



Special Eclipse Edition

Volume 24, Number 9 September 2017

From The Editor

This is a special edition

of the Event Horizon, with lots of articles,

photos and stories of

of many HAA club

members. Thanks to

all who contributed!

Most regular content returns in the October

Bob Christmas, Editor

amateurastronomy.org

E.H.

Enjoy!

editor 'AT'

the eclipse experiences



#### Chair's Report by Bernie Venasse

Welcome back from the summer recess! I hope that everyone had a great summer.

It has been anything but quiet around the astronomy table this past season. We have had three Outreach sessions, Canada 150, the club BBQ, the Perseid event, Cherry Springs, a total eclipse of the sun expedition, a partial eclipse event at McQuesten park, and a Binbrook park opening. There have been newbies experiencing their first light experiences; old hands experiencing new viewing techniques. There are new astronomers to welcome to the club and seasoned veterans from other clubs to welcome into the fold.

#### June 24, 2017 Lakeland park Outreach event

This event was planned as a solar viewing event to be followed by a celestial viewing event.

The Solar viewing event commenced at 5:00 PM under partly cloudy skies and in a bit of a breeze. Robert, Chris & Denise, Gary, young Steven, Sarah (first-light), and I were in attendance, most without solar equipment. I set up my PST and loaned my Herschel wedge to Chris. (Continued on page 2)

#### Check out the H.A.A.'s new 2024 Eclipse Countdown Page:

http://www.amateurastronomy.org/2024-solar-eclipse-countdown/

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#### Chair's Report (continued)

After the sun set we switched to celestial viewing. Jupiter was the main target and was viewed by as many as 80 visitors.

#### July 29, 2017 McQuesten Park

This event was planned as a solar viewing event to be followed by a celestial viewing event.

The Solar viewing event commenced at 3:00 PM under partly cloudy skies and in a bit of a breeze. We had 5 scopes set up and although the solar event was poorly advertised we still had 25 visitors. There were no sunspots visible but there were a couple of nice prominences to be viewed. The first quarter moon was also visible, showing some nice features. Dee was encouraged to create her first astro-sketch. Well done, Dee.

After a short dinner break things started moving quickly. The beautiful weather and the advertising that we had regarding the National Star Party day drew scores of people to the event. Attendance exceeded 250. We had many councillors and members in attendance with scopes and a few members who were there without optics lending a hand or advice where needed. Thank you all! We had a few newer members getting their first light experience as well.

#### 2017 Club BBQ and Perseid event

The barbeque was attended by 45 members and guests. Lots of food including salads, sandwiches, fruit, baked goods and ambrosia! The BBQ was manned once again by Jim. Thanks for the effort, Jim!

(*Continued on <u>page 3</u>*)



#### H.A.A.'s Loaner Scope Program

We at the HAA are proud of our Loaner Scope Program.

If you don't have a telescope of your own and want to make use of one for a month or so, you can borrow one of our fine loaner scopes.

Please contact Jim Wamsley, at: 905-627-4323 or e-mail Jim at: secretary 'AT' amateurastronomy.org

and we'll gladly get one signed out for you.



#### HAA Helps Hamilton

To support our community, we collect non-perishable food items and cash for local food banks at our general meetings. Please bring a non-perishable food item to the meeting or a donation of cash and help us help others.



Our donations go to Hamilton Food Share, which delivers them to various food

banks around the Hamilton area. If you would like to help or have any questions about this initiative, please contact the H.A.A.

Masthead Photo: Total Solar Eclipse Collage, August 21, 2017, by Bruce Pawlett.

Taken with his Canon EOS 70D through his Canon EF 100-400 mm zoom lens from Princeton, Kentucky. See Bruce's eclipse article on page 10. See Bruce's Totality image in the Eclipse Gallery on page 16.

#### Chair's Report (continued)

The BBQ was held at Pavilion 3 -- no need to move from site to site. After the park closed we were joined by 400 visitors - the majority of whom came to view the meteor shower and were treated to a screening of Guardians of the Galaxy, Volume 2.

Most of the persons asked stated that they were there for the astronomy and that the movie was a loud, distracting annoyance that they could have done without.

Many members and guests set up their scopes or other optics and were happy to share the views of the sky with scores of interested individuals. A few members were enjoying their first 'dark-sky' viewing and were very excited. There were many 'oohs' and 'ahhs', 'wows' and 'awesomes' through the night. Several dozen Perseid and kappa Cygnid meteors thrilled the crowd including at least one bolide.

Although they fall from July 17 to August 24, the best viewing next year will be the night of Saturday August 11, 2018 during the night of the new moon, peaking after midnight.

#### August 21, 2017 Solar Eclipse, McQuesten Park -- Crowds Eclipse Expectations

Karen and I arrived early at the park to set up in peace but found 30 people waiting to receive the free solar glasses. All were informed that none would be distributed until noon. We proceeded to set up after setting up a caution tape to identify a working zone. The tape seemed to give a sense of order to the growing line.

We were joined by Ron Fields of the RASC who had asked to join us at the park. Soon it was Denise White and I at the table. Alfred Chassi, first in line, paid his membership, joined the club, and went right to work helping the visitors in line. By noon there were 150 persons in the line.

Brenda, Mike W, Dee, Barry, Robert and others arrived to assist. At 1:00 the line was over 300 long to obtain glasses (now limited to 1 per family or group) and to get a view through one or all of the scopes. I had my PST set up on its own tripod plus the Orion 110 with the Herschel Wedge attached and a solar continuum filter on a tracking mount. Ron had his PST as well as a C-8 with a mylar solar filter. Mike W had his scope set up with a solar funnel projection system, which allow several persons to view at the same time. Robert brought a very welcome cooler of bottled water.

Food and cash donations for the foodbanks were plentiful. 250 pounds of food was collected and delivered to the foodbank and \$300 was donated to Mission Services. That cash amount will supply 80 meals for the needy.

Brenda was good enough to take the welcome information/membership/donation table once she arrived. Dee, Robert, Denise and I worked the crowd. Our combined efforts led to the signing of 5 new members at the event. Welcome Alfred, Aleksandrija, Ron, Manuela, and Mary.

Pinhole cameras and projections became the topic of discussion and demonstration as the eclipse proceeded and the lineups continued. Newspaper and television press were in attendance and documented the event. Sadly, the parking enforcement was also in attendance and tagged dozens of cars for parking on the grass.

The lineup of persons waiting to get a scope view continued on until after 4:30... after all, there was a nice string of sunspots and a couple nice prominances to view.

We had expected 200 to 300 persons at this event. I stopped counting at 815 and they were still coming to the park. The Hamilton Mountain News estimates the crowd at between 900-1,000. We had visitors from Etobicoke, North York, Oshawa, Gravