Science AMA Series: I'm David Baron, a science writer and umbraphile (eclipse chaser). I've witnessed five total solar eclipses around the world and have written a book about one that crossed America's Wild West in 1878. AMA!

Eclipsejunkie [1] and r/Science AMAs[1]

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April 17, 2023

Abstract

*** THIS AMA IS NOW OVER, BUT I WILL CHECK BACK FROM TIME TO TIME TO ANSWER ADDITIONAL QUESTIONS. THANKS TO EVERYONE WHO PARTICIPATED. I WISH YOU CLEAR SKIES ON AUGUST 21! *** I hope you've got plans to experience the total solar eclipse that will cross the United States on August 21. It will be a mind-blowing, awe-inspiring, not-to-be-missed spectacle! I've been chasing total eclipses since I saw my first, in Aruba, in 1998. It was such a moving, addictive experience that I just had to repeat it. (You can read about my obsession/hobby here and here.) I also became fascinated with the history of eclipses, which led me to write my new book, American Eclipse: A Nation's Epic Race to Catch the Shadow of the Moon and Win the Glory of the World. My book tells the true story of the total solar eclipse of July 29, 1878, which crossed America's western frontier, from Montana Territory to Texas. In the nineteenth century (and even today), total eclipses were keenly important for astronomers, enabling them to probe the outer reaches of the sun and the inner reaches of the solar system. In 1878, many of the era's great scientists traveled to Wyoming and Colorado to conduct their studies in the midday darkness. American Eclipse focuses on three remarkable individuals. Thomas Edison, age 31 and a recent celebrity due to his invention of the phonograph, traveled to Wyoming with a new device (the tasimeter) to study the sun's corona. James Craig Watson, an astronomer at the University of Michigan, used the eclipse to search for a mysterious planet called Vulcan, which scientists believed circled the sun within the orbit of Mercury. And Maria Mitchell, professor of astronomy at Vassar College, used the eclipse for political/social purposes. She assembled an all-female expedition to Denver, to demonstrate to a skeptical public that women could equal men as scientists. I love to talk about solar eclipses! Ask me about the eclipse of 1878, the upcoming one on August 21, or anything else. I can also offer eclipse-viewing advice. I recently gave a TEDx talk about eclipse chasing, and it's now online here. And I wrote a blog post about the August 21 eclipse for Scientific American here. I should also mention that my friends at NOVA PBS will be producing a live broadcast on Facebook during the eclipse from Irwin, Idaho. It'll be hosted by science journalist Miles O'Brien—follow them on Facebook to get more information and updates. —David

the WINNOWER

REDDIT

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ECLIPSEJUNKIE R/SCIENCE

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—David

READ REVIEWS

WRITE A REVIEW

CORRESPONDENCE:

DATE RECEIVED:
August 09, 2017

I live in a city that is a popular destination for the upcoming eclipse (I get work off that day because my boss doesn't expect any of us to be able to make it in due to the insane traffic. My city of 60,000 is expecting as much as 500,000 people for the event).

So my question, aside from getting the special lenses, what could the average person do to prepare to enjoy the experience?

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VictorCrowne

Thanks for the question! I'd advise several things... 1) Keep an eye on the weather in the day or two before. If it looks like it's going to be cloudy where you are, you might want to make last-minute plans to head toward clear skies. 2) Find a good spot to view the eclipse, someplace where you can take in a broad expanse of the sky. You'll want to see not only the sun (i.e. the solar corona) but planets, stars, and the horizon, which will be tinged with what looks like a 360-degree sunset. A good locale might be a rooftop, soccer field, or lakeshore. 3) Decide who you want to be with. A total eclipse is deeply moving, emotional, and--for many--spiritual. Witnessing it with family and close friends can enhance the experience.

Hi David. I live in Northern California and the eclipse path maps say the magnitude of the eclipse where I live will be 0.8. I've considered doing a road trip up to Oregon to see the 1.0 version. Can you describe the difference between viewing the 0.8 version and the 1.0 version? Is the 1.0 worth a couple days vacation?

