Highlights of the October Sky. . .

- - - 5th - - -

DAWN: Venus and Mars are only 14 arcminutes apart, with the star Sigma Leonis about 20 arcminutes to Venus' left.

Full Moon
2:40 pm EDT

- - - 8th - - -

PM: A waxing gibbous Moon is near the Hyades cluster and Aldebaran.

- - - 12th - - -

Last Quarter Moon
8:25 am EDT

- - - 15th - - -

AM: A waning crescent Moon occults Regulus at approx. 5:39 am EDT.

- - - 17th - - -

DAWN: A razor-thin waning crescent Moon is 6° above Venus, while Mars is less than 2° to the Moon's right. Binoculars recommended to spot the Red Planet.

- - - 19th - - -

New Moon
3:12 pm EDT

- - - 21st - - -

AM: The Orionid meteor shower peaks before sunrise.

- - - 23rd - - -

DUSK: Saturn is about 6° left of a waxing crescent Moon, low in the southwest.

- - - 24th - - -

PM: The crescent Moon is about 6° to the upper left of Saturn.

- - - 27th - - -

First Quarter Moon
6:22 pm EDT

- - - 29th - - -

PM: 2 Pallas, the second largest asteroid by diameter, shining at magnitude 8.3 in Eridanus, reaches opposition.

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ October 2017 ★ ★ ★

This Months KAS Events

General Meeting: Friday, October 6 @ 7:00 pm

Kalamazoo Area Math & Science Center - See Page 14 for Details

Board Meeting: Sunday, October 8 @ 5:00 pm

Sunnyside Church - 2800 Gull Road - All Members Welcome

Observing Session: Saturday, October 14 @ 7:00 pm

The Galaxies of Autumn - Kalamazoo Nature Center

Observing Session: Saturday, October 28 @ 7:00 pm

The Moon, Uranus & Neptune - Kalamazoo Nature Center

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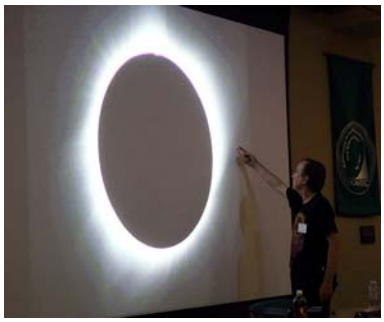
SEPTEMBER Meeting Minutes

The general meeting of the Kalamazoo Astronomical Society was brought to order by President Richard Bell on Friday, September 8, 2017 at 7:05 pm EDT. Approximately 55 members and guests were in attendance at the Kalamazoo Area Math & Science Center (KAMSC).

Richard began his President's Report by saying how great is to be back in the swing of things after our August hiatus. So, that means...VOLUNTEERS NEEDED! Crane Fest will be held on October 14th & 15th from 12 - 7pm at the Kiwanis Youth Conservation Area, located between Bellevue and Marshall in Calhoun County. We'll observe the Sun (weather permitting) and pass out KAS literature and NASA freebies. Kingman Museum's Spooky Science Saturday will take place from 11am - 3pm on October 28th. We'll offer solar observing again, but also a hands-on activity. KAS Vice President Jack Price also mentioned that WMU Education Day will be held at the Seelye Center (adjacent to Bronco Stadium) on September 30th from 5:00 - 6:30 pm. We'll offer some displays and pass out KAS information.

Our feature presentation for the evening were *Great American Eclipse Stories* from the KAS membership. The following members shared their tales from the Moon's shadow during the first half of the meeting: Harold Ballen (Madras, Oregon), Eric Jeska (Hiawatha, Kansas), Mike Patton (Gerald, Missouri), Mike Sinclair (Sparta, Illinois), Roger Williams (Hemingford, Nebraska), and Karen Woodworth (Carbondale, Illinois).

After a snack break, Richard decided to throw out (literally) the standard agenda items, since there were several more reports to be given. He did mention the impending doom of the Cassini spacecraft and that we received four new memberships during the meeting, which adds to our already record-level. We currently have 167 KAS memberships - an impressive increase from the previous record of 151. Keep'em coming!



The following members presented their eclipse reports during the meeting's second half: Cal Lamoreaux, pictured on the left, (Sparta, Illinois), Jack Price (Sparta, Illinois), Eric Schreur (Carbondale, Illinois), and Dave Garten (Carbondale, Illinois). It took over 2½-hours to get through everyone's report, but it was great fun. Part 2 of *Great American Eclipse Stories* will be at the October General Meeting. Many of those that shared reports at the meeting, typed them up for everyone to enjoy. After all, no one can tell their story better than they can! Please enjoy them beginning on page 4. The meeting concluded at 9:54 pm.

BOARD Meeting Minutes

The Kalamazoo Astronomical Society Board met on September 10, 2017 at Sunnyside Church. President Richard Bell called the meeting to order at 5:10 pm. Other board members present were Joe Comiskey, Scott Macfarlane, Rich Mather, Jack Price, Don Stilwell, and Roger Williams.

Rich presented the Treasurer's Report, which showed among other things that we had sold 2,200 pairs of eclipse shades associated with the Great American Eclipse of 2017. The cash flow showed significant additions from dues payments and donations. Rich had the correct individual numbers for the items, but due to a programming problem, the totals shown were not correct. Rich agreed to submit by e-mail corrected balances as soon after the meeting as he could (which was done). No other questions about the report were raised.

Richard summarized the planned events for September-October, including Public Observing Sessions on September 16th and 30th. The general meeting on October 6th will feature the remaining reports of member experiences with the eclipse event. The discussion turned to follow-up items from the last meeting (which was on May 21st), specifically the Robotic Telescope Project Update. Replacement of a defective board had restored the mount to operation, and some more run time had been logged. However, some unexpected glitches still had been seen. Richard said that meetings of the project group should be resumed and all agreed that efforts should be made to achieve some positive results that would show the potential of the instrument.

Some discussion was held next regarding after-effects of Astronomy Day 2017, for which some book sales receipts were not accounted for in our records. Our suggestion of just reimbursing Fred Espenak for his cost of the missing books was not well received by Fred. The Board considered a suggestion by Richard that we square things with Fred even though we could not explain the missing receipts. A check for $410 would be required for this, and after a motion by Rich and second by Don, the Board voted to authorize Rich to send the check.

Community outreach projects discussed included WMU Education Day (September 30th) and Crane Fest (October 14th & 15th). Some board members volunteered to staff the displays at these events, but additional help from the membership will be required. Richard reported that in a previous appearance at Bronson Park, the large KAS banner was apparently overlooked in the packing-up process after the event. Attempts to trace it since then have been fruitless. A suitable replacement banner was available for about $100. After a motion by Don and second by Jack, the Board voted to replace the lost banner.

In New Business, Richard introduced some ideas on the Owl Observatory Upgrade Project currently being considered. He

suggested that a Meade 16" SCT with an Astro-Physics mount would eliminate many of the problems encountered with the current setup. The Board felt that it was not yet time to take any action, but ideas for the improvements could be considered and discussed.

The next new item on the agenda was appointment of a Member-At-Large to serve as assistant treasurer. The treasurer responsibility has fallen solely on Rich for many years, and it seemed prudent to have another member familiar with the records. Don volunteered to accept the Assistant Treasurer position. Joe revealed that he was interested in running for the now-vacant Publicity Manager position.

Richard listed a few items which needed to be ordered, and they were quickly dispatched as follows: KAS general brochures (motion by Jack, second by Joe), Miller Planispheres (motion by Joe to buy 24, second by Rich), Quickbooks computer program for Treasurer records (~$185, motion by Richard, second by Joe), and U.S. stamps ($50, motion by Scott, second by Don). All were approved unanimously. Richard invited consideration of ideas for 2018 events, and some were very briefly discussed.

With the conclusion of business, the next board meeting was set for October 8th. The venue may be changed, since Jack may not be back in time to open Sunnyside. The meeting was adjourned at 7:00 pm.

Respectfully submitted by Roger Williams

Observations

by **Richard S. Bell**

Jean DeMott, Rich Mather, and I attended the 26th annual Ta -You Wu Distinguished Lecture in Physics at the University of Michigan on September 13th. This year's special guest was Kip Thorne, The Feynman Professor of Theoretical Physics at the California Institute of Technology. Dr. Thorne was also a Science Advisor and an Executive Producer on the movie *Interstellar*. The title of his excellent presentation was *Exploring the Universe with Gravitational Waves: From the Big Bang to Black Holes*. Before attending the lecture I considered writing a report for the newsletter, but decided to gamble that U-M would record the presentation and post it on YouTube. I was right! When time permits, **click this link** and enjoy Dr. Thorne's talk.

This lecture is very timely, since the fourth detection of gravitational waves was announced on September 27th. And, for the first time in history, the gravitational waves were observed by three detectors simultaneously - the two identical LIGO detectors (or Laser Interferometer Gravitational-Wave Observatory) in Livingston, Louisiana, and Hanford, Washington and the Virgo interferometer in Cascina, Italy. Detection by the three facilities enabled a relatively accurate localization in the sky.

The gravitational waves reached Earth on August 14th and were the result of a collision and merger of two black holes, weighing in at 31 and 25 solar masses. The merger took place 1.8 billion light-years away and resulted in a 53 solar mass black hole. The missing 3 solar masses were radiated away as gravitational waves, tiny ripples in the very fabric of spacetime. As described by Dr. Thorne in his presentation, Gravitational Wave Astronomy has a rich future. These ripples in spacetime may even help us explore the universe in the moments after the Big Bang!

Closer to home, we've got a lot coming up in October. First is the general meeting on October 6th. It'll feature more *Great American Eclipse Stories* from the membership, including one from yours truly. I really enjoyed hearing about everyones experiences from August 21st. Thankfully, most of the members that shared their stories at the meeting wrote them up for the newsletter. Hopefully we'll have many more eclipse reports in future additions of *Prime Focus* - especially if you are unable to attend the October meeting.

Our last two Public Observing Sessions of the year will be held on October 14th and October 28th. The season got off to a rough start, with cancellations in April and May, but we've had nothing but clear skies since them. Although, we didn't schedule any sessions in August since we were on hiatus! As I've mentioned countless times before, our membership doesn't attend the public sessions in droves. So, if you have yet to attend a session this year, you only have two chances left. Let's hope skies are clear for both of them!

We have some fun activities scheduled for November and December, but overall the KAS schedule will lighten up a bit once the observing season is over. That means it's time to plan for activities in 2018. I broached the subject of 2018 activities at the last board meeting, but would like to open it up to the general membership as well. What would you like the KAS to do next year? Any general meeting presentation topics you'd be interested in hearing? Even better, any presentations you'd be interested in *giving* at a general meeting in 2018?

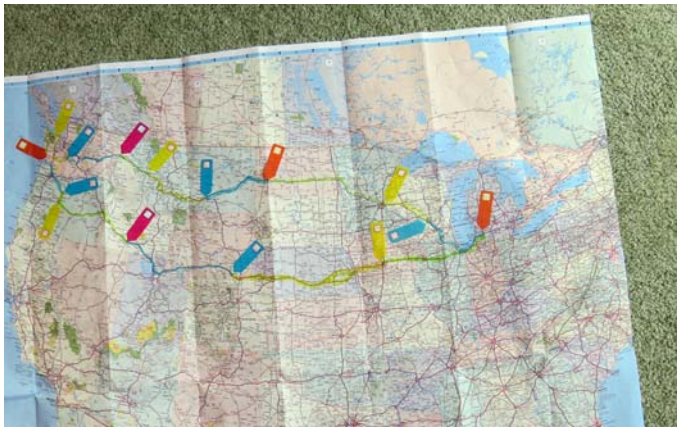
Usually I have to hunt members down and ask them to give a talk. Just for ONCE, it would be nice if someone - out of the blue - would volunteer to give a talk. It has happened, but not too often. How about any field trips, workshops, or other special activities? My e-mail inbox is open 24/7, so drop me a note and give us some ideas. I've been coming up for ideas for 20+ years and I gotta be honest, the cupboard is getting a little bare. Help!

