National Park Service
U.S. Department of the Interior

Grand Canyon National Park

Dark Skies Program

Annual Report 2024

Aurora over Grand Canyon

There were several nights of aurora borealis visible from the Grand Canyon this year. Look closely to see the aurora reflected in the river below!

NPS Photo by Matt Young

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Milky Way at Phantom

In no place else on nocturnal Earth can one stare up through as much deep time as when stargazing from Phantom Ranch! Night sky programs at Phantom are popular in the fall, spring, and winter months.

Photo by GCC Astronomer in Residence Imma Barrera

Introduction to the Dark Skies Program

Rader Lane
Park Ranger—Dark Skies Program Manager
Interpretation and Resource Education
Grand Canyon National Park

Hi all, my name is Rader Lane, I am a park ranger in the Division of Interpretation and Resource Education. I also serve as our park's Dark Skies Program Manager. Among the many resources we interpret, *Dark Skies* continues to be one of the most sought-after resources of our park visitors.

There are two main pillars to this program. First, our Dark Skies Team works to keep the park dark. We were certified an International Dark-Sky Park in 2019. During our initial pursuit, we inventoried over 5,000 lights park-wide—and we have a plan to retrofit every single one of them to be "dark-sky-friendly." Second, we maintain the park's dark skies outreach programs. There are several programs upon this pillar: The Grand Canyon Star Party, the Astronomer in Residence Program, the Astronomy Volunteer Program, and more.

We have a unique situation here at Grand Canyon—no other place provides as much visitor-access *whilst maintaining* such pristine night skies. And our park leadership is taking this fact to new heights. We lead the National Park Service in our outreach efforts, and we continue to set the bar for Dark-Sky Parks worldwide. I hope this report provides perspective on our work this year. And remember, *"Half the Park is After Dark!"*

Meet the Dark Skies Team

“Hi, I'm Rader. My focus is on managing our public night sky programs in the park. I like to say I am a park ranger by day, and a DARK ranger by night. I was born under a new moon in Rio de Janeiro, Brazil--the only country whose flag depicts several constellations in the night sky!”

Rader Lane - Dark Skies Program Manager
Division of Interpretation and Resource Education

“Hi, I’m Matt. I help coordinate the retrofitting of the park’s lighting fixtures. Keeping the park sky dark brings a great sense of purpose. It is protecting something that I truly love. Seeing the milky way from here is a powerful experience that I hope all can enjoy.”

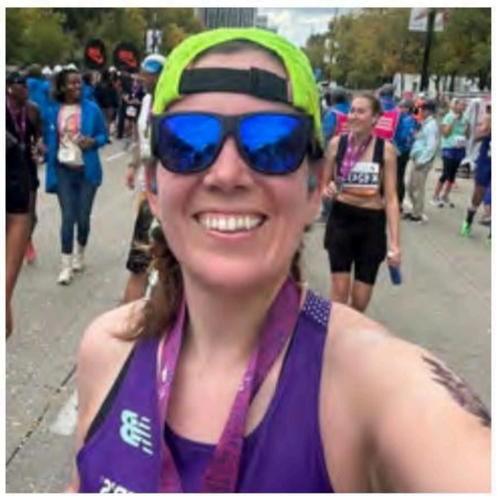
Matt Young - Construction Control Representative
Division of Planning, Environment, and Projects

Employee Spotlight

Matt Young was born and raised in Phoenix. He moved to Flagstaff where he went to Coconino Community College for sustainability, green building, solar, and other related classes. He began working in the “green” field, installing solar, wind turbines, and more. He was a supervisor for a contracting company for his last 3 ½ years in Flagstaff, before moving here to the Canyon and joining the Park Service. He is a CCR here at Grand Canyon, working on multiple phases to help the park achieve one hundred percent dark-sky compliance. He get bids from contractors to execute the retrofitting work then manages and coordinates the work itself. “Any light that gets retrofitted brings a sense of accomplishment, particularly knowing that I am assisting in keeping the night sky dark. I love that.” In his spare time, Matt enjoys astrophotography.

“Hola, I’m Santiago, helping lead data efforts at Grand Canyon. Being a part of the Dark Sky Team to help preserve night sky is one of the most rewarding projects I’ve participated in.”

Santiago Garcia - Data Management
Science and Resource Management

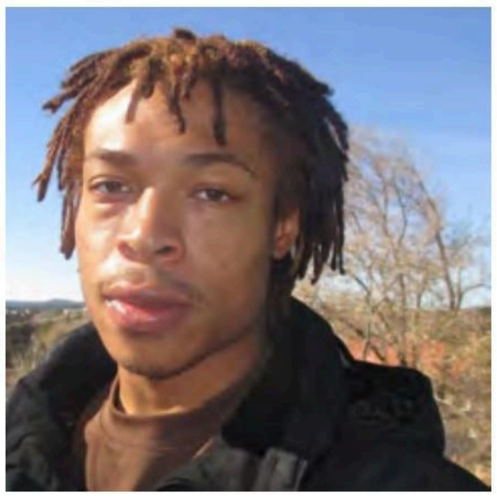


"Hey there! I'm Lauren—a photographer, dark sky advocate, and the voice behind Grand Canyon Conservancy's social media. I love helping visitors discover the magic of dark skies at Grand Canyon and why protecting it matters. Basically, I'm totally star-struck and here to share the view!"

Lauren Cisneros - Marketing Coordinator
Grand Canyon Conservancy

"I'm Steve, a retired Florida State Park Ranger and 10 year volunteer for NPS, USFWS, USFS, and BLM. There aren't many things in today's world people can agree on, but the majesty of a dark sky is one and that is why I love sharing it with visitors."

Steve Dimse - Astronomy Volunteer
Division of Interpretation and Resource Education



"Hi there, I'm Tyler, an astronomy enthusiast from Texas. I enjoy advocacy work, and having the opportunity to participate in astronomy outreach is especially gratifying. It has been a pleasure working with you all."

Tyler Cherry - Astronomy Volunteer
Division of Interpretation and Resource Education

"Hey there, I am Joey! I'm an Arizonan who is passionate about exploring cultural connections with the night sky. I am fortunate to be a part of such an amazing program early on in my career in Night Skies Interpretation."

Joey Green - Astronomy Volunteer
Division of Interpretation and Resource Education

"Hello! I'm Clover, Residency Program Manager with Grand Canyon Conservancy. I have the honor of running the Astronomer in Residence program. It's been an incredible inspiration to work with dark sky experts in this magical place where we can see and treasure our place in the universe. Astronomers are really far out!"

Clover Morell - Residency Program Manager
Grand Canyon Conservancy

"I am a retired chemical engineer and a long time National Park junkie. Joining the astronomy team here at Grand Canyon has been a tremendous opportunity to learn new things about the night sky and to share that knowledge with our visitors."

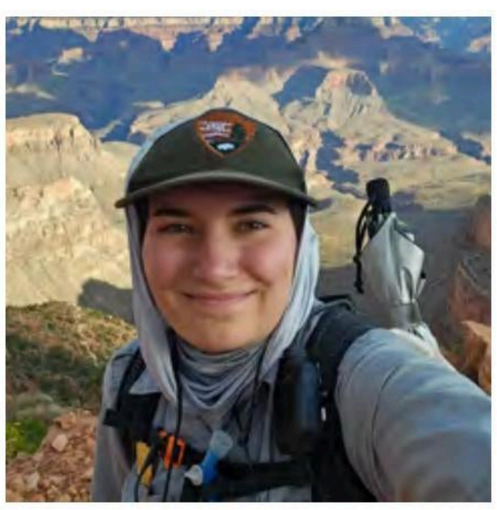
Robyn Tan - Astronomy Volunteer
Division of Interpretation and Resource Education

"I am a retired scientist/engineer from 3M. Making the night sky a highlight of visitors' trips to Grand Canyon has been an extremely rewarding experience."

