

CORNELL ASTRONOMICAL SOCIETY NEWSLETTER

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LETTER FROM THE EDITOR

Hello cosmic enthusiasts and welcome to the May edition of the Cornell Astronomical Society newsletter! This month, we embark on a journey to the quasi-moon Zoozve and recap the CAS eclipse trip to Rochester.

In terms of CAS events, we had our final talk of our Spring Lecture Series on April 12th to celebrate Yuri's Night. Our lecture series will resume in the fall, so keep an eye out for more information at the beginning of next semester.

Thank you to all the writers that made this, and all previous newsletters, possible. And thank you, to our readers, for your engagement and support. It has been an honor.

Signing off,
Abigail Bohl, Editor-in-Chief

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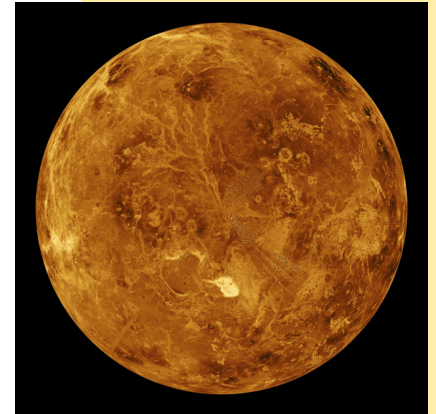
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ZOOZVE: AN HONORABLE MENTION

BY JUSTINE SINGLETON

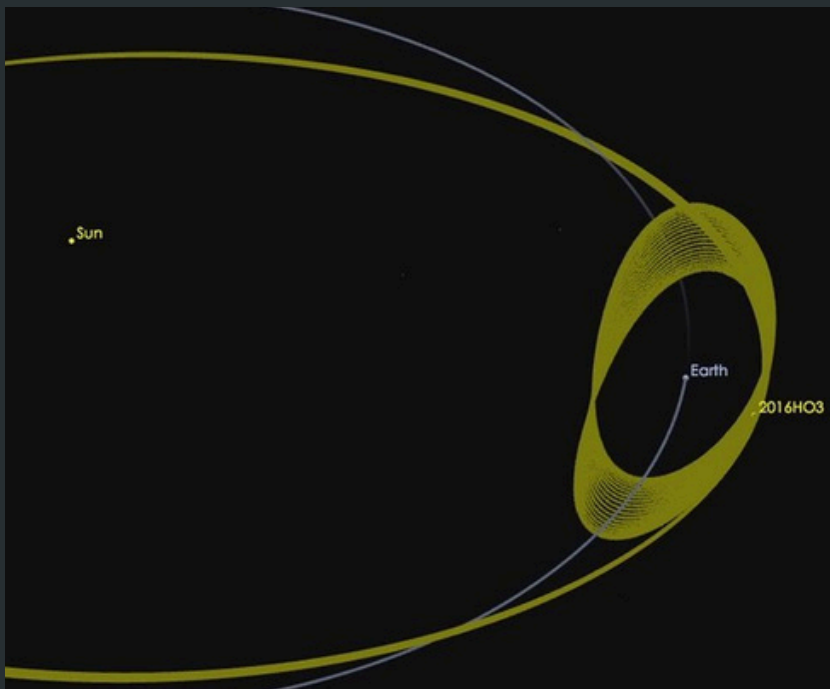
Picture this: You are standing in your child's bedroom, or maybe that of a younger sibling or cousin. There is a poster of the Solar System on the wall. As you admire the art, you notice something interesting. Venus has a moon marked next to it. That's strange, you think to yourself. Venus doesn't have any moons. You lean in closer. And that's when you see the name. Zoozve.

If you are Latif Nasser, journalist and co-host of Radiolab, your next step is to contact someone at NASA yourself to solve this mystery. When your contact is equally confused, you decide to reach out to the artist who made the poster. Through the conversation with artist Alex Foster and a follow-up with the NASA contact Liz Landau, it becomes clear that Foster had made a mistake. The object was not named Zoozve, but 2002VE. And it wasn't a moon. It was a quasi-moon.



Simulated view of the surface of Venus, as seen by the Magellan spacecraft.

Credit: [NASA](#)



As they orbit the Sun, quasi-moons, such as 2016 HO3, circle their host planet as well. 2016 HO3 is a quasi-moon of Earth, like Kamo'oailewa and 2023 FW13.