Members of the Kalamazoo Astronomical Society stood in nearly every state along the path of totality on August 21st with hopes of witnessing the grandest phenomenon in nature...a total solar eclipse. These are their stories...

Harold Ballen
Madras, Oregon

I joined KAS 5 or 6 years ago because I hoped to learn more about astronomy by associating with knowledgeable people. At that time Richard Bell, President of the KAS, was talking about an eclipse in 2017. I had seen a partial eclipse in the 70's and it was neat but no big deal. Over the ensuing years, Richard kept bringing up how this was a must-see event and that totality was an almost out of body experience. Eventually he convinced me that I should make an effort to see totality.

I have friends in Bend, Oregon that had indicated I could visit them at that time. I turned it into a trip out west and visited some other friends on the way. I drove through Madras on my way to Bend, so I had an idea of what the town looked like and where there might be places to be on the day of the eclipse. I arrived in Bend on Thursday the 17th. My hosts showed us a number of local attractions and said we would go to Madras on Sunday and stay with some friends. They said warnings were issued that it might take 8 hours to get from Bend (~50 miles) to Madras close to the eclipse time.



Harold traveled a total of 5,400 miles between Kalamazoo and Madras, Oregon to witness the eclipse.

We left Bend at 10:00 am on Sunday and arrived at a little after 11 in Madras. After arriving and settling in, we got to participate in the carnival-like atmosphere in the town. They had shuttle buses that would take us from venue to venue. It was a very festive affair.

We were concerned about the smoke (it was a little hazy on Sunday) from the forest fires and how it would affect our viewing of the eclipse on Monday.

We woke up on Monday and the wind had shifted. It was now clear. After a delightful breakfast, we set up our lawn chairs on their front lawn and had a totally unobstructed view of the eclipse starting at 9:15 am. Words cannot describe my reaction to totality (10:20 am). It was overwhelming. We heard some foxes yipping in the distance during totality. After the 2 minutes 20 seconds of totality, we continued to watch as the shadow slowly withdrew.

Then we looked at the nearby highway and saw a virtual parking lot. According to a cell phone app, for a 30-mile radius, the traffic was pretty much deadlocked for hours. A later report said the local bank was robbed at 2pm that afternoon!

That evening we attended a neighborhood pot party. Unlike what you might be thinking it consisted of a large cast iron pot with vegetables and meat boiled in it. We left for Bend on Tuesday before the next wave of traffic. (It was now quite smoky.)

This was definitely a memorable experience and I'm beginning to think of when can I see another. 2024 or sooner?

C C C

Eric Jeska
Hiawatha, Kansas

Sue and I travelled to Kansas for the Total Eclipse of 2017. If you recall, Fred Espenak didn't even bother to mention

Eric & Sue Jeska gave away all their KAS Eclipse Shades, so they had to make due with inferior pairs of Baader Planetarium eclipse glasses!

Kansas in his talk earlier this year, because the path of totality barely cut through Northeast Kansas.

But we had other reasons to visit. Our son and daughter-in-law are expecting our first grandchild, so we spent Saturday and Sunday in Kansas City with them under absolutely crystal clear bright blue skies.

We headed north to the center of the path on Sunday afternoon, to Hiawatha, Kansas. A few miles east of town, I spied some telescopes set up near a barn about ¼-mile off the road, and we drove over to talk with the folks there. It was a group of amateurs and professionals that had rented the local community college's private Klinefelter Farm for observing the eclipse. We were invited back to join them on Monday but were warned that the gates would be locked at 9am.

The next morning was very cloudy with rays of sunlight beaming through.

We got out to the farm early, and set up. I had built a homemade iPhone holder for my telescope, and was a bit worried that I wouldn't be able to polar align during the daylight, but was able to use the compass on my iPhone to find true North, and the level feature on it to find a latitude of 39.85°. It tracked perfectly.

We had a mix of overcast, rain, lightning, and little bits of blue sky. A garbage bag was on and off the telescope all morning.

I had given away the eight pair of KAS eclipse glasses that I bought to family and friends thinking I could just buy more, but Richard's email stating that they were 'sold out' forced me to search Amazon for more. I was able to get 12 more pair from Baader Planetarium, but a few days after they arrived, Amazon sent an email telling me not to use them because Baader hadn't provided them an ISO certification, and that Amazon was refunding my money but didn't want the glasses back. I trust Baader more than I trust Amazon when it comes to solar filters, so I felt comfortable using them.

I was able to get some decent eclipse photos with clear sunspots between the rainfalls, but 10 minutes before totality the clouds covered the sky.

Everything went dark and cool, and with crickets chirping for the brief 2+ minutes, but the show was over for us after that.

The local Topeka radio station was there and the host interviewed me live on the air before the eclipse started.

I told my story of why we were there all the way from Michigan, and he asked "Which is more exciting, your first grandchild or your first total eclipse?" I paused, and after a few seconds of dead air I replied "Well, they could both be a once in a lifetime experience".

I was really hoping that my daughter-in-law wasn't listening to that station.

C C C

Cal Lamoreaux

Sparta, Illinois

A math problem: how long does it take to drive 8 miles at 4 mph? Having faced this many times while driving to visit grandkids in Chicago, I picked up a scientific friend Friday afternoon and we drove to Michigan City. Then we headed straight south on US-412 for many miles, avoiding the usual Gary-Chicago traffic jams. Thence southwesterly through beautiful Indiana and Illinois farm country on fine paved, mostly back roads to the World Shooting and Recreational Complex at Sparta, Illinois. We used the site map Jack Price had sent us, along with Google Earth and the car GPS, to thread the trails into the huge dark complex and onto our reserved campsite, arriving about 11pm. A voice from the darkness saying, “Cal, is that you?” assured us we had hit the mark. We pitched two small tents and, in the morning, a 10’×10’ shade frame over the picnic table.

We toured historic sites nearby on Saturday and Sunday, like Fort Kaskaskia (1735) and Ste. Genevieve, the first

Cal snapped this picture of Don Stilwell preparing his 92mm refractor and Sun Funnel, which gave great views of the partial stages of the eclipse.

organized European settlement west of the Mississippi River in present-day Missouri. Also photographed the impressive Mississippi bridge at Chester, Illinois and the Popeye and Lewis & Clark monuments. We noticed three huge power plants, each apparently built at a coal mine, within 15 miles of the campgrounds.