Lian Tan - Astronomy Volunteer
Division of Interpretation and Resource Education

"Hi I'm CC! I am so grateful to be a part of the Dark Skies Team. Getting to witness the joy that our program brings visitors each night makes me feel like the luckiest person in the galaxy (and probably Andromeda galaxy too)!"

CC Cogswell - Astronomy Volunteer
Division of Interpretation and Resource Education



"I'm Kate, and I'm part of Canyon District Interpretation. I love being able to connect with people below the rim of the canyon, looking up at the night sky while surrounded by ancient rock! I'm a permanent ranger at Grand Canyon now, but my night sky interpretation journey began at Death Valley."

Kate Hensel - Park Ranger (Inner Canyon)
Division of Interpretation and Resource Education

"Hi, I'm Ranger Dave, I have been working in the park service for over ten years, in a few Dark Sky Parks. I currently work on the North Rim under some of the Darkest Skies in the country. I'm passionate about creating special experiences for our visitors to experience the night skies."

Dave Kent - North Rim Interpretation Lead
Division of Interpretation and Resource Education

"Hi, I'm Mark Gregory. I've been coming to the Grand Canyon Star Party since 2019. Its my favorite star party, because of the outreach to the public. I've enjoyed sharing the sky for 25 years, and this is both the best sky and crowd for sharing. I intend to keep coming back as long as I can!"

Mark Gregory - Astronomy Volunteer
Division of Interpretation and Resource Education

"I am Dave Hagarty. I am a NASA/JPL Solar System Ambassador and was able to pass on some knowledge that I have gained through this program. Doing daytime solar viewing as well as nighttime stargazing for over 17,000 people was an incredible experience!"

Dave Hagarty - Astronomy Volunteer
Division of Interpretation and Resource Education

"I am Rob, a retired science teacher and VIP volunteer for the 2024 season. I am continually amazed when people are introduced to Dark Skies as some have never experienced the wonders of the sky before."

Rob Cochran - Astronomy Volunteer
Division of Interpretation and Resource Education

"I'm Bernie, a retired engineer. I have the privilege to share the night sky as an Astro VIP under one of the country's darkest locations. My goal is for every person I meet to experience a celestial wonder through my telescope under the majestic arc of our Milky Way. I expect this to take a while."

Bernie Sanden - Astronomy Volunteer
Division of Interpretation and Resource Education

"Hello, Paul here! Former math teacher, planetarian, volunteer with the USFS, amateur astronomer since childhood. It was an honor every night sharing all I could about the order and majesty of our universe and the importance of preserving our dark skies so all may look up and wonder..."

Paul Braiman - Astronomy Volunteer
Division of Interpretation and Resource Education

Dark Skies Program 2024 at a Glance...

344 astronomy programs

76,239 visitor attendance

140 astronomy volunteers

5,611 volunteer hours

3 Astronomers in Residence

34th Annual Grand Canyon Star Party

91% of lights in park are dark-sky friendly

2% increase of retrofitted lights from FY 23

It's not all about *quantity*. It's also about *quality*:

"We wanted to thank volunteer Bernie so much for the incredible night sky & astronomy session we had tonight. We learned so much and he was so knowledgeable and excited to show us the night sky. This program was one of the highlights of our entire trip to the Grand Canyon, please keep it up!!"

Visitor comment via email (09-25-24)

International Dark-Sky Park Certification Progress

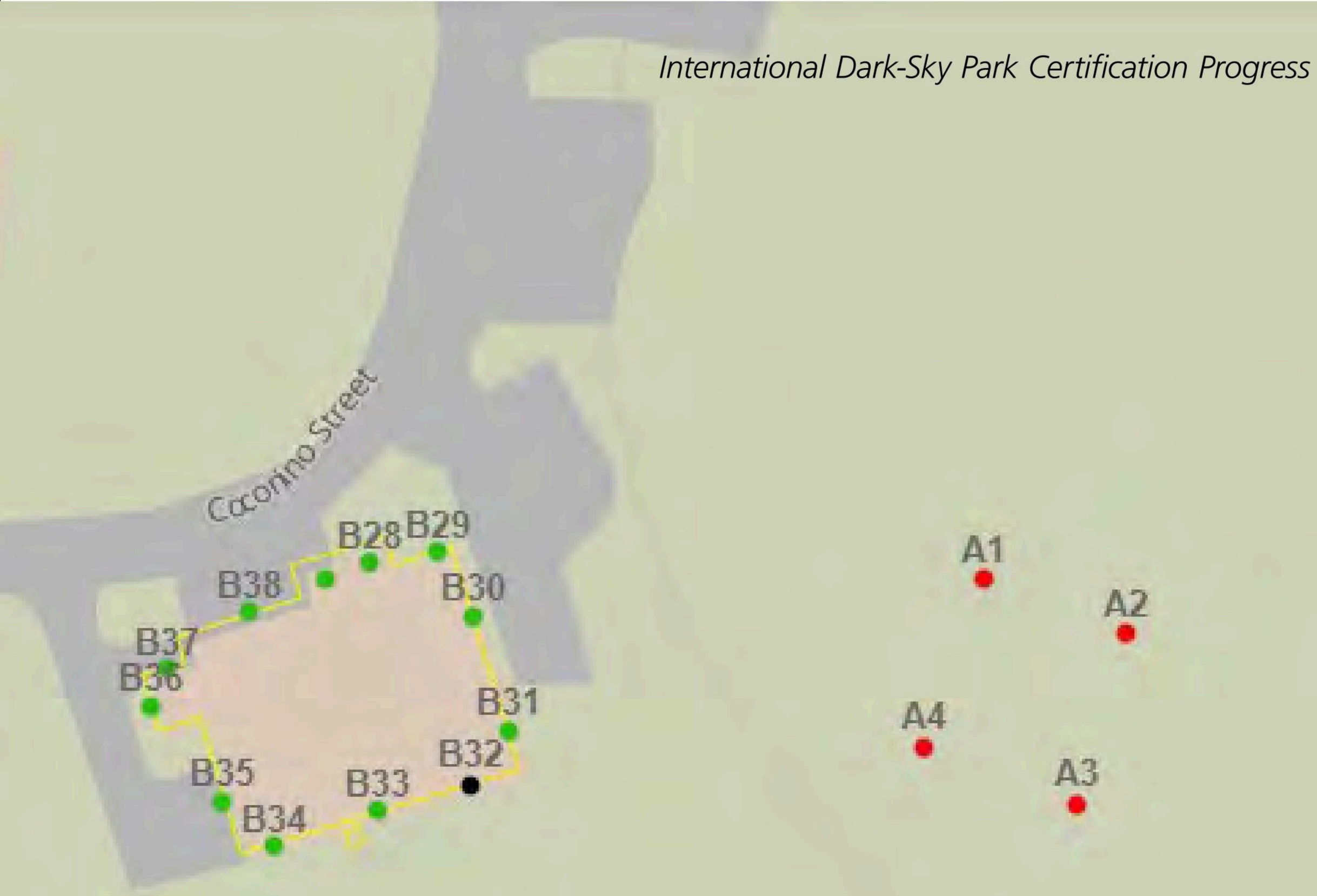
In 2013, Grand Canyon Conservancy hired a specialist to map out all the lights in the park. She inventoried 5,094 lights! In order to become an International Dark-Sky Park, an initial 67% of the lights had to be retrofitted as “dark-sky-friendly.” That meant shielding fixtures, using warm bulbs, adding timers, or removing some all together. We achieved 67% compliance in June 2019.

The park had five years to make 90% of the lights compliant. We are happy to report that the park surpassed the 90% milestone in January of 2024! We are currently at 91%. We now have five more years to become 100% compliant. Our dark-sky efforts have been unprecedented in scale—we are undoubtedly the largest, most complex, International Dark-Sky Park in the world. Learn more about dark skies here.