billbixbyakahulk

An excellent question. People often assume, understandably, that an 80% or 90% partial eclipse is "good enough." However, even a 90% partial eclipse is nothing at all like a total eclipse. Consider a couple of things... A 90% partial eclipse means that daylight drops by a factor of 10 (i.e. to 10% of its normal brightness). That's pretty modest--like an overcast day. A total eclipse, however, drops daylight by a factor of a million, and most of that darkening occurs in just the final seconds. You are suddenly plunged into twilight. Now, you might say, what's the big deal--I've experienced twilight--but it's unlike any twilight you've seen before. You are actually looking toward the center of the solar system and can see the sun and the planets together. And the sun itself, my gosh--it's spectacular. The solar corona--which you can only see if you're in the path of totality--looks like a shimmering wreath of tinsel. It contains glowing filaments that are bent by the sun's magnetic field. Gazing at the view makes you feel like you're standing on another planet, looking at an alien sky. Short answer: Take the vacation and make the drive! :-)

What are some cool phenomenon that may occur during the eclipse this year?

dabadydab

Any total eclipse has many interesting phenomena that you might see: Baily's beads (the last rays of sunlight, just before totality, filtering through valleys on the edge of the moon), prominences (which look like rosy flames leaping off the eclipsed sun), shadow bands (which look like ripples of light rushing across the ground just before totality sets in). The most impressive sight, however, is the solar corona--the sun's outer atmosphere. It's different at every eclipse, and you never know what it's going to look like much in advance, but the National Solar Observatory has issued a prediction of what it's shape will be this year. Check it out: https://phys.org/news/2017-07-national-solar-observatory-corona-august.html

This year virtually everyone in the U.S. will be aware of the eclipse before it hits. hat percentage of U.S. residents at the time would have been aware of it and what are the first person accounts of the experience like in 1878 for those who were not aware of it?

aClimateScientist

Yes, I dare say that anyone who pays attention to TV, radio, newspapers, or the web will know about

this year's eclipse. In 1878 as well, newspapers provided a tremendous amount of coverage of the coming eclipse, and the public was very excited to see it. There were eclipse tours to the path of totality in Colorado, and newsboys across the country sold "eclipse glasses" (pieces of smoked glass) so people could watch the partial eclipse. That said, some Americans were taken by surprise, and you can imagine how horrifying it was for them to see the sun disappear in the middle of a July afternoon, and then to look up and see a glorious, shimmering crown in the heavens. Indeed, I open my book with the story of what happened in Texas, where a lot of people assumed that it was Judgment Day. Farmers fells to their knees in the fields, families ran to church, and a devout man tragically took his own life--and his son's--in an effort to avoid the apocalypse.

Is there a vantage point from drones or airplanes which might be different from the ground ?

metalliska

I've never seen the moon's shadow from an airplane, but it's said to be quite a sight. Veteran eclipse chaser Mike Kentrianakis watched an eclipse last year while on an Alaska Airlines commercial flight. His video of the experience is priceless: https://www.youtube.com/watch?v=YBoa81xEvNA

I'll always remember the 1994 solar eclipse that passed Michigan, I was in 6th grade and my science teacher made a cool projection box so kids could look down instead of up. Do you recommend any fun homemade methods of viewing other than ordering from a website?

SteveJB313

I too remember the 1994 eclipse. That was a partial eclipse, although in portions of the U.S. it was a special kind of partial eclipse called an annular eclipse. In an annular eclipse, the moon passes directly between the earth and the sun, but it's at the far end of its orbit and therefore appears too small in the sky to completely block the sun. At the height of an annular eclipse, the sky doesn't go dark, but the sun is left as a fiery ring in the sky. To answer your question, though: The best way to watch a partial eclipse is through eclipse glasses, which enable you to look directly at the sun, but there are other fun things to do. Anything with small holes can act as a pinhole projector. Go into your kitchen, grab a colander, and take it outside. During the deep partial phases of the eclipse, when the sun is a thin crescent, the colander's shadow will show crescents where the holes are. And don't forget to look under trees. The spaces between leaves will act as pinhole projectors, so you'll see crescent suns scattered across the ground!

If I get lucky enough to see the solar eclipse this year, it'll be my first! What was it like to witness your first solar eclipse?

boob55

I hope you do get to see the eclipse this year, and I hope you see it as a total eclipse--not a partial eclipse. My first total eclipse was the most awe-inspiring thing I've ever witnessed. It made me understand, in a gut-wrenching way, just how minuscule I am in this enormous universe. I'd encourage you to watch my TEDx talk, because it's my best attempt to put the experience into words: http://www.tedxmilehigh.com/talks/life-advice-eclipse-chaser/

I'm getting married during the solar eclipse in near Jackson, WY. This has been an extremely difficult event to plan at times due to lodging being reserved years before I met my soon to be future wife.

My question, how far in advance of an upcoming eclipse do you start making/reserving travel plans? Looks like the University of California booked rooms in 2012 for this one. Is this a little too overly or are all eclipses this way?