The satellite views of the Complex had shown that the campsites were designed for self-contained Recreational Vehicles. Since we had only tents, we brought bicycles. Those eased the 0.6-mile trips to the restroom facilities. We also made good use of the facilities in nearby Sparta, such as McDonalds, Taco Bell, and Wal-Mart. And purchased a few camping supplies and food items.

Monday, we relaxed under our canopies and tested out our camera equipment. The few morning clouds gradually thinned to produce a clear blue sky overhead with a comfort factor temperature of 101°. Don Stilwell had made a Sun Funnel and attached it to the eyepiece of his refracting telescope. This made viewing of a 3-inch screen image of partial phases simple for passersby, so many of us viewed it instead of fussing with our sun scopes. I attached an old manual 400-mm lens to my Nikon and made a few test pictures of scenery as totality approached and the skies darkened. The shots of totality, without any filters, were right on, and beautiful. A few people cheered. I looked around and saw clouds all around the horizon, top lighted with pink light. But I did not swap out my 400-mm lens to take in scenery. Venus was obvious, not far from the Sun, and a few faint stars showed up close to the corona when we eventually viewed the pics. Three red prominences were visible on the Sun's rim. An evening shot of the southern sky, a half hour after sunset, produced a similar picture to the cloud view seen at totality.

C C C

Bill Nigg
Grand Island, Nebraska

I observed and photographed my 11th solar eclipse IN A ROW! I've been on the center line for 7 totals and 4 annular eclipses since 1970. I chose a KOA campground in Grand Island, NE for a family reunion. My 4 children have been to several solar eclipses before, but the first for 5 grandchildren. We were also visited by Mark & Nina Miller and (long time no see) Robert & Wendy Wade.

Veteran eclipse chaser Bill Nigg snapped this image of the second diamond ring, signaling the end of totality.

As many first timers just learned, a solar eclipse is primarily a weather and location event. Many live satellite resources show what we need and we usually ignore the TV "weather clown." There were some clouds in the southeast but they were moving away and pretty thin. We decided to stay at the campground for the event. The grandkids contributed "junior scientist" projects including timing call outs, shadow band watching, and mirror image projecting.

This eclipse had one coronal streamer to the east and two towards the west. They are all different.

Several sunspots helped in camera focus and several prominences decorated the Diamond Ring with rubies. I called out "filters off" and "filters on" but temporarily forgot to put his filter back on for a minute after contact 3. Oops!

I was happy there were many clear sky sites along the path. Probably a billion cell phone pictures. Astronomers are inspired by the Sun projecting the Moon's shadow on them. The night time stars can be confusing and the daytime Sun is too bright but every eclipse observer can understand our location in space.

C C C

Mike Patton
Gerald, Missouri

The 2017 total eclipse was important to me because my wife was going and it was going to be her first eclipse experience of any kind. She originally said she didn't want to go but changes in plans and some encouragement convinced her to go. I had seen a total eclipse in Lumberton, NC when I was a senior in high school but those memories were faded as well. I had also seen a half dozen partials.

Our travel strategy was specific.

(1) Avoid the crowds. Your ability to move due to weather is proportional to the number of people surrounding you. Some of the more advertised areas were definitely not an option.

(2) Keep driving to one long day or less. This was just a personal decision and not based on any factors that would improve our odds of viewing the eclipse. We understood that going west was statistically better the further you go but we determined that we could move quickly enough with just the two of us that an extended road trip was not necessary.

(3) Go to an area of totality where there were adequate roads running east and west. Some of the mountain venues out west were lacking in this category due to the terrain.

(4) Stay on the back roads when possible and spend as little time as possible in the path of totality.

Kathy Patton viewed the partial phases of the eclipse, her first, with a pair of 12×50 binoculars.

With that in mind, we headed out Saturday, August 19th, thinking we could avoid some of the congestion possible in the Chicago area. We ended up in Pella, Iowa which is just short of Des Moines, Iowa. We spent the evening watching the weather and certain blogs from people spread all over the country discussing observing probabilities.

On Sunday we dropped down to Polo, Missouri which was our intended destination. This is in the St. Joseph/Kansas City area and only about 20 miles north of the center line. Our thinking was to drop down into the path of totality during the morning using back roads and set up in some obscure town that had a church or school parking lot we could use. Shopping malls were out of the question!

Mike Patton gets ready to shoot the eclipse!

Sunday night we realized there was no chance of seeing the eclipse from Polo. The weather predictions indicated the chances were slim to none in that area. We made the decision to get up early the morning of the eclipse and travel across the state of Missouri to an area just southwest of St. Louis. Indications were that this area would be clear but only at the time of the eclipse and not much earlier than that.

After driving four hours we ended up in the very small town of Gerard, Missouri. It put is about 5 miles south of the center line and right on the southern edge of total cloud cover. This compromise lessened the time of totality by 7 seconds but it gave us a shot. We set up in a school parking lot, pretty much by ourselves, and waited.

How lucky can we get? About an hour before the start of the eclipse the clouds cleared completely off and left us to terrific sky for the event.

I set Kathy in a stadium chair with a pair of 12×50 filtered and pre-focused binoculars and told her that her job was just to watch and listen. I had a camera set up that I only planned to use sparingly. I too wanted to re-etch the sight of a total eclipse in my brain. This approach worked perfectly and we both had an experience we will never forget. I don't need to describe what happened to anyone who saw it. It was indeed worth the effort and something Kathy and I can share for a long time.

We had chosen a small population viewing area and as a result we didn't hear the noise of the crowd when they witnessed totality. We really only heard each other and the animals around us.

By plan, I only took a half dozen pictures. I really wont start processing them until winter or a stay indoors rainy day. I don't need them as proof or a record of the event. That is in my brain and readily accessible to review.

The first picture I did look at tells me I will need to spend some time processing the data. I looked more like the KAS logo than the delicate shots taken by people like Espenak or Dyer (and maybe some of our members). We will have to see what I can come up with but it is really not my goal. My goal was to watch it with my eyes and remember it forever. Mission accomplished.