Grand Canyon receives 90% Certificate from DarkSky International in an award ceremony on the final night of Grand Canyon Star Party. Left to right: AJ Lapre (NPS), Linda Cook (GCC), Katie Morris (NPS), Michael Rymer (DSI), Rader Lane (NPS), Vicky Stinson (ret. NPS), Jan Balsom (NPS).

The lighting assessment for the Desert View District (above) is complete. We are retrofitting this area in conjunction with the Desert View Inter-Tribal Heritage Site construction. Upon completion, the Desert View District will be one of the best places to enjoy the night skies, as it is consistently measured as one of the darkest areas in the park! NPS Photo by Matt Young.

Click here to learn more about the Desert View Inter-Tribal Heritage Site!



Completed in 2024:

- Assessment for Desert View
- Assessment for North Rim
- Assessment for rest of Village
- Bids out to contractors

Next Up in 2025:

- Contracts awarded
- North Rim retrofits
- Village retrofits
- Desert View retrofits

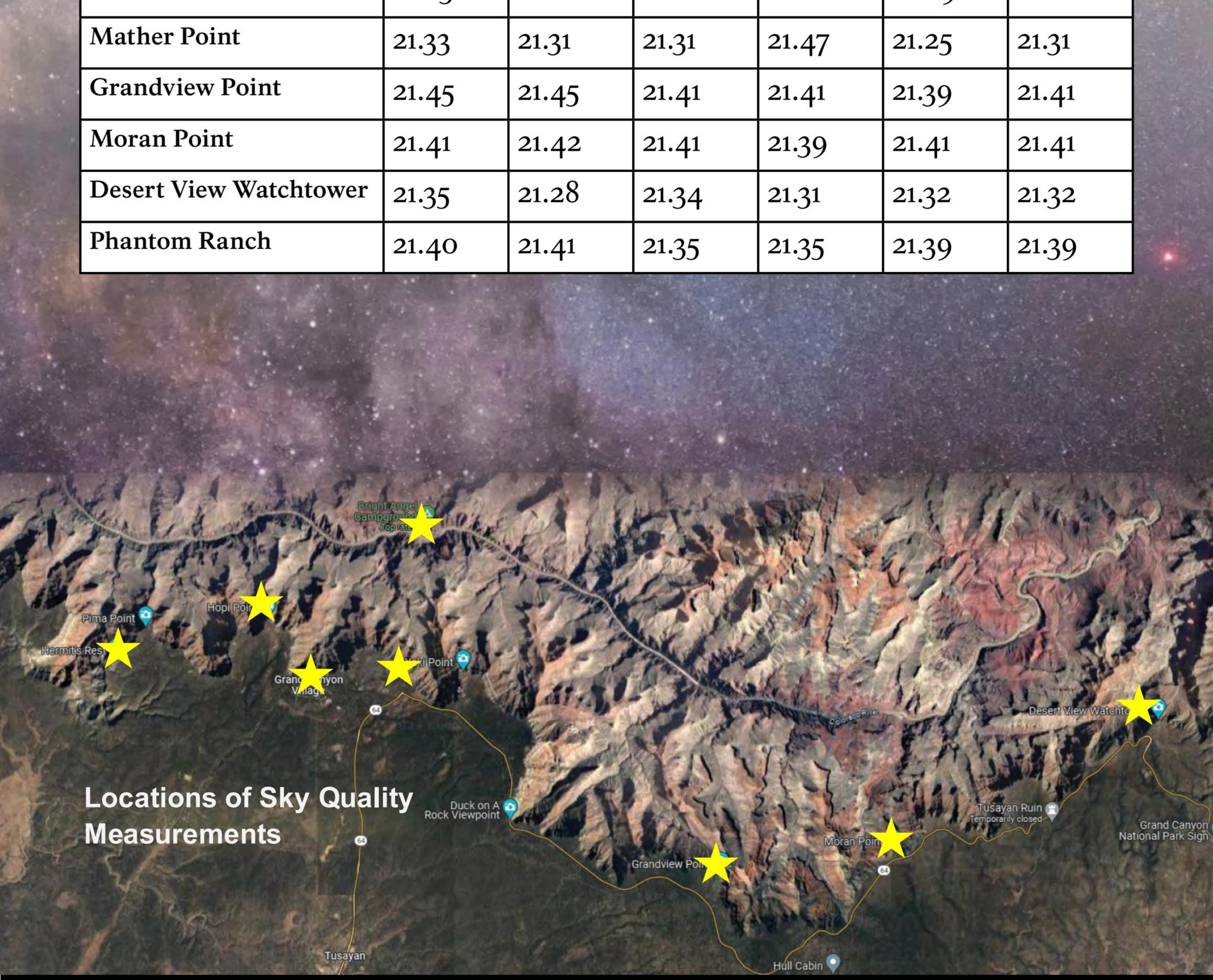
You may be wondering, “Why do we need five more years to make the last 10% of lights dark-sky compliant?” Great question! The last 10% of lights are inherently the more difficult lights to replace. Take, for example, the Grand Canyon School’s outdoor basketball court lights (above red dots). We need to find lights that enable sufficient visibility for games, but are also dark-sky friendly. Does that mean installing a timer? On/off switches? Motion sensors? How bright should these lights be? Retrofits like this just take a bit more time!

Another component of maintaining our International Dark-Sky Park status is to monitor the darkness of our night skies. We do this using a Sky Quality Meter. Our team goes out at night to several locations around the park and uses this device to measure the darkness (or brightness) or our night sky. When the moon phase is just right (not out), we point the device towards the top of the sky, or the zenith. We take several readings then derive the median. Readings above 21.00 represent very dark sites. For technical folks, the unit is magnitude per arc-second squared. The park average is 21.27 mag/arc^2. Here, astronomy volunteers Joey Green and CC Cogswell prepare for a night of collecting Sky Quality Data. Joey (left) demonstrates the Sky Quality Meter. CC (right) holds the data-collection binder.

2024 Sky Quality Data

11-30-24 / ~ 0 C / Clear

Location	Read 1	Read 2	Read 3	Read 4	Read 5	Median
Hermit's Rest	20.71	20.93	21.04	21.06	21.11	21.04
Hopi Point	21.08	21.10	21.17	21.11	21.14	21.11
Village (El Tovar)	21.23	21.26	21.20	21.00	21.09	21.20
Mather Point	21.33	21.31	21.31	21.47	21.25	21.31
Grandview Point	21.45	21.45	21.41	21.41	21.39	21.41
Moran Point	21.41	21.42	21.41	21.39	21.41	21.41
Desert View Watchtower	21.35	21.28	21.34	21.31	21.32	21.32
Phantom Ranch	21.40	21.41	21.35	21.35	21.39	21.39



34th Grand Canyon Star Party

What started as a few astronomers in the Yavapai Geology Museum Parking Lot in 1991, has turned into the largest night sky festival in the National Park Service. For eight nights in June, we celebrate the night skies with over one hundred volunteer astronomers, 50-60 telescopes every night, special guest speakers, constellation talks, and more. Nearly 10,000 visitors attended this year. Learn more about Star Party.

34th Grand Canyon Star Party at a Glance...

9,016 visitor attendance

80,647 visitor telescope views

8,211 solar telescope contacts

4,682 theater talk attendance

125 astronomy volunteers

2,228 constellation talk attendance

52 average number of telescopes per night

Laser-guided Constellation Talk

Astronomers use high-powered astronomy lasers to trace out constellations to thousands of visitors per year!

Photo by Lauren Cisneros

The Dark Skies Program is proud to celebrate a diverse range of guest speakers every year for Grand Canyon Star Party. This year, we welcomed several amazing women in astronomy. Above, Dr. Jennifer Wiseman, Senior Project Scientist for NASA's Hubble Telescope, gave a fascinating talk about her work on one of the most important scientific instruments ever created by humanity!