Captain_Phil

I look forward to seeing you in Jackson. I made my hotel reservation there three years ago! This eclipse--because it's so easily accessible by so many people--spurred a lot of reservations earlier than usual, but in my experience the best hotels in the path of most any eclipse tend to book up many months in advance, and I usually book my flights as soon as the airlines release them (i.e. 11 months in advance). Eclipse travel will likely get even more difficult in the future, because I suspect thousands of Americans will be indoctrinated into the ranks of eclipse chasers after Aug. 21. Good luck with the wedding!

Was the 1878 eclipse anticipated by the public in a similar way as this upcoming one? Did they understand the cosmic significance? Any reports/stories of strange eclipse related activity (during the 1878, or any other, total eclipse)?

turkeyandswissonrye

The eclipse was hugely anticipated in 1878 and was in many ways more significant than the one this year. Back in the 19th century, scientists were just starting to unravel the mysteries of the sun, and total solar eclipses allowed them to conduct key experiments to deduce the solar structure and composition. American scientists traveled to Colorado, Wyoming, and Texas to study the eclipse, and the American public cheered them on as they would a home team of athletes heading into a sporting competition. Although important research will also be conducted during this year's eclipse, it's much more of a public spectacle and less of a scientific undertaking compared with 1878.

The last time there was a partial eclipse in my area, I noticed that dappled light coming through tree leaves and hitting the sidewalk had crescent-shaped shadows. It was really cool. Can you explain why this would happen?

culkribro

Yes! That's great fun to see. The spaces between the leaves act as pinhole projectors. You can get the same effect by punching a hole in a piece of cardboard and projecting the image of the crescent sun onto another surface.

For those of us who want to try to photograph the eclipse, is it possible with consumer level camera equipment?

jnxtheband

If you have never witnessed a total solar eclipse--i.e., if this is your first--then my sincere advice is don't try to photograph it! A total eclipse is so precious and fleeting, you don't want to waste a second fiddling with your camera equipment. What's more, this eclipse will be the most photographed ever. You can be sure there will be many spectacular images uploaded to the web by people who have fancy equipment and lots of experience. That said, if you're adamant about taking pictures, here are a couple of websites that can provide advice: http://www.popularmechanics.com/space/solar-system/a27064/how-to-photograph-a-solar-eclipse/ https://amazingsky.net/2017/06/23/ten-tips-for-the-solar-eclipse/

I am in southern Georgia (Albany to be specific), and it looks like I'll be in the 90% blacked out path...is it worth the 5 hour drive up to Charleston to see the full eclipse? Will the ~10% difference be noticeable?

TokiNotABumbleB

Yes, drive to the path of totality! Please see my response to billbixbyakahulk, above. Clear skies!

I'm hosting a viewing party in Gallatin, TN. Expecting to experience 2:35 ish of totality. I've got glasses for everyone and will have a telescope with sun filter set up. Anything else I can prepare for to make it a good experience?

Also, I'm terrified of cloudy skies. Has poor weather ever affected your viewings in the past and how much did it dampen your experience?

afrothunder1987

See previous posts about cloudy skies. Obviously, you want to avoid clouds if possible, but even under cloudy skies a total eclipse will be exciting. As for other ways to prepare... Although I advise against trying to photograph a total eclipse, I do recommend finding a way to record one's own experiences of totality. Perhaps you could set up a smartphone on a tripod, point it toward you and your viewing party, and start recording video ten minutes before the total eclipse. Then just leave it running and ignore it while you take in the spectacle. Afterwards, you may cherish that record of how you and your friends reacted to the sight.

Is there a really good interactive map to help me find the ideal location to stand to see the eclipse? Ideally, I'd like a google map overlay so I can sort out roads, plan routes, and such.

photolouis

Yes! Go to www.greatamericaneclipse.com, and click where it says "Launch app: Tour the Great American Eclipse." You can also find NASA's Google map of the path of totality here: https://eclipse2017.nasa.gov/sites/default/files/interactive_map/index.html

I don't have plans to go to a location to watch this years eclipse, but I'd love to participate via streaming. Will I enjoy the experience and where is the best place to do that (i.e., NASA, etc.)?

rogamore

NASA and the Exploratorium will be live streaming the total eclipse. (See the link below.) ABC TV and The Weather Channel have announced that they will broadcast it. Keep in mind that if you are anywhere in North America on August 21, you'll be treated to at least a partial eclipse, so don't forget to step outside (with your eclipse glasses) and enjoy the show overhead while you watch the total eclipse on your screen. I realize that not everyone can get to the path of totality, but do try to experience a total eclipse--with your own eyes--at some point in your life.
https://www.exploratorium.edu/eclipse

Hi David! Thanks for doing the AMA!