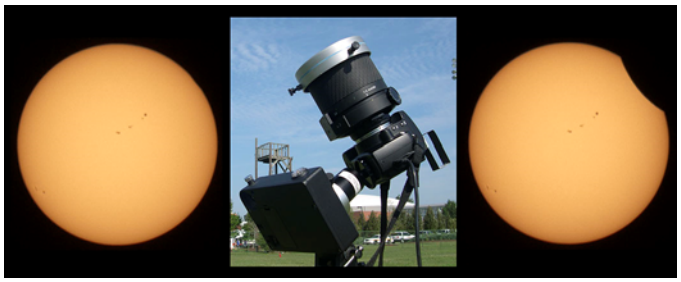
The downside: the seven-hour trip from St Louis to Plainwell took twelve. The only thing keeping us from going crazy in the traffic was knowing that we had accomplished something spectacular and want to do it again.

C C C

Eric Schreur

Carbondale, Illinois

I had very limited time for this eclipse trip – basically one overnight. I chose to take the Amtrak trains to Chicago and on to Carbondale, Illinois where the eclipse would be total. The travel cost was $320. I checked on the web for eclipse activities in Carbondale and found an event hosted at the Southern Illinois University stadium, about a mile and a half south of the train station. A stadium pass cost $25, and guaranteed a spot near restrooms and concessions. Because I had a tripod and camera I was allowed to set up on the



Eric Schreur, another veteran eclipse chaser, captured images of the eclipse with a Nikon D40 and 600mm lens on an iOptron SkyTracker. The image of the left shows the moment of first contact. It's more obvious 5 minutes later, as shown on the right.

practice field adjacent to the stadium where about two dozen other observers set up.

My gear was simple, a tripod, an iOptron SkyTracker aligned with a hand compass, a Nikon D40 camera with a Sigma 600mm telephoto mirror lens that I have used at other eclipses, a glass Thousand Oaks solar filter for the lens, and a netbook computer with Eclipse Orchestrator software (lite) to run the camera during totality. The software would cycle through the range of exposures four times during totality while I sat back and watched.

Starting just before first contact I began a sequence of partial eclipse exposures, one every 5 minutes. The first images appeared sharp revealing two sets of sunspots, an arc on the right and a pair on the lower left. The tracker alignment was a little off and I made some adjustments during the partial phases, at one point shifting the lens a little out of focus.

As the partial eclipse deepened a few clouds began drifting in from the west-northwest. There was a lot of room between the clouds overhead. In the last minute before totality one last huge, very slow moving cloud started to pass over – the sky beyond was clear and the cloud was about to graze across the Sun. Just before totality an eclipse breeze began pushing the cloud from the south. When totality began the Sun briefly appeared in a break at the edge of the cloud and disappeared. It was now a race between the end of totality and the cloud clearing the Sun. Halfway through totality the Sun broke out of the cloud and a cheer roared up from the stadium at the end of the practice field. My camera was not centered, but the eclipsed sun was in the frame, so I decided to keep my hands off through the end of totality. For a little over a minute I just watched – the Sun's corona, the light on the clouds near the Sun, and the light around the horizon.

Like all eclipses, this one seemed to last a little over ten seconds. The photographs of totality were not my best, but they were okay, especially since I wasn't looking at the eclipse through a viewfinder this time. There were a lot of images with some cloud, but the last of the four sets of totality images were clear – a little out of focus, but clear of cloud and haze. I combined a few of the images into a composite with the uneclipsed sun.

Roger Williams (center) observed the eclipse from Hemingford, Nebraska during a family reunion.

You couldn't ask for a better birthday present! Roger celebrated his 76th birthday on August 21st.

Roger & Molly Williams

Hemingford, Nebraska

Our plans for 2017 eclipse began two years earlier, during a visit to Roger's sister Darlene. She lives in Chadron, Nebraska, about 50 miles north of the central line of the eclipse path. We decided that the next family visit could be combined with an eclipse viewing experience, and soon found that more of the extended family were enthusiastic about joining in – including some of Molly's Ohio relatives in addition to Roger's Nebraska clan. We made motel reservations at a time when the motel operators were quite unaware of the coming phenomenon.

Our initial intent was to view the eclipse at Alliance, since favorable weather conditions were expected that time of year, and there was the extra amusement of Carhenge right on the center line. As time passed and word of the eclipse became known to the wider community, we became uneasy about the predicted crowds at Alliance and possible traffic jams on eclipse day.

Further research with the help of the online tools provided by NASA suggested that the village of Hemingford (population 993) would be a good alternative. It had about 10 seconds less than the maximum possible eclipse totality, but it was located north of Alliance and did not require Chadron residents to cross the heaviest expected traffic. Moreover, it is home to the Box Butte County Fairgrounds with plenty of open space and facilities. With some encouragement from us, Hemingford began planning for the event and advertising on the websites, so it became our primary objective.

While Chadron is easy to reach from Kalamazoo by air and car rental (via Rapid City, South Dakota), we needed to drive because of the amount of equipment being carried. We left on Friday, August 18th and reached the Nebraska – Iowa border the first day. Saturday was an easier day, and we had time for a brief stop at Roger's home town of Ainsworth in north central Nebraska before proceeding on to Chadron.

After a good night's rest, we helped Darlene transport food and supplies to her church, located on state route 87 about 15 miles from Hemingford, since she had volunteered to provide lunch to the family group following the eclipse. We made a quick run on to Hemingford to check out the site, and

As described in his report, Roger had technical issues with his camera during the eclipse. Shown above is a 30-second image of totality with the filter still ON!

some who had already been camping there overnight spoke favorably of the location, assuring us that the village street lights (which could not be disabled) would not be a problem during totality. The only worry was the possibility of some clouds or even rain on eclipse day. But planning a large family gathering limits the possibility of last-minute moves to a better location, and we had to hope for the best.

We left Chadron early in the morning on August 21st, and at first thought we must have been transported to Kalamazoo, with fog obscuring the road enough to make driving difficult. However, it burned off by the time we reached Hemingford, and we had encountered essentially no traffic. We set up on a roomy field with nearly 40 family members.