(Left) Vannessa Gressieux, Kitt Peak National Observatory, presented a talk on the amazing astronomy outreach opportunities found all over the state of Arizona. (Right) Ranger Tish warms up the crowd of over 500 park visitors before Vannessa's talk.

Autumn Gillard, Cultural Resource Manager for the Paiute Indian Tribe of Utah, presented "The Amazing Nuwuvi Universe."

Dr. Taylor Kutra, Lowell Observatory, presented a fantastic talk on her research on planet formation.

Lauren Camp, poet laureate of New Mexico, presented a talk about her book of night-sky poetry, followed by a poetry reading under the stars.

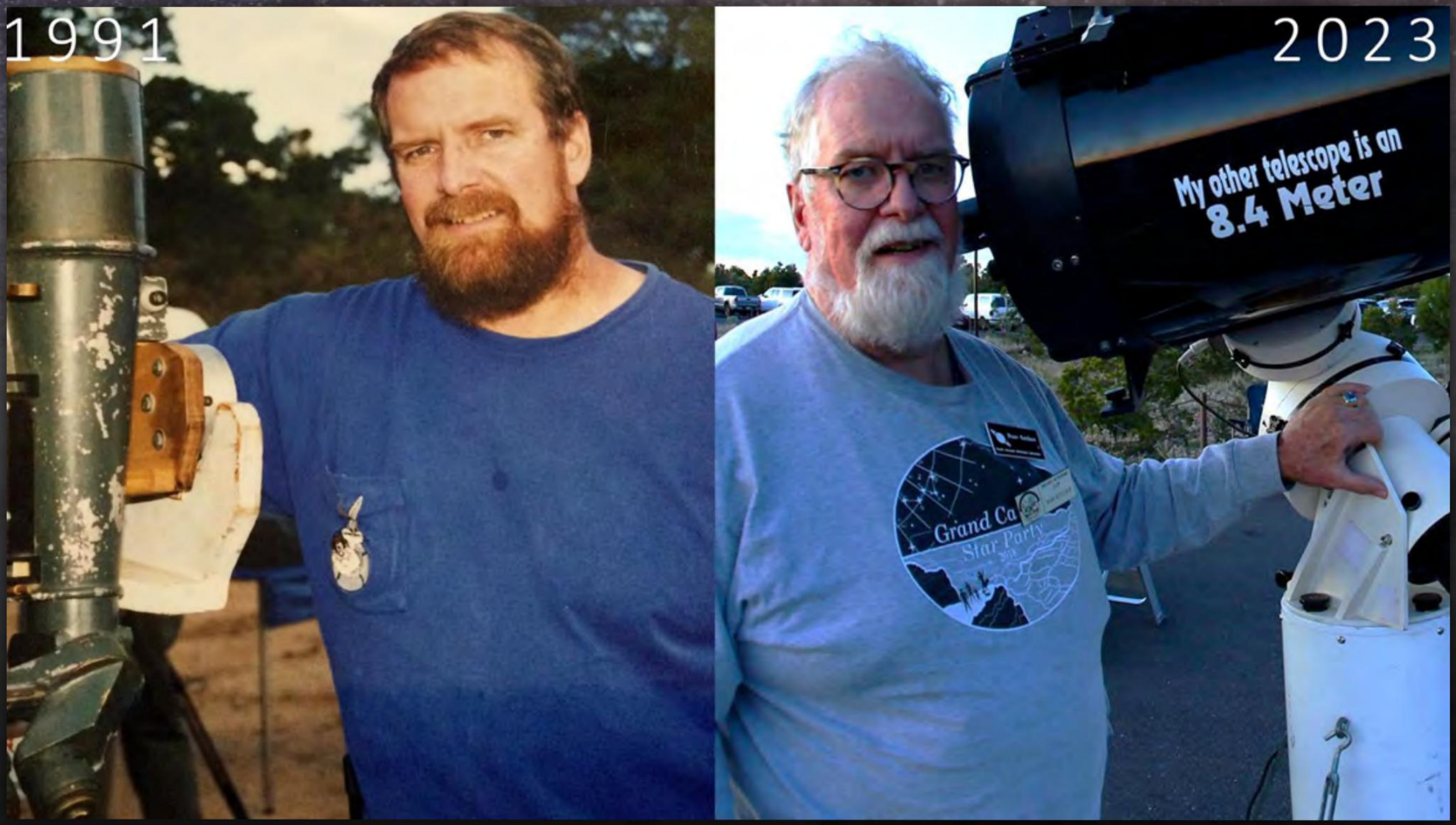
Click the book to learn more about Lauren's night-sky poetry book, *In Old Sky*!

Gerald Dawavendewa, Hopi Artist, author of the book *Codex Taawa*, gave a talk on Hopi cosmology through the lens of his artwork. Thanks, Gerald, for your inspiring talk and provoking artwork!

Ground Control to Major Tom. This year, the Dark Skies Team connected the Star Parties on both rims with HAM radios. Visitors were invited to speak to each other using the HAM radios, asking each other the prompt: “Imagine you are taking a one-way trip to the stars. If this were your last chance to speak to someone you love before blasting off forever, what would you say?” We recorded the responses and are creating a film for the Night Spoken Series. Volunteers Steve and Paul are licensed HAM radio operators who oversaw the operation of their radios on both rims. Thanks to Steve and Paul for your great work!

Congratulations to Dean Ketelsen

Winner of the 2023 NPS National Excellence in Volunteerism Award!



Grand Canyon Star Party founder, Dean Ketelsen, is our 2023 national recipient for the NPS Excellence in Volunteerism Adult Impact Award!!

In 1990, Dean's honeymoon at Grand Canyon National Park sparked an idea that would grow into something extraordinary—the Grand Canyon Star Party. What began with a pair of binoculars has now become the largest night sky festival in the National Park Service, drawing thousands of visitors each year.

For over three decades, Dean led this event, bringing together over 100 volunteer astronomers annually to share the wonders of the night sky with the world. In 2023 alone, the Grand Canyon Star Party welcomed over 10,000 visitors, offering an unmatched experience under the stars.

Though Dean passed away in 2023, his legacy continues to shine bright. We've put together a special video to celebrate his incredible contributions—don't miss this chance to see the magic of the Grand Canyon Star Party and the lasting impact Dean has made on the park and its visitors. Congratulations, Dean!

(Left) Dean's family is surprised with the announcement of his Regional Award at Grand Canyon Star Party.

(Right) Rader Lane and Mae Smith accept the National Award on behalf of Dean Ketelsen in Washington D.C.

(Left) Dean's family was invited to the NPS Award Ceremony in D.C. Here, they receive a round of applause after park leadership announced Dean's award.

About *half* of the volunteer astronomers for the 2024 Star Party. This year, we had 125 volunteer astronomers attend from around the world! This event is not possible without them, or the support of the Tucson Amateur Astronomy Association. THANK YOU ALL!

(Left) The volunteers for the North Rim portion of Star Party. Thanks to our longtime partners, the Saguaro Astronomy Club, for being such dedicated educators for the North Rim every year!

See you next year at the 35th annual Grand Canyon Star Party

June 21-28, 2025!

Astronomer in Residence Program

Grand Canyon Conservancy's award-winning Astronomer in Residence Program started in 2021. Modeled after the Artist in Residence Program, it offers astronomers, scientists, visual and performing artists, and writers, the opportunity to practice and share their discipline under one of the most pristine night skies in the United States. Through artwork and educational outreach, the ASTiR inspires visitors to see the values of dark skies, spreads awareness about the threats of light pollution, and explores society's complex relationships with natural darkness. Learn more about the Astronomer in Residence program here.

Astronomer in Residence 2024 at a Glance...