Credit: [NASA/JPL-Caltech](#)

Typically, a moon orbits directly around its planet and nothing else. It goes around the Sun, but only indirectly as a companion of its planet. But quasi-moons are different. They directly orbit the Sun, but also orbit a planet due to its gravitational pull. Zoozve is orbiting the Sun and Venus at the same time. While Zoozve was the first quasi-moon discovered, it is not unique. Quasi-moons exist throughout the Solar System. Earth itself has several quasi-moons, such as Kamo'oailewa, which could be a fragment of the Moon, and 2023 FW13, which might have been orbiting Earth since 100 B.C./B.C.E. In fact, there is evidence that Zoozve used to be a quasi-moon of Earth before it began orbiting Venus.

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Upon reaching out to Zoozve’s discoverer, Brian Skiff at Lowell Observatory, you find out that he doesn’t even remember discovering it. At the time, it was considered a completely unremarkable asteroid. Seppo Mikkola and Paul Wiegert realized it was a quasi-moon in 2004, two years after its discovery. But what is so special about quasi-moons anyway? Maybe it is a reminder that the movement of the Solar System is not set in stone. When more than two bodies interact with each other, it is impossible to determine the exact trajectories they will take in the long term. Scientists refer to this as the N-Body Problem, or in its simplest form, the Three-Body Problem. Zoozve interacts with both the Sun and Venus, so this problem applies to it. On a larger scale, this applies to the entire Solar System. The exact motions of Earth and the other planets billions of years from now cannot be predicted today. As Seppo explains this to you, he waves his finger and says, “Just by doing this, I may have changed the Earth’s orbit.”

While talking with all these experts and learning more, you find out that the discoverer of a minor body like Zoozve is given naming privileges, and the name is ultimately approved or declined by the Minor Planet Center of the International Astronomical Union. Suddenly, you have an idea. You ask Skiff if he would consider officially naming the Venusian quasi-moon “Zoozve”. He says no. But you are persistent. You explain to him the story of the poster and how you ended up on this quest. Finally, he agrees. You write up a short summary of the entire story as an argument to the Minor Planet Center, and after months of deliberation, 2002VE is officially named “524522 Zoozve” on February 5, 2024.

Later, back in the child’s bedroom, you glance at the Solar System poster again. You think about how to explain Zoozve, once your child is old enough to ask about it.



Venus from the Parker Solar Probe

Credit: [NASA/APL/NRL](#)

ASTROPHOTOGRAPHY YEAR-IN-REVIEW



This year, with the aid of Fuertes's old CMOS and a more recent DSLR, CAS members new and old made a renewed effort at astrophotography with some of the observatory's most prized instruments. Above is a collage featuring images from the past twelve months.

The **Ring Nebula** and **90% Moon** were taken over the summer last year by Ben Jacobson-Bell and Erik Payton, both using Irv and the DSLR.

The **Andromeda Galaxy** and **Hercules Globular Cluster** were taken in the fall by Ben Jacobson-Bell and Gillis Lowry, also using Irv and the DSLR.

It was a good fall semester for planets—Erik Payton took the images of **Jupiter** and **Saturn**, and Ben Jacobson-Bell took the image of **Uranus**, all through Irv with the DSLR.

Unfortunately, around this time, the DSLR's shutter broke, so images for most of the spring had to be taken using the CMOS. Andrew Lewis took the images of **Mercury** through Irv and **Tiangong's transit of the Sun** through the Coronado solar scope.

Last but certainly not least, Marquice Sanchez-Fleming used our 5" Meade refractor ("Alex") with a newly repaired mount to score the stunning image of the **Orion Nebula**.

We look forward to more astrophotography next year with CAS's new DSLR!

ECLIPSE RECAP

BY ABIGAIL BOHL

On April 8th, 2024, select areas of upstate New York were graced with a once-in-a-lifetime event: the long awaited total solar eclipse. Cornell Astronomical Society members, spearheaded by CAS president Gillis Lowry and vice president Ben Jacobson-Bell, chartered eight buses to bring four hundred people to totality in Rochester.