Our equipment included a Coronado 60-mm solar scope, a 102-mm classic Meade Schmidt-Cassegrain with Baader solar film (set up for visual use), a 4-inch refractor also with Baader filter (reserved for photography), and a pair of 15×45 image-stabilizing binoculars (fitted with solar filters made at one of our KAS workshops).

The practice I had been devoting to solar viewing seemed to be paying off, and the three mounted scopes were tracking nicely before first contact. Things continued to go well until seconds before total eclipse, when I tried to get in one more shot before totality. The camera was set to run 9-level bracketing exposures, and up to then, exposure times were a small fraction of a second. However, the low light level of that last shot caused the camera to shift to 30-second time exposures, and it would not give it up until all 9 bracketing levels were covered. In retrospect, I could have salvaged the situation by turning off the camera, removing the solar filter, and turning it on again with intended parameters for photographing totality. However, my practice had not covered this situation sufficiently, and with my concentration on what the camera was doing, I suddenly became aware that I WAS NOT WATCHING THE ECLIPSE! I then left the camera to do whatever it wished and concentrated on the eclipse experience. The diamond ring signaling the end of totality left most of the company screaming and shouting, but I was shaking my head and muttering "I blew it."

The photography mishap had two interesting results. I got absolutely no photograph of the corona, so that anyone with a cellphone camera (maybe even a pinhole camera) outdid my efforts. On the other hand, as the camera chugged along with its 30-second exposures and with the solar filter still in place, it managed to get some unusual shots of hydrogen-alpha prominences that I had never expected to capture.

After totality, as the Sun returned and the light intensified, the clan set off for the church where Darlene had the food prepared. She had only about 1 minute of totality, but that was sufficient for her. Once again, the drive was free of significant traffic, and we all enjoyed a sumptuous meal. And since Nature had been so considerate as to do the eclipse on Roger's birthday, the meal ended with an eclipse-themed birthday cake created by Roger's sister Darlene.

C C C

Karen Woodworth

Carbondale, Illinois

My sons and I went to Southern Illinois University in Carbondale to watch the Great American Eclipse. Although I had looked at a couple of other places, I decided that I wanted to go somewhere that would have a lot of activities in case the eclipse got clouded out. So I rented two campsites in the Student Recreation Center and bought three tickets for the eclipse at Saluki Stadium.

Arthur and I left Kalamazoo on Saturday afternoon and made a slight detour to Midway Airport in Chicago to pick Daniel up (he flew in from Boston). Our evening destination was a hotel in Effingham, Illinois. As we drove down Interstate 57, we passed under three large LED signs warning people about

Game Day? No, Eclipse Day! Arthur, Karen, and Daniel Woodworth viewed the eclipse from Saluki Stadium, located on the campus of South Illinois University.

possible traffic delays due to the solar eclipse on August 21st. But on the evening of August 19th, the traffic was just fine.

We arrived in Carbondale on Sunday morning and parked by the Rec Center. There were 112 campsites in all, and the boundaries and numbers for each one were marked on the gymnasium floor with tape. We received a very cordial welcome and some complimentary eclipse glasses. After we set up our tents, we headed across the pedestrian bridge to the main part of campus.

We went to the Eclipse Comic Con at the Student Center and the Crossroads Astronomy Science and Technology Expo at the Arena. We picked up a lot of great information from NASA about the eclipse at the expo and I had the chance to make a handheld eclipse fan with a hole in it to use as a pinhole projector. The fan came in handy as we walked across the campus because it was very hot and humid in Carbondale. In the evening we were in the audience for a live Planetary Radio program that was also recorded and filmed for broadcast; you can listen to it online or watch it online. We ended the evening at the Crossroads Festival Carnival. When we returned to the Rec Center all the campsites were full.

Monday was a beautiful day, with a clear blue sky in the morning. We walked through the Crossroads Art & Craft Fair on our way to Saluki Stadium. As we entered the stadium around 9:45 am, we received Saluki cardboard fans and complimentary eclipse glasses. (We all needed the fans, since the high would be in the 90s and the heat index 103° in Carbondale and higher in the stadium.) The Saluki Marching Band was performing on the field, and the cheer squad ran in with special eclipse flags. Darth Vader and his Storm Trooper entourage along with Princess Leia and some Jedi Knights were special guests. Mat Kaplan, the host of Planetary Radio, was the emcee for the eclipse. Adler Planetarium assisted in the festivities.

The stands gradually filled and excitement mounted as the eclipse approached. Three weather balloons were launched from the field as the partial eclipse began. I picked up special solar 2× disposable binoculars from the NASA table under the stands. Totality would happen at 1:20 pm.

At 1:00 pm, an evil black cloud moved over the Sun. We

The Woodworths camped in a gymnasium at SIU. This was very fortunate as the humidity was quite high in Carbondale.

The Woodworths in a Tardis at the Eclipse Comic Con.

remained hopeful, as we could actually see the cloud moving. The Sun peeked out through a hole during the last part of the partial eclipse, but it was completely obscured when totality began. We were able to see the sunset effect outside the stadium, as well as one of the planets. Tenseness took over in the stadium - would the cloud finish moving in time for us to see any of totality? Luckily, we had over two minutes of totality -- and the cloud moved off for the last few seconds. The stadium erupted in cheers and yelling. I saw the colorful prominences in the corona and then the diamond ring before putting the eclipse glasses back on.

Although the program in the stadium was scheduled to continue, the heat was so intense that we and most of the crowd left fairly soon after totality had ended. Arthur, Daniel, and I went back to the Astronomy Expo in the arena. Just before the partial eclipse ended, we went back outside and looked at it through a solar telescope.

The campus cleared out more quickly than I would have thought possible. When we went back to our campsite after dinner, we were two of only seventeen sites that were still occupied. We left on Tuesday morning and had no traffic problems driving back to Midway Airport and Kalamazoo.

We enjoyed the SIU Crossroads Eclipse experience and are hoping to go back to Carbondale in 2024.

Cassini Ends Its Historic Exploration of Saturn

A thrilling epoch in the exploration of our solar system came to a close on September 15th, as NASA's Cassini spacecraft made a fateful plunge into the atmosphere of Saturn, ending its 13-year tour of the ringed planet.