Why is it that we need to get special glasses to watch the solar eclipse? Would normal sunglasses work since we wear those on a normal sunny day?

I'm in an area that's gonna get almost complete magnitude, and my eye doctor hasn't gotten any glasses in stock yet. I just wanna make sure I can still watch the eclipse incase they don't come in on time.

FencingFemmeFatale

This is all good advice. Do NOT look at the sun with normal sunglasses. Even at this late date, you should be able to order safe eclipse glasses online and receive them in time. They're not terribly expensive. Look at the list of approved vendors by the American Astronomical Society: https://eclipse.aas.org/resources/solar-filters

Listened to your great interview on NPR a few weeks ago.

My son starts high school on the 21st. Should he miss his first day or should he miss the eclipse? We live about 4 hours drive.

Help me convince my wife he should see it!

Thanks for the AMA

italian_spaghetti

He should go see the eclipse! I have no recollection of my first day of high school, but I will never forget my first view of totality--indeed, it's permanently seared into my memory. Please have your wife watch my TEDx talk: http://www.tedxmilehigh.com/talks/life-advice-eclipse-chaser/. Good luck!

I live in one of the top areas for the longest totality of the eclipse. I'm SO freaking excited!!

I have several questions: I assume the best thing I can do is get away from the city and into the outskirts where light pollution is the least to really experience this the "right way." Would you agree? Have you experienced them in cities and rural areas? What are the differences?

Also I've heard the temperature can drop by as much as 20º F during those 2½ minutes of darkness, which seems crazy to me. Has that ever actually been your experience?

Thanks!

sindex23

Frankly, I find the temperature drop to be subtle--not that big a deal. As for your question about city vs. rural viewing... you don't have to worry that much about light pollution. The sky won't get as dark as midnight--it's more like twilight--and the solar corona glows as bright as the full moon, so even in a city you should see things just fine. (That said, don't situate yourself so you're staring up at a streetlight.) In fact, one of my favorite experiences was watching a total eclipse from a rooftop in Munich in 1999. Hundreds of thousands of people were out in the streets and on buildings all around me, and when the moon's shadow moved in, I felt like I was participating in some ancient pagan ritual. The entire city erupted in an enormous cheer. Seeing a total eclipse in a crowd can be great.

If I stood overlooking a valley will I see the shadow rushing across the valley floor? Also would I possibly see the column of the shadow in the atmosphere.

amordecosmos

The moon's shadow moves really, really, really fast--at least 1400 mph across the ground in this eclipse--so you'd need to get up very high and look out over a wide landscape to see it as a moving patch of darkness on the ground. That said, you may very well see it as a black column in the sky. In the final 10 minutes before totality, look to the west and you'll see the sky darkening. If you have a good view of the horizon, it will look like a monster storm rushing in.

Is there a good app or website that will help me with timing and what to expect at each stage of the eclipse?

alpacasarebadsingers

There are a number of good (and free) smartphone apps. I like one called Totality by Big Kid Science. You'll find a list of several others here: https://www.space.com/37568-best-total-solar-eclipse-apps.html

Eclipse Glasses with Binoculars? I have some certified ISO 12312-2 eclipse viewing glasses. It is safe to put those on your face and look at the sun. A friend wants to look through binoculars while wearing them. I don't think that is a good idea. He suggested putting them on the far side of the binoculars instead (the other end from the eyepiece) and then looking through them. I still don't think it's a good idea. Help me explain why (or why not)?

AreThree

Definitely do NOT put the glasses over your eyes and then look through binoculars. The binoculars will focus the sunlight to a point where the eclipse glasses may no longer be safe. I've heard some people claim that you can put the filters on the far side of binoculars, but I would not recommend that either. For one thing, if the filters slip or you haven't affixed them properly, direct sunlight might bleed through. You can, however, buy solar filters that are custom made for binoculars. See the American Astronomical Society's list of approved vendors: https://eclipse.aas.org/resources/solar-filters

What is more spectacular: the aurora borealis or a total solar eclipse? For those who have witnessed both.

beebeethebulldog

I've seen both, and both are amazing, but a total eclipse beats everything! :-)

How old were you in 1878 when you wrote about the great American eclipse?

nigony

:-) I was -86 years old.