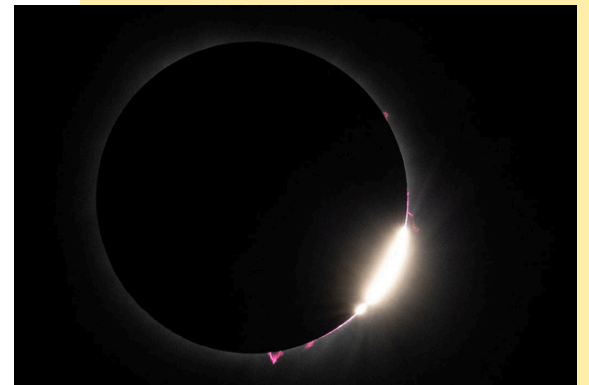
The event was a year in the making; we began serious planning during the summer of 2023. That summer, CAS officers met on Zoom to begin sketching out ideas for how we could feasibly bring as many undergraduates as possible to totality (without charging any hefty fees!). From September 2023 through April 2024, we had weekly meetings discussing topics on how to spread eclipse safety information, the logistics of chartering buses for four hundred people, and how much we truly hoped the weather would cooperate.

In typical upstate New York fashion, the weather did not, in fact, cooperate.



Image of the moon's shadow during the April 8th eclipse.

Credit: [NASA](#)



Bailey's Beads and solar prominences from the April 8th eclipse

Credit: [NASA/Keegan Barber](#)

After much anticipation (and anxiety), the day of the eclipse finally arrived. After an early morning start, the eight buses were loaded with excited undergrads who were all given eclipse glasses, stickers, and carefully considered safety sheets. The buses then departed for Rochester and, just like that, we were off!



CAS members on the road!



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The Rochester eclipse festival was incredible. When we arrived, the sun was shining through translucent clouds, and all were hopeful for clear skies. It was a pleasantly cool day, and there was a hum of excitement in the air for what was to come. Although we arrived a few hours before the eclipse was set to begin, there was so much to see and do that the time flew by.

Some CAS members staffed a table outside the planetarium, others manned solar telescopes, while others still enjoyed shockingly reasonably-priced and well-portioned meals from the food trucks. Songs ranging from “Total Eclipse of the Heart” to a Star Trek song medley filled the air, and we all cheered for *mooore Isotopes!* With all the joy and whimsy of the festival, we were almost able to ignore the sun disappearing behind an increasingly opaque cloud cover.



Festival pictures!

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At a certain point, it became clear that we were not going to see the moon pass in front of the sun. The clouds were not going to break.

The time between when the eclipse began and totality was especially disheartening. Every now and then, I would adorn my eclipse glasses and squint hopefully at the homogeneous gray blanket in the sky, only to sadly remove them moments later. There was an eclipse up there, somewhere, but no way to see it. All we could do was wait.



The cloud cover at 2:42 pm.

All suspense and angst was happily dissolved upon the onset of totality. The changes were subtle in the minutes prior: the ground became tinted red, and the spring air took on a noticeable chill. Then, all of a sudden, and before anyone really knew what was happening, the sun gave way and totality was upon us.

It was very dark in the shadow of the moon. Hundreds of people stood together in hushed surprise and wonder. Between the hints of orange and maroon on deep gray clouds, the delighted voices of friends, and the slight breeze in the cool air, the whole world seemed new and captivating. How amazing it was! How exciting to be able to see this!



Totality!



The journey back to Ithaca was less eventful. After totality ended, we all quickly returned to the buses and strove to endure the herculean ordeal of post-eclipse gridlock. It was difficult and, at points, I thought I might not survive, but we eventually found our way back to home sweet Cornell.



Gridlock :(

Even though the eclipse was blocked by clouds, in the end, it didn't really matter. From my two years in upstate New York, I have come to accept that the weather here is unpredictable at best and vindictive on average. Yet, there is a reason why we still show up to Fuertes Observatory every cloudy Friday.

In my experience, the club, as well as the wider astronomy community, form a collective that is connected by something more than just a shared interest in astronomy. What would CAS be, really, without mysterious fast-food orders to a landline long since retired or weekly interpretive percussion?

Years from now, when I think of the April 2024 eclipse, I will absolutely remember those three incredible minutes of darkness. But, more than the eclipse itself, I will look back fondly on the memories made with some of the people most important to me. I wouldn't trade a hundred clear eclipses for that.