"This is the final chapter of an amazing mission, but it's also a new beginning," said Thomas Zurbuchen, associate administrator for NASA's Science Mission Directorate at NASA Headquarters in Washington. "Cassini's discovery of ocean worlds at Titan and Enceladus changed everything, shaking our views to the core about surprising places to search for potential life beyond Earth."

Telemetry received during the plunge indicated that, as expected, Cassini entered Saturn's atmosphere with its thrusters firing to maintain stability, as it sent back a unique final set of science observations. Loss of contact with the Cassini spacecraft occurred at 4:55 a.m. PDT (7:55 a.m. EDT), with the signal received by NASA's Deep Space Network antenna complex in Canberra, Australia.

"It's a bittersweet, but fond, farewell to a mission that leaves behind an incredible wealth of discoveries that have changed our view of Saturn and our solar system, and will continue to shape future missions and research," said Michael Watkins, director of NASA's Jet Propulsion Laboratory in Pasadena, California, which manages the mission for the agency. JPL also designed, developed and assembled the spacecraft.

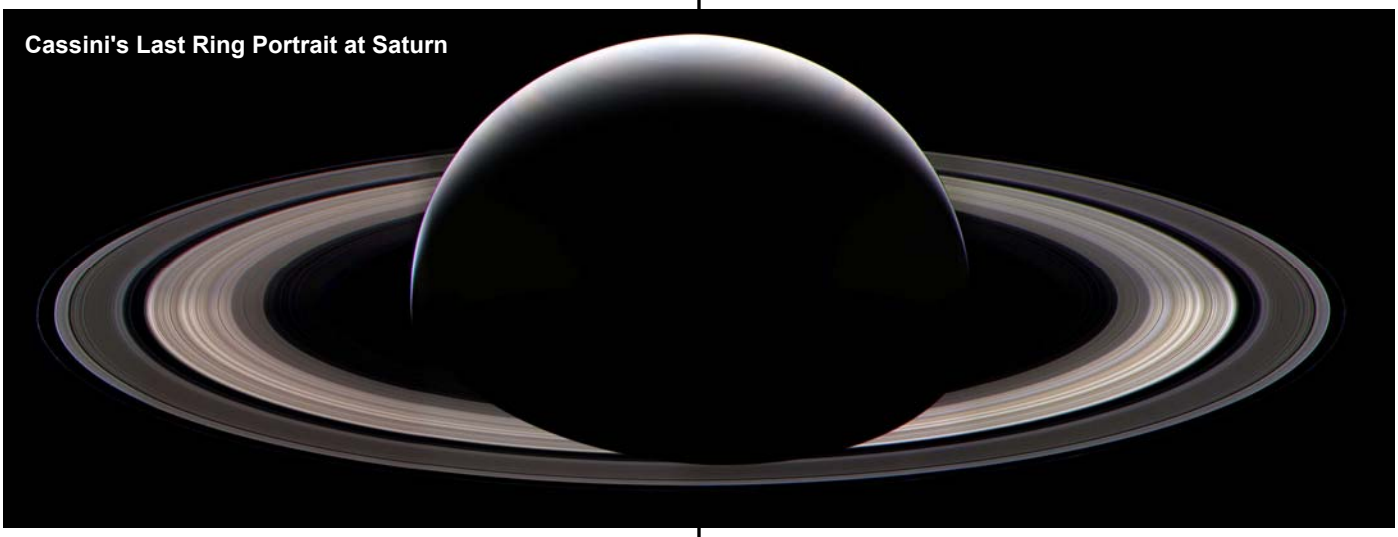
Cassini's plunge brings to a close a series of 22 weekly "Grand Finale" dives between Saturn and its rings, a feat never before attempted by any spacecraft.

"The Cassini operations team did an absolutely stellar job guiding the spacecraft to its noble end," said Earl Maize, Cassini project manager at JPL. "From designing the trajectory seven years ago, to navigating through the 22 nail-biting plunges between Saturn and its rings, this is a crack shot group of scientists and engineers that scripted a fitting end to a great mission. What a way to go. Truly a blaze of glory."

As planned, data from eight of Cassini's science instruments was beamed back to Earth. Mission scientists will examine the spacecraft's final observations in the coming weeks for new insights about Saturn, including hints about the planet's formation and evolution, and processes occurring in its atmosphere.

"Things never will be quite the same for those of us on the Cassini team now that the spacecraft is no longer flying," said Linda Spilker, Cassini project scientist at JPL. "But, we take comfort knowing that every time we look up at Saturn in the night sky, part of Cassini will be there, too."

Cassini launched in 1997 from Cape Canaveral Air Force Station in Florida and arrived at Saturn in 2004. NASA extended its mission twice – first for two years, and then for seven more. The second mission extension provided dozens of flybys of the planet's icy moons, using the spacecraft's remaining rocket propellant along the way. Cassini finished its tour of the Saturn system with its Grand Finale, capped by its intentional plunge into the planet to ensure Saturn's moons – particularly Enceladus, with its subsurface ocean and signs of hydrothermal activity – remain pristine for future exploration.


Cassini's Last Ring Portrait at Saturn

While the Cassini spacecraft is gone, its enormous collection of data about Saturn – the giant planet, its magnetosphere, rings and moons – will continue to yield new discoveries for decades to come.

"Cassini may be gone, but its scientific bounty will keep us occupied for many years," Spilker said. "We've only scratched the surface of what we can learn from the mountain of data it has sent back over its lifetime."