3 Astronomers in Residence

44 astronomy programs

6,237 visitor attendance

12 dark-sky performances or artistic projects

1st official Alumni Program resident

Winner 2024 Public Lands Alliance Award

2024 PARTNERSHIP AWARDS

In Recognition of

OUTSTANDING PUBLIC ENGAGEMENT
FOR PROGRAM OR SERVICE

This award is proudly presented to

Grand Canyon Conservancy

for

The Grand Canyon Conservancy Residency Program

Kevin Kissling
Chair, Public Lands Alliance

Dan Puskar
President and CEO, Public Lands Alliance

Adeene's Residency at a Glance:

- 9 astronomy presentations
- 1,000 visitor attendance
- Special guest speaker at the "I HEART Pluto" Festival
- Visit to Grand Canyon School
- Presented a capstone dance at the Shrine of the Ages Auditorium for two evenings
- Minute Out In It Film
- Full dance performance film

Dr. Adeene Denton

Feb 8 - Feb 26, 2024

Dr. Adeene Denton is a geologist and planetary scientist interested in giant impacts and their influence on the history, evolution and tectonic activity of icy satellites, ocean worlds, and Kuiper Belt Objects. Adeene is trained as a scientist, historian, and dancer, which informs her scientific and artistic research process. She is an avid astrohumanist focused on approaching future planetary exploration from a scientific and humanistic perspective.

During her residency, Adeene focused on providing public programs about her research from the South Rim to Phantom Ranch. She capped her residency with a modern dance performance, which explored the connections between the geology of the Grand Canyon, canyons found on Mars, and how humans are driven to explore both.

(Left) Astronomer in Residence Dr. Adeene Denton presented Astronomy on Tap talks at Phantom Ranch to packed cantinas. She also gave geology talks during the day, comparing Grand Canyon geology to other planets (below).

(Above) Dr. Denton recorded an interpretive dance focusing on the geology of the Canyon and other planetary bodies. (Below) She performed the dance live for packed audiences!

Watch Dr. Denton's dance via a Minute Out In It here!

Ashley's Residency at a Glance:

- 10 public programs
- 2,000 visitor attendance
- 9th grade science talk at Grand Canyon School
- Interactive stargazing livestream with Lowell Observatory
- Created a visitor-participated fiber-art piece of a light pollution map of the United States.

Dr. Ashley Pagnotta

March 4 - March 31, 2024

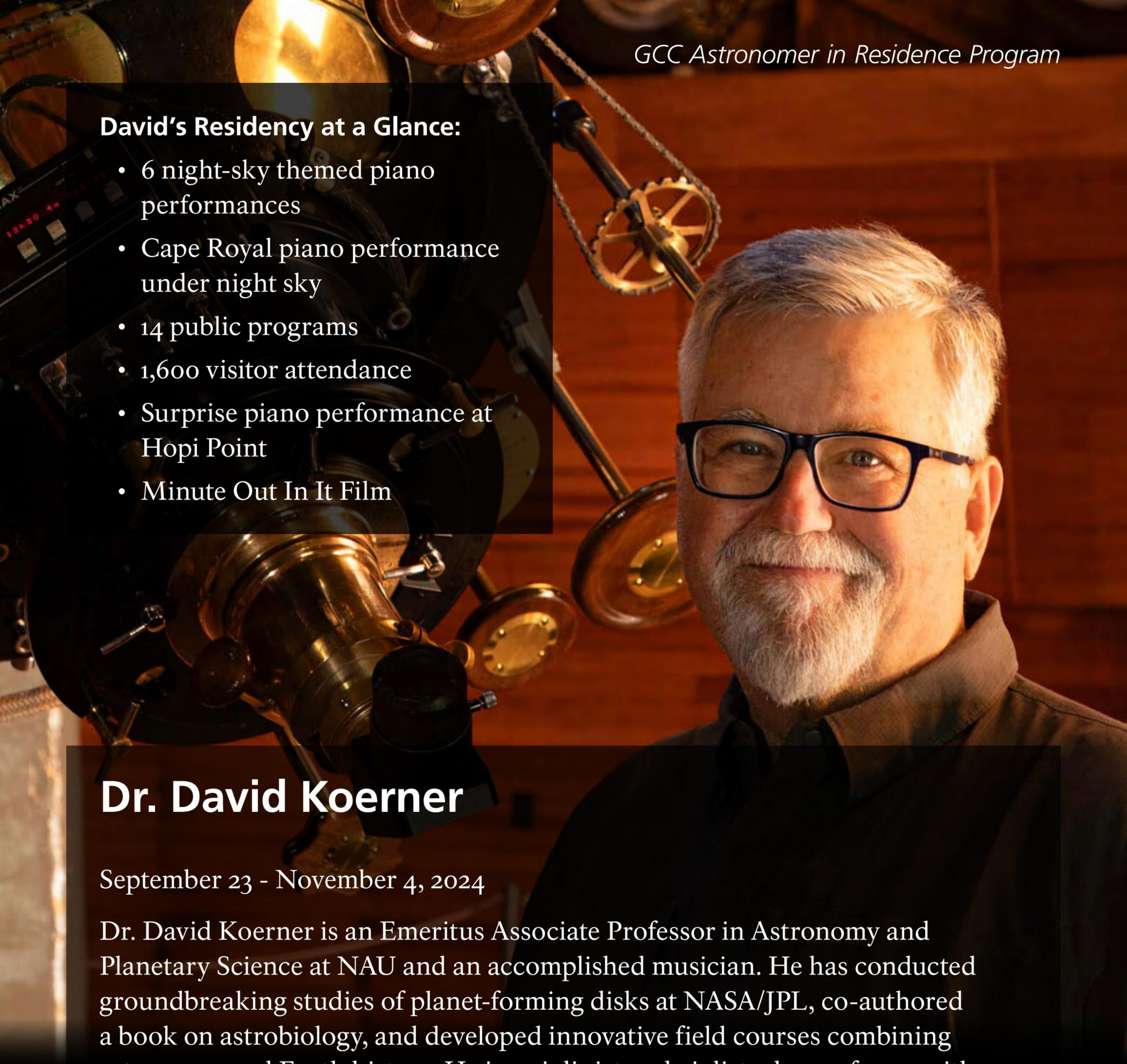
Dr. Ashley Pagnotta is Assistant Professor in the Department of Physics & Astronomy at the College of Charleston, in Charleston, SC. She teaches a variety of astronomy and physics courses to all levels of students, and conducts research on exploding stars. She was a Kathryn W. Davis Postdoctoral Fellow studying observational astrophysics at the American Museum of Natural History. Additionally, she was a faculty member with the Museum's new MAT program, for which she designed and implemented the astronomy lab practicum part of the curriculum.

During her residency, Ashley combined her love for dark skies and fiber arts, working on a fiber-based dark sky map to highlight global light pollution levels. Her programs available to the public included "Exploring Tonight's Sky," "Constellations Across Cultures," and "The Harvard Computers," which showcased the pioneering women astronomers of the 1900s. She was Grand Canyon's 10th Astronomer in Residence!

Dr. Pagnotta presented several talks during her residency to packed theaters. Here she is presenting her talk about pioneering women in astronomy. Each talk was followed by an outdoor constellation talk.

Dr. Pagnotta participated in an interactive online live stargazing session with Lowell Observatory and fellow Astronomer in Residence Kevin Schindler. **Click the picture to the right to watch!**

Dr. Pagnotta at Verkamp's Visitor Center, working with visitors on a fiber-art light pollution map. Visitors were invited to stitch in the color corresponding to the light pollution they experience from home.