MOON

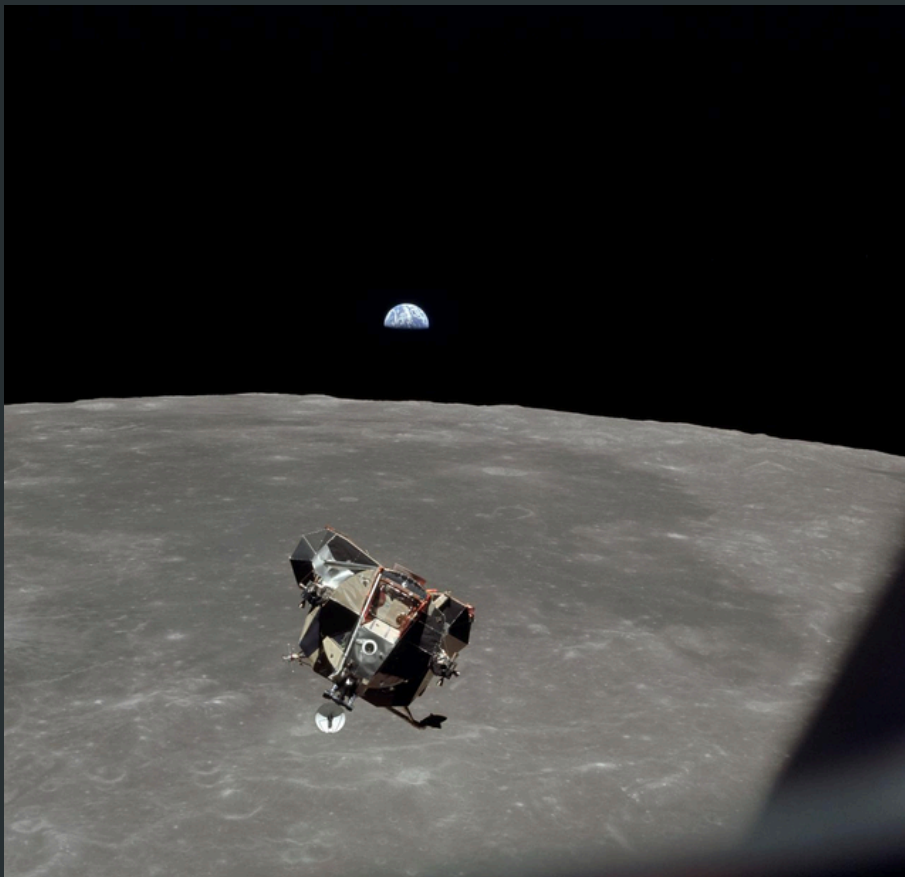
BY JUSTINE SINGLETON

You don't need my help picturing this one. If you've ever looked up at the night sky, chances are you've seen it—a silvery-white mirror in the vast, tranquil darkness.

As we live out our lives on Earth, the Moon is ever-present. Its name is so simple because as Earth's moon, it is the first moon we ever knew. Even when we cannot see it, we can feel its influence on us through the tides and through the way we measure time. And when we *can* see it, from “chin of gold” to supermoon and everything in-between, it fascinates us. People stay up late to see Earth's shadow stain the Moon red during lunar eclipses. Crowds clustered together in the middle of the day on April 8 to watch the Moon itself eclipse the Sun.



The Moon captured from Fuertes using the Irving Porter Church Refractor
Credit: Greg Powers



Apollo 11's Lunar Module ascent stage photographed from the Command Module during their rendezvous in lunar orbit | Credit: [NASA](#)

You don't need my help to imagine walking on the Moon's surface either. Twenty-four astronauts have been to the Moon, twelve have walked on its surface, and four of those moonwalkers are still alive today. As Apollo 8 orbited the Moon, the first crewed mission to ever do so, William Anders described the surface as like a “sand pile” or “big beach”, a metaphor helped by the layer of dust. Charlie Duke of Apollo 16 emphasized “the stark contrast between the brilliant gray of the Moon and the blackness of space”. When Apollo 11 first arrived at the Moon, Buzz Aldrin described its appearance as “magnificent desolation”.

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You might have heard that Apollo 11 landed in the “Sea of Tranquility”. The Moon’s “seas”, or maria, are unrelated to oceans on Earth, although they were named because they looked like bodies of water to early observers. Lunar maria are actually flat, dark plains of magma that have long since cooled into rock. Just because there are no oceans on the Moon, however, does not mean there is no water. Two years ago, when I first began writing for the newsletter, I commented that the Moon doesn’t have any snow, “just dust.” But this is not entirely accurate. The Moon may not have snow, but it does have ice. Small amounts of water ice are protected from sunlight by permanently shadowed regions in craters. Most of these permanently shadowed regions are near the Moon’s poles, but others exist across the lunar surface. In 2020, trace amounts of water were also detected on the sunlit surface—about twelve ounces (enough to fit in a water bottle) within a cubic meter.

