Essentially meaning, he shoots a .50 caliber gun with a spitzer round to test the variation in the density of the field that the bullet passes through.

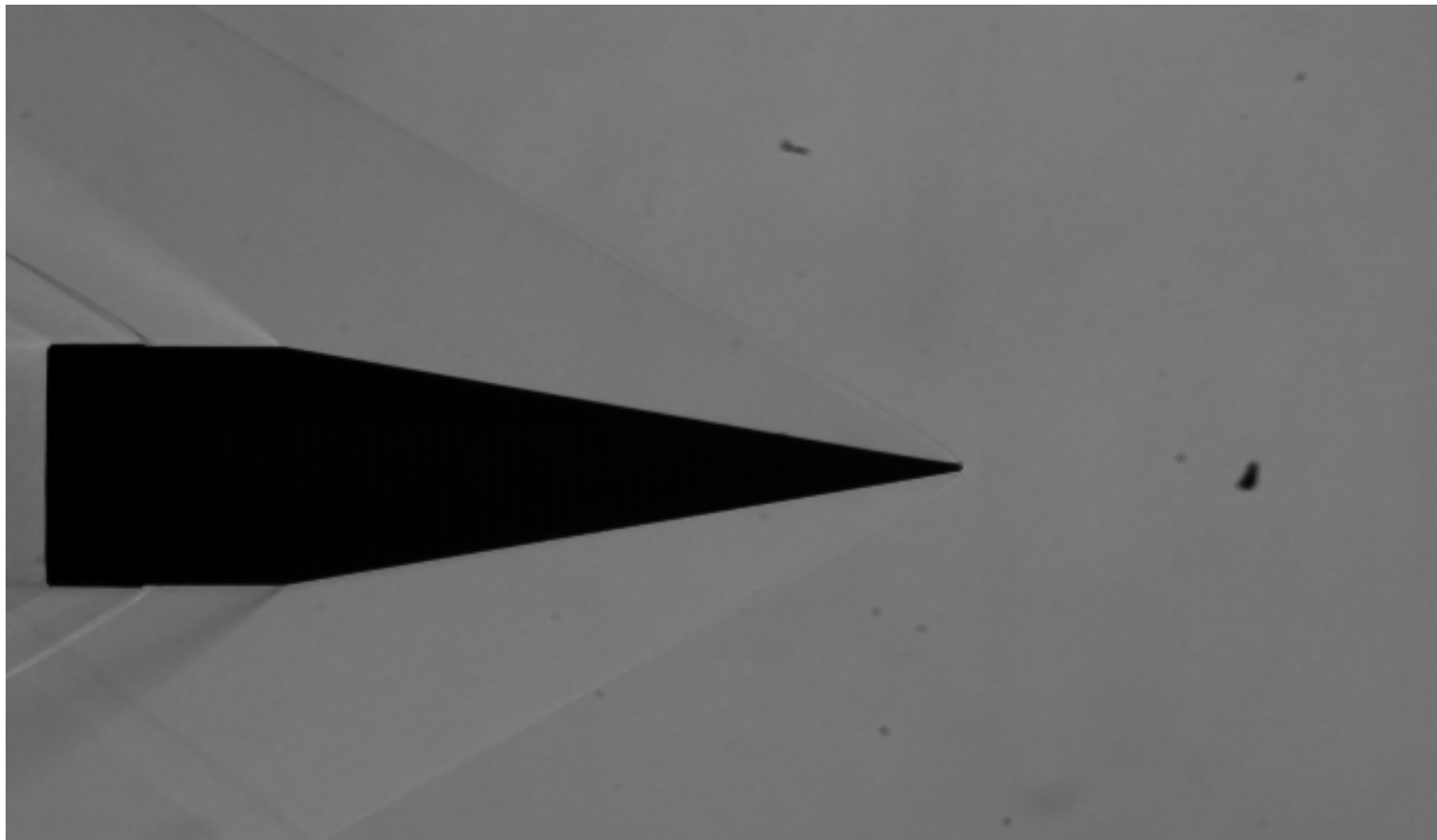
Falls first constructs a computer simulation in order to predict the density field, then he utilizes Schlieren imaging to obtain the first derivative of the refractive index of the projectile. Schlieren imaging allows

a researcher to photograph the flow of fluids (this includes air) of varying density. Falls, specifically, utilized a lens based schlieren system.

"Instead of aiming light diagonally at a mirror, just aim it straight on at a lens to provide the parallel light on the test section...It's predominantly used for smaller fields of view. We have 700 mm lenses with test sections in the range of 3-4 inches."

As the bullet passes through this 3-4 inch window, it is traveling at Mach 2, meaning at twice the speed of sound (approximately 1535 mph or 685 m/s).

Jason applies the data gathered from these tests to compare to his simulations from his computer. He's finding that he is, on average, underpredicting the density fields by around 5%. This can be due to the "characterization of noise." While Falls may specifically be monitoring the spitzer round's effect on the density



of the field it passes through, the noise of the firing can also impact the imaging test. The lenses he uses are also highly sensitive to issues and dust, which, well, we live in a desert.

Working under Dr. Hargather has motivated Falls to work even harder, "[He] pushes his graduate students to achieve only the best."

So while graduate school and research can be filled with busy days and long lab hours, at least there is always the chance to shoot cool guns, right?

- Alexandra Sartori