David's Residency at a Glance:

- 6 night-sky themed piano performances
- Cape Royal piano performance under night sky
- 14 public programs
- 1,600 visitor attendance
- Surprise piano performance at Hopi Point
- Minute Out In It Film

Dr. David Koerner

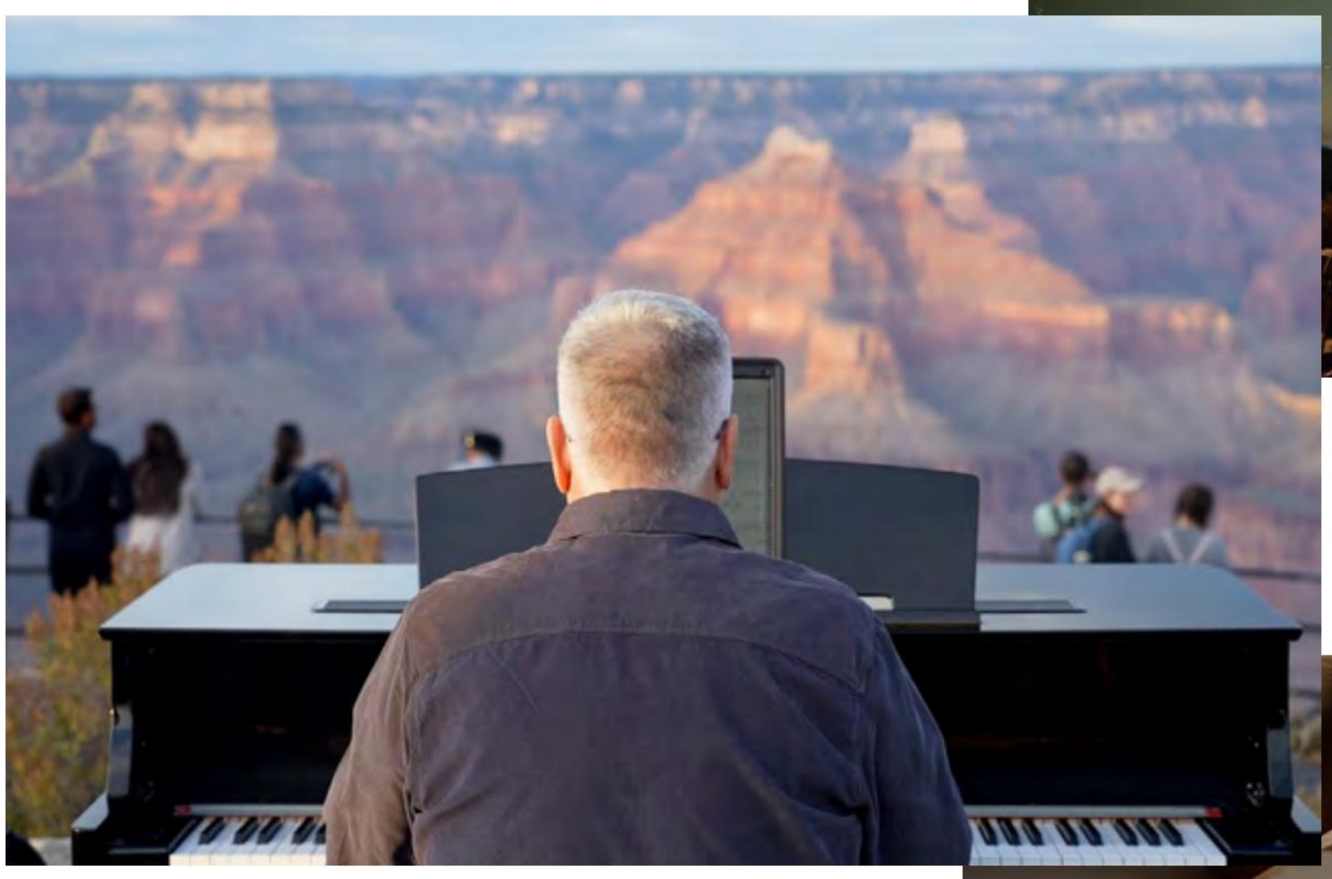
September 23 - November 4, 2024

Dr. David Koerner is an Emeritus Associate Professor in Astronomy and Planetary Science at NAU and an accomplished musician. He has conducted groundbreaking studies of planet-forming disks at NASA/JPL, co-authored a book on astrobiology, and developed innovative field courses combining astronomy and Earth history. He is a violinist and violist who performs with the Dark Sky Quartet and is also a featured pianist at the Grand Canyon Music Festival.

During his time at Grand Canyon, Dr. Koerner worked on a book that connects individuals with vast stretches of time, and wrote and performed musical compositions that emotively represent significant periods of time in Grand Canyon's sky and strata. He also presented several astronomy lectures and constellation programs on both the North Rim and South Rim.

(Left) Dr. Koerner performed several night-sky themed piano pieces under the night sky at Cape Royal on the North Rim. Chopin, Debussy, Beethoven--all under the moon, stars, and Milky Way!

(Right) David presented numerous astronomy lectures and laser-guided constellation talks!



(Below) A moon-themed piano performance at Shrine of the Ages.

Click above to watch David's music-filled Minute Out In It!

Kevin's Alumni Visit at a Glance:

- 4 public programs
- 500 visitor attendance
- Several new Apollo re-creation photographs
- Special talk for the 55th anniversary of the Apollo Moon Landing

Alumni Visit - Kevin Schindler

July 20 - July 27, 2024

Kevin Schindler is the historian and Public Information Officer at Lowell Observatory in Flagstaff, Arizona, where he has worked for 28 years. Schindler contributes a bi-weekly astronomy column, "View from Mars Hill," for the Arizona Daily Sun newspaper and has authored seven books, including *Images of America: Northern Arizona Space Training*, which features a chapter about the Grand Canyon.

As Lowell Observatory's Historian for over two decades, Kevin Schindler was selected as Grand Canyon's seventh Astronomer in Residence for his extraordinary record of unveiling the history of astronomy in the Grand Canyon region. His residency focused on researching and sharing NASA's Apollo Astronauts' connections with the region in preparation for their historic missions to the Moon. He returned as Grand Canyon's first official Astronomer in Residence alum to continue his work and collaboration with the park!

Kevin continued his project re-creating the Apollo astronaut training photos in the Grand Canyon. His alumni visit allowed him to find the most famous of all the astronaut photos, one that had been eluding him for years--the “Neil Armstrong” photo (above). Kevin embodies what it means to be an Astronomer in Residence--the next night, he was sharing his discovery with visitors (below)!

Astronomy VIP Program

The Astronomy Volunteer Program began in the fall of 2023. The goal of the program is to provide opportunities for telescope viewing and constellation talks on a more consistent basis throughout the park. Our Astro VIP team was made up of a great mix of amateur astronomers, retired rangers, and seasonal interpreters this year. We're excited to expand the program into 2025 and beyond! Learn more about the Astronomy VIP Program here.

Astronomy Volunteers

Astro VIP Paul Braiman aligns his telescope for an evening of mesmerizing visitors with views of Saturn, clusters, galaxies, nebulae, and more!

NPS Photo Rader Lane

Astronomy VIP Program 2024 at a Glance...

14 Astronomy Volunteers

202 astronomy programs

50,897 visitor attendance

16,263 solar astronomy contacts

18,247 spotting scope contacts

12,806 constellation talk attendance

2,530 volunteer hours

Milky Way over Point Imperial

The center of the Milky Way galaxy (above) appears in the south. To get photos of the Milky Way with the Grand Canyon in the foreground, the North Rim is the best place to be!

Photo by GCC Astronomer in Residence Imma Barrera

Dr. Daniel Fleisch Returns as a Volunteer!

August 5 - 12, 2024

Astronomer in Residence alum Dr. Dan Fleisch returned for a Astronomy Volunteer stint in August. He offered several evening presentations, filling multiple venues. Here, he presents an evening presentation at McKee Amphitheater, which included projecting live images of deep-sky objects (like galaxies and nebulae) onto the big screen!

Dean Regas Returns as a Volunteer!