The presence of water was partly detected with the Lunar Reconnaissance Orbiter (LRO), which has been orbiting the Moon since 2009 and is being used to help NASA plan future Artemis missions. Artemis’ future and that of others’ plans to reach the Moon remain to be seen, but I will not be here to see them with you. This is my final piece before graduating. Thank you for following me across the Solar System.

Be seeing you.



GOODBYE FROM THE PRESIDENT

GILLIS LOWRY

Like a telescope tracking by the hours or stars that slide throughout the season, it's hard to notice the day-to-day differences until nearly all our time is up. Orion sets so early, now, doesn't he?

Fuertes is an ever-changing world. In my freshman COVID days, it was a singular bright spot in the dreary sludge of soulless assignments and lonely nights. In sophomore year it grew to be more than just a fascinating building; Fuertes contained all my new, wonderful friends, and one whose ear I hoped I wouldn't completely talk off, who would later become my partner and CAS's amazing Vice President. With my officer positions, Fuertes grew into a responsibility, too—the greatest one I've ever had.

Serving as CAS's President has brought me more purpose in life than any other role. I've known since I was a child that science communication was my calling. Fuertes finally gave me the chance to share all the wonder I could barely contain, from Q&A sessions with excitable Girl Scouts in front of the slide wall to welcoming the dimly lit faces of freshmen on their first dome tour. CAS (and the great Shawn Hikosaka and Chase Funkhouser) taught me how to use a telescope, recognize the constellations; in my time I hope I have passed this knowledge to hundreds more.

I am still unsure what my future holds. I know I'll return to Fuertes again and again, until everyone I know has graduated and for many years more, when the sea shants no longer echo the dome but the memories and Irv stand fast. Although it's sad for certain things to fade, I wouldn't have it any other way—I love this place and its ever-changing legacy to death, and I can't wait to see what parts of my time become legend.

To next year's officers (Pres. Erik Payton, Vice Pres. Andrew Lewis, Treasurer Christopher Brown, Outreach Coordinator Jillian Epstein, and Editor-in-Chief Shane Kuo), I'm honored to leave the club in your very capable hands. To all my closest friends in CAS—there's far too many names for me to list—I know that I'll be seeing you again! It's not the leaving of Ithaca that grieves me, but my dear friends, when I think of thee.

Best wishes and all my love,
Gillis, your lifelong President

*Outgoing and incoming officers—
may your skies be clear and your
shants resounding!*