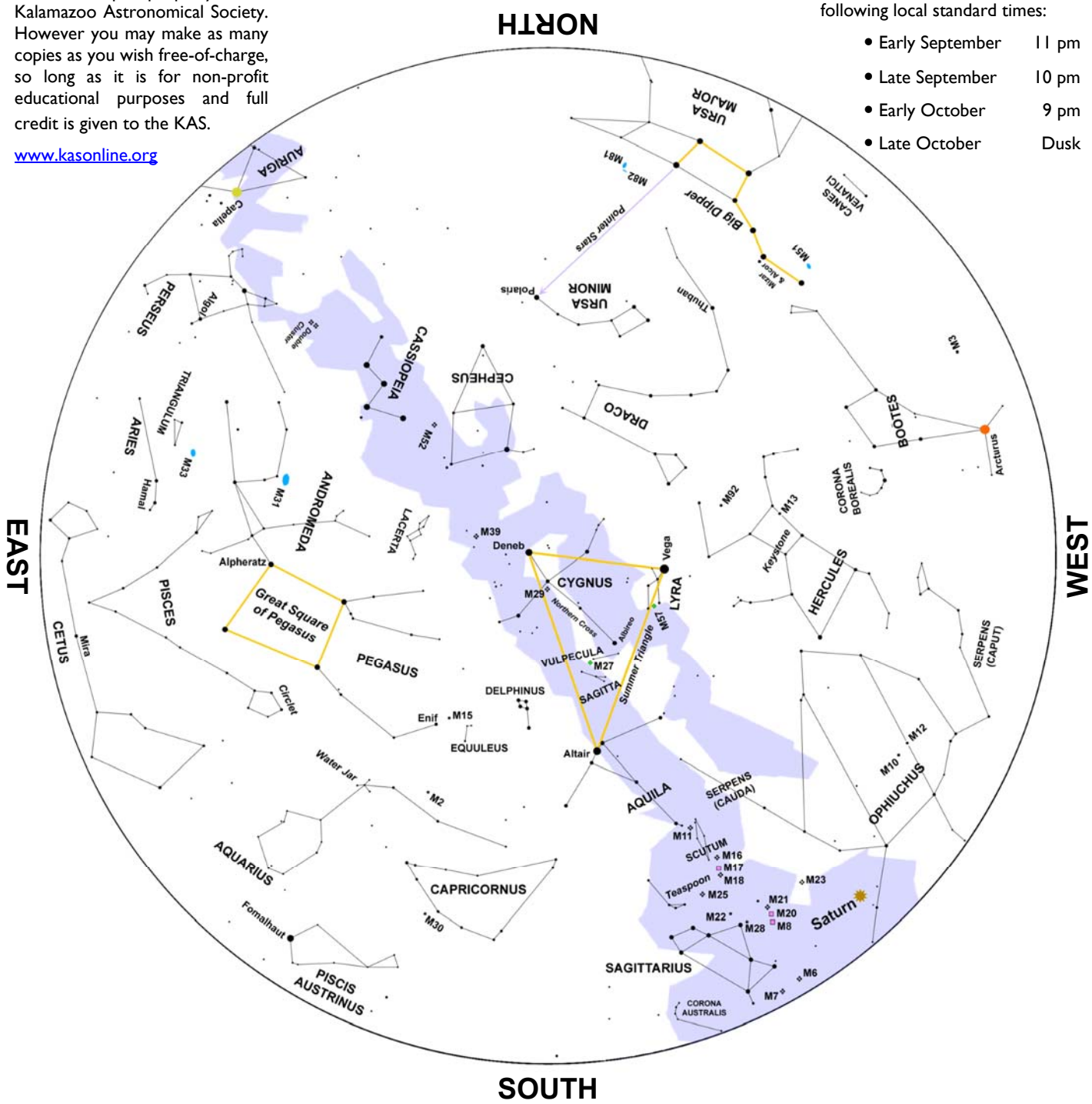
October Night Sky.....

This star map is property of the Kalamazoo Astronomical Society. However you may make as many copies as you wish free-of-charge, so long as it is for non-profit educational purposes and full credit is given to the KAS.

www.kasonline.org

This map represents the sky at the following local standard times:

- Early September 11 pm
- Late September 10 pm
- Early October 9 pm
- Late October Dusk



Venus and Mars are a mere 14′ (less than ¼°) apart as dawn approaches on October 5th. As an added bonus, the star Sigma Leonis is only 20′ (⅓°) to Venus' left. Look low in the eastern sky starting about an hour before sunrise. Binoculars will help spot Mars and Sigma Leonis.

The illuminated portion of a thin waning crescent Moon will occult the bright star Regulus at about 5:39 am EDT on October 15th. The star will dramatically reappear behind an unilluminated section of the Moon at about 6:29 am. The Moon will be 32° above the eastern horizon at the end of the occultation.

A razor-thin waning crescent Moon will hang about 6.5° above Venus at dawn on October 17th. Mars can be found, with the aide of binoculars, about 1.5° to the Moon's right. Best viewing begins about an hour before sunrise.

The Orionid meteor shower peaks during the early morning hours of October 21st. Expect around 20 meteors per hour.

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Share the Sky! Volunteers Needed For...

WMU Education Day
Saturday, September 30th @ 5:00 - 6:30 pm
Seelye Center (next to Bronco Stadium)

Crane Fest
Saturday, October 14th & Sunday, October 15th
12:00 - 7:00 pm (both days)
Kiwanis Youth Conservation Area

Spooky Science Saturday
Saturday, October 28th @ 11:00 am - 3:00 pm
Kingman Museum

Please contact us for more information and/or to volunteer. We need you!

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— skyshop.kasonline.org —

Public Observing Sessions

Saturday, October 14th
Features: The Galaxies of Autumn

Saturday, October 28th
Features: The Moon, Uranus & Neptune

Gates Open: 7:00 pm • Observing Begins: 7:30 pm

Kalamazoo Nature Center
— 7000 N. Westnedge Ave. —

General Meeting Preview

Great American Eclipse STORIES Part 2

On August 21, 2017, the Moon's shadow traced out a 70-mile-wide, 2,500-mile-long path across our country between Oregon and South Carolina. Members of the Kalamazoo Astronomical Society stood in nearly every state across this path and – weather permitting – got to witness the grandest phenomenon in nature...a total solar eclipse. Members that successfully viewed this *Great American Eclipse* are encouraged to share their photos and videos at the October General Meeting. Join us and relive that historic day.

Friday, October 6 @ 7:00 pm

Kalamazoo Area Math & Science Center

600 West Vine, Suite 400 • Use Dutton St. Entrance

– ***Dutton Entrance Locked by 7:10 pm*** –

Kalamazoo Astronomical Society
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Kalamazoo, MI 49008

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