September 16 - October 2, 2024

Astronomer in Residence alum Dean Regas returned for an Astronomy Volunteer stint in September. Among his many talks, Dean provided a special talk out at Mather Point, inviting visitors to watch the full moon rise over the Canyon AND to witness a partial eclipse of the Moon! See the black shadow on the top of the Moon in the image below! Thanks for a great stint, Dean!

(Top) Astro VIP Steve connected with thousands of people this year with his H-Alpha solar telescope. The H-Alpha scope allows visitors to see solar flares in great detail. (Below) Astro VIPs Robyn and Lian Tan use a white-light filter solar telescope in front of the visitor center. A couple hours with these solar telescopes yield hundreds of visitor contacts!

Our Spring 2024 Astronomy VIP Team. Clockwise from left: Paul Braiman, Mark Gregory, Rader Lane, Steve Dimse, Dave Hagarty, Tyler Cherry, Rob Cochran.

Astro VIPs provided “Astronomy Nights” on Friday, Saturdays, and Sundays this year. 5-7 telescopes were setup over a couple hours, attracting hundreds of visitors per night.

(Above) The Astro VIPs hosted a few full-moonrise events. They setup telescopes and invited visitors to watch the amazing spectacle of moonrise over the Canyon at Mather Point. (Right) Astro VIP Robyn inspires visitors with a spotting scope near Verkamp’s Visitor Center!

(Above) Our Fall 2024 Astronomy VIP Team. Left to Right: Bernie Sanden, Robyn Tan, Steve Dimse, Lian Tan, Tyler Cherry, Rader Lane, CC Cogswell, Joey Green.

(Left) Astro VIP Steve provided dozens of constellation talks this year to thousands of visitors! Excellent work, Steve! (Right) Astro VIP Paul provides telescope training to Interpretive Rangers on the North Rim in May. Thanks, Paul!

You never know what you'll see at our Astronomy Nights!

Among all the meteors, fireballs, bolides, comets, aurora, airglow, gegenschein, zodiacal light, eclipses, and other fascinating astronomical phenomena one can see at any given Grand Canyon Astronomy Night, we sometimes see the odd rocket launch from California! Here, visitors witnessed the Falcon 9 rocket as it launched from California's Vandenberg Air Force Base carrying several communication satellites into orbit. Water vapor from the aircraft engine exhaust is immediately exposed to very cold temperatures at very high altitudes, creating the condensation trail. The trail is backlit by the engine burn and the setting Sun, making for a stunning lightpath in the sky!

Again, you never know what you'll see at our Astronomy Nights!

C/2023 A3 (Tsuchinshan–ATLAS) is a comet from the Oort cloud (an outer layer of material surrounding our solar system) discovered in early 2023. The comet became visible to the naked eye in September of 2024. With an 80,000 year orbit around the Sun, and a weak gravitational bind, it will likely never come as close to our Sun again as it departs us at 180,000 miles per hour. This photo was made just west of Mohave Point along Hermit Road on Sunday, October 13, by PSAR Volunteer PAPA #60, Maria Icenogle. Great shot, Maria!

NPS Night Sky Programs

Weaved throughout every month, NPS park rangers provide public programming on various topics related to night skies, from nocturnal ecology, to cultural astronomy, from constellation talks to light pollution talks. They also create digital media about night skies. The NPS has a long tradition of DARK rangers interpreting the vanishing resource of the stars to thousands of visitors per year. Learn more about NPS Night Sky Programs here.

NPS Night Sky Programs 2024 at a Glance...

31 astronomy programs

2,680 visitor attendance

3 districts of the park

2 digital products

4 online talks

Ranger Rader Lane conducts an induction ceremony for several junior rangers during a night sky event. Did you know junior rangers can earn a special "Night Explorer" junior ranger patch if they complete the book and attend a night sky event at a national park? [Learn more about Junior Ranger Night Explorer!]

NPS Night Sky Programs

Ranger Dave Kent marveling at the night sky with a visitor. Dave led the night sky efforts on the North Rim this year. Stellar work, Dave!

NPS Night Sky Programs

Ranger Rader and Astronomy Volunteer Paul Braiman traveled to the North Rim to train North Rim seasonal staff on night skies interpretation. They learned telescope use, laser use, night sky orientation, app use, and safety procedures.

Ranger Michael Quinn took many fantastic shots of night sky phenomena this year, posting them on our social media channels, generating thousands upon thousands of digital engagement. (Above) The Full Moon rises over Grand Canyon Village. (Below) Aurora as seen above Train Depot and El Tovar. Thank you, Michael!

Special Events

The spring Astronomy Volunteers visited Lowell Observatory for a special tour with Lowell Historian Kevin Schindler. Here, the team stands in front of the mighty Clark Telescope! Thanks to Lowell Observatory for your fantastic partnership!

Ranger Rader Lane and Tucson Amateur Astronomy Association President Mae Smith traveled to Washington D.C. this year to attend the NPS Awards Ceremony. They accepted the 2023 National Excellence in Volunteerism Award on behalf of Grand Canyon Star Party founder and volunteer Dean Ketelsen. Dean passed away in 2023 but was posthumously honored with this tremendous award. Dean's family was also in attendance at the ceremony, which was held in the Department of Interior building. Here, Rader and Mae pose with the award on the roof of Main Interior--famously, the best view of Washington D.C.!

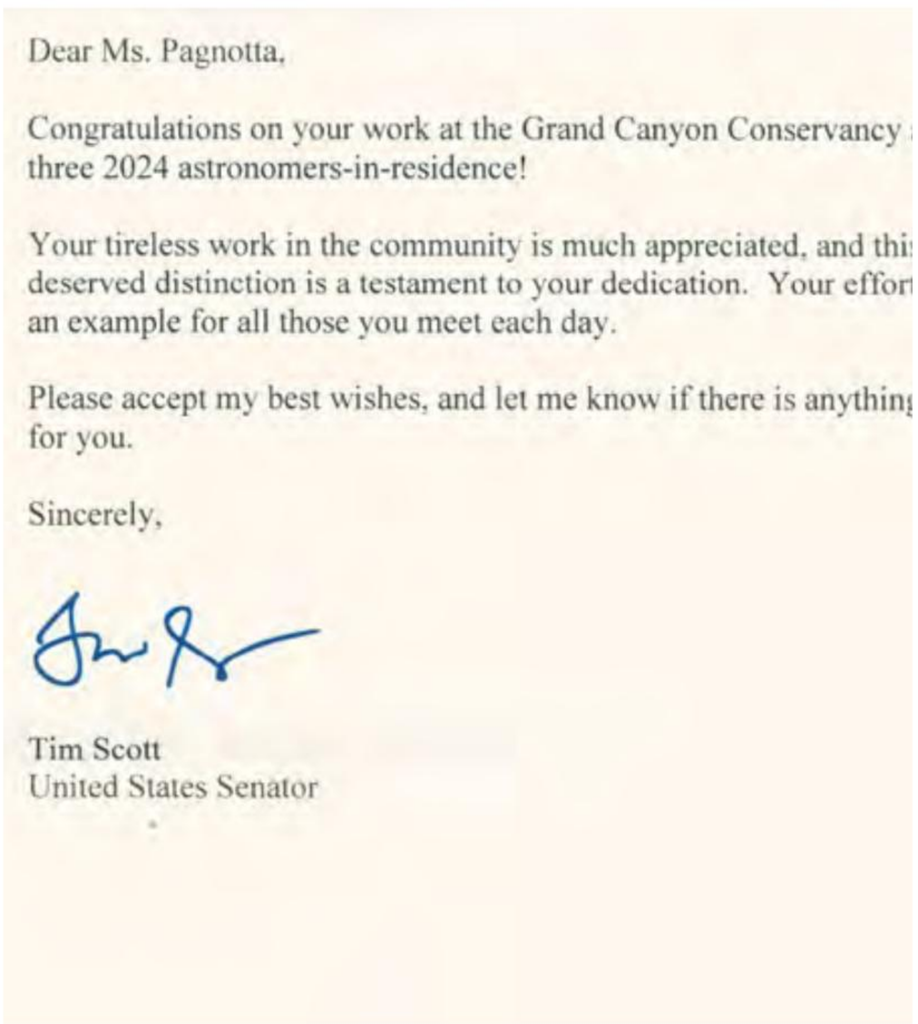
Astronomer in Residence alumna Lauren Camp was so prolific writing poetry during her 2022 residency, that Grand Canyon Conservancy published a book of her work this year. *In Old Sky* features poems about Grand Canyon's stars, thoughts on natural darkness, and Lauren's personal journey discovering both during her residency! Learn more about In Old Sky here.