CROSSWORD

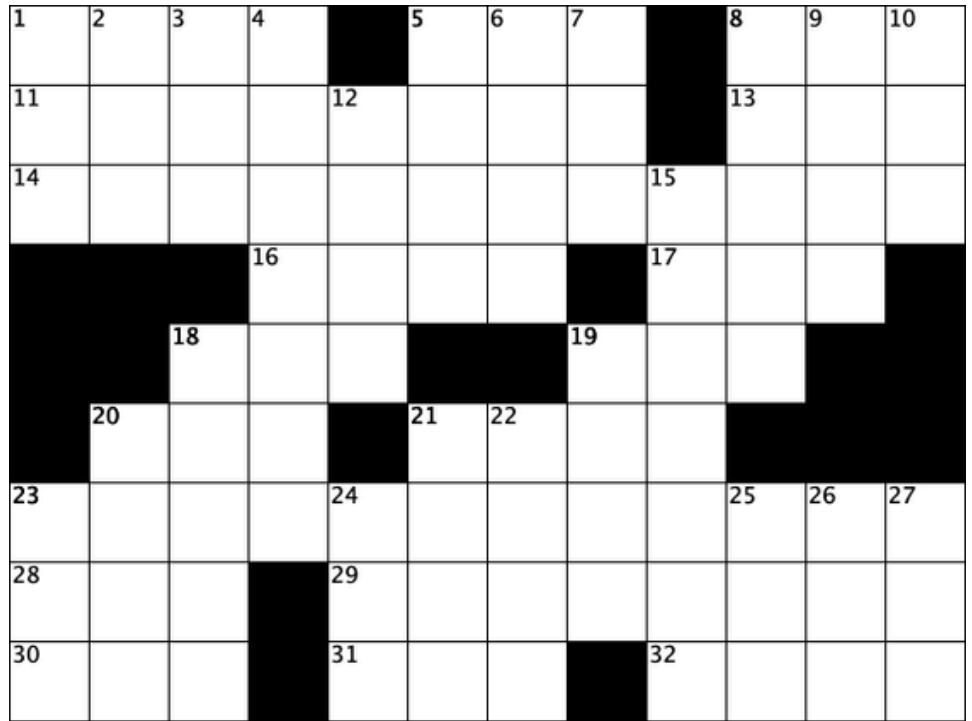
BY BEN JACOBSON-BELL

ACROSS

1. Tool for hanging up posters in Fuertes
5. Four hours ahead of us (in May): Abbr.
8. Poem of praise
11. Earl Grey, e.g.
13. 2024 Slope Day hit
14. "Until we meet again!"
16. Como, in English
17. Number of stars within a parsec of Earth
18. Chimpanzee, but not baboon
19. Beetles, e.g.: Abbr.
20. Prefix with "cover"
21. On the briny
23. "Until we meet again!"
28. Catan resource
29. Hobby that spawned a subfield of astronomy
30. H.S.-level exam
31. ___-Wan
32. Second-person plural pronoun with an apostrophe

DOWN

1. Nostalgic Instagram initialism
2. Muhammad who floated like a butterfly and stung like a bee
3. Friend
4. Effect of syzygy as seen from one of the bodies involved
5. Collegetown boba locale
6. Message
7. Temporary resident at a downtown Ithaca café
8. Library on the Arts Quad and residence hall at Weill Cornell
9. Irv's home at Fuertes
10. Lamb mother
12. It can be taken in protest
15. Like many a no-parking zone
18. Put out, as laundry or grievances
19. Make a sharp turn
20. Alternative to truth
21. "Moby Dick" captain
22. Freight truck
23. Stymier of many a stargazing session
24. "However," abbreviatedly
25. "The Owl House" witch
26. Short, for short
27. "Ha!"



A NOTE FROM THE VICE PRESIDENT

BEN JACOBSON-BELL

The Sun, the Moon, all the stars and planets and everything else, all rise in the east and set in the west, carried overhead by the rotation of the Earth. That's what I tell people who ask about the governor, who wonder why this old telescope has to move itself at the ponderous rate of one rotation per Earth day. So it has been almost 40,000 times since this observatory was built; so it has been over 1,000 times since I first came to Fuertes myself. So it will be for many, many more days and nights in this building's future.

For me, one of the most special experiences of my time at Cornell has been learning the history of this place. How our generations of alumni—on average, perhaps a few dozen a week, times 50-ish weeks per year, times 50 years since CAS's inception or 100 since Fuertes's; so, by a fairly conservative estimate, at least 100,000 visitors in this beautiful obs's history—how they all walked the same hall, the same spiral staircase, the same dome that we do today. How so many of them left their mark on Fuertes in one way or another: Irv himself, Sam B., Mike S., Brian and Kim, Jeff, Kevin, Jennifer, Shianne, Mike R., Dave, Sam N.-S., Brecken, Karen, the enigmatic G.E.E.(or F.?)G., and others; a host of others; too many to list but all recognized. And, of course, Phil Nicholson, our advisor for the past 40 years. All recognized with our gratitude for the way they made this building how it is today.

I hope in our time here we have sped Fuertes on its way, bringing the stars to the public by way of Irv's 100-year-old achromat in a way those forebears would be proud of. It fills me with confidence and pride to think on how the observatory will do in the hands of our successors.

Till next time, CAS. Fare thee well!

CREDITS

CAS Officers

Gillis Lowry, President
Ben Jacobson-Bell, Vice President
Haonan Gong, Treasurer
Ben Shapiro, Outreach Coordinator
Abigail Bohl, Editor-in-Chief
Phil Nicholson, Faculty Advisor

Cornell Astronomical Society (CAS) is a student-run non-profit organization founded in 1972.

Contact:
209 Cradit Farm Dr.
Ithaca, NY 14853
astrocommunity@cornell.edu

Contributors to this issue

Abigail Bohl
Ben Jacobson-Bell
Gillis Lowry
Justine Singleton
+Special thanks to all who contributed astrophotography and eclipse pictures!

Sources for "Zoozve"

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Image credit: [NASA](#)