DarkSky International (DSI) awarded Grand Canyon National Park (GRCA) with a certificate of achievement for surpassing 90% compliance of its lighting fixtures--a milestone mandated to be surpassed within five years of becoming an International Dark-Sky Park. GRCA's retrofit process has been unprecedented in scale, hence the special visit and ceremony at this year's Grand Canyon Star Party. Here, Acting Deputy Superintendent Katie Morris and DSI's Michael Rymer pose with the certificate.

Grand Canyon's Night Spoken Series, a video series exploring visitors' relationship with the stars, was featured this year at the Paonia Dark Skies Film Festival in Colorado. Here, a packed theater prepares to enjoy the Night Spoken Series. Thank you to Aaron Watson of Dark Skies Paonia for coordinating this screening!

Ranger Rader Lane was invited as a keynote speaker at the 2024 Flagstaff Star Party in September. He spoke about Grand Canyon's dark skies efforts. Did you know that Flagstaff, AZ was the world's first International Dark Sky Community? You can walk through downtown and still see the Milky Way! It is important for all communities and public lands in the region to collaborate in protecting the night.

One of our Astronomers in Residence received a letter from a US Senator - "Dear Ms. Pagnotta, Congratulations on your work at the Grand Canyon Conservancy as one of three 2024 astronomers in residence! Your tireless work in the community is much appreciated, and this well-deserved distinction is a testament to your dedication. Your efforts serve as an example for all those you meet each day. Please accept my best wishes, and let me know if there is anything I can do for you. Sincerely, Tim Scott - United States Senator."



Dear Ms. Pagnotta,

Congratulations on your work at the Grand Canyon Conservancy
three 2024 astronomers-in-residence!

Your tireless work in the community is much appreciated, and thi
deserved distinction is a testament to your dedication. Your effor
an example for all those you meet each day.

Please accept my best wishes, and let me know if there is anythin
for you.

Sincerely,

Tim Scott
United States Senator

Ranger Rader Lane was featured on DarkSky International's webseries called "Night Matters." He talked about Grand Canyon's journey in becoming a world-leader in dark-sky preservation. Click the picture to watch the recording.

In the Media

The world loves talking about Grand Canyon's dark skies! The following are a collection of media coverage from this year, from news articles to podcasts, television to other digital media. Here, Public Information Officer and Historian Kevin Schindler hosts a livestream for Lowell Observatory at Grand Canyon Star Party. Watch the recording of the livestream here!

News Articles

Grand Canyon Night Skies

- AFAR Magazine - Stargazing Without the Crowds on the Grand Canyon Floor
- Williams News - More than 5,000 light fixtures at Grand Canyon now Dark-Sky friendly
- Outside Magazine - The Perseid Meteor Shower Is This Weekend. These Are the Best Ways to See It

GCC Astronomer in Residence Program

- Dance Magazine - Dancing Across the Solar System as the Grand Canyon's Astronomer in Residence
- Santa Fe Reporter - Dispatches from the Dark - Lauren Camps "In Old Sky"
- Grand Canyon Conservancy - Chasing Canyons Across the Solar System as Astronomer in Residence
- Post and Courier - College of Charleston professor takes to the stars in Grand Canyon residency
- Williams News - Chasing Canyons Across the Solar System as Astronomer in Residence
- AZ Central - Under the Grand Canyon's dark skies, an astronomer finds a universe of real stars

Podcasts

- Star Stuff Podcast - LIVE from Grand Canyon: Turning the Park Dark - Lowell Observatory
- Night Sky Tourist Podcast -Poetry For All: Episode 70: Lauren Camp
- Looking Up Podcast - Half the Park Is After Dark (with Rader Lane) | WVXU
- KNAU - Earth Notes: Grand Canyon Dark Skies

Digital Media

- Minute Out In It: Astronomer in Residence - Dr. Adeene Denton
- Minute Out In It: Astronomer in Residence - Dr. David Koerner
- Minute Out In It: Cellicion Zuni Dancers - Star Dance
- GCC Book Club: "In Old Sky" with Lauren Camp
- Grand Canyon Adventure with Dean Regas
- LIVE with Lowell Observatory and Astronomer in Residence Dr. Ashley Pagnotta
- Grand Canyon National Park's Dark Skies Ft. Rader Lane (Night Matters)

In the Community

Holiday Lights

Oh no! Is the Dark-Sky Grinch coming for your HOLIDAY LIGHTS!?!

One of the themes we explore through our dark-sky programming is our complex relationships with darkness. A great example is to look at the cultural practice of holiday lights. Let me start by saying, the Dark Skies Team is not opposed to holiday lights! I personally love this time of year. Holiday lights are a celebration of the triumph of light over darkness—physically, emotionally, spiritually. If you think about it, we preserve darkness so that we may enjoy *the light* of the stars. We need darkness when we sleep to appreciate the coming day. Does the experience of emotional or spiritual darkness make us appreciate times of lightness and joy? Again, our relationships with darkness is complex.

This time of year, reflect on your personal relationship with the dark. The nights are longer, it's colder outside—some feel holiday lights are a way to bring warmth and connection to a community. What do you think?

The park's Lightscape Management Plan allows holiday lights from November 15th through January 15th. That should give *juuust* enough time to start planning for next year. So, no, we are NOT coming for your holiday lights. But the Dark-Sky Grinch *does* wake up January 15th! In the meantime, Happy Holidays!

Residential Light Fixtures

One of the big challenges of protecting our pristine night skies is to ensure that the lights we have spent years making dark-sky-friendly, *stay* dark-sky-friendly.

We have already noticed that some residences have begun changing out their dark-sky-friendly light fixtures with non-compliant lights. A good explanation for this, no doubt, is simply a lack of awareness for our dark-sky park certification.

In the coming year, the DST will work with Park Housing to ensure the continued compliance of our dark-sky-friendly lighting codes. If you have changed out your fixture, you may be contacted with an explanation as to why the new fixture is out of compliance, then kindly asked to return the dark-sky fixture. We are still developing best methods for this. But in the meantime, ask yourself the following:

- Have I changed out my exterior lights?
- Is my light bulb above 2700K?
- Does my light shine onto my neighbor's house or out into the street? Can I see the light bulb from the street?
- Do I have lights on all night?
- Do I have decorative lights up? Do I leave them on past 10 pm?

If you answered "yes" to any of these, reach out to us so we can help you get back into compliance. Thanks for your support! It really takes a Village to protect the skies!

Grand Canyon's Dark Skies Team:

- Rader Lane—Dark Skies Program Manager (rader_lane@nps.gov)
- Matt Young—Construction Control Rep. (matthew_young@nps.gov)
- Santiago Garcia—Data Manager (santiago_garcia@nps.gov)
- Kate Hensel—Inner Canyon Park Ranger (katherine_hensel@nps.gov)
- Clover Morell—GCC Residency Program Manager (cmorrel@grandcanyon.org)
- Lauren Cisneros—GCC Marketing Coordinator (lcisneros@grandcanyon.org)

Grand Canyon Dark Skies Annual Report 2024

Created December 2024 by Rader Lane and Carmen Kraus

Grand Canyon National Park—National Park Service

PO Box 129, Grand Canyon, AZ, 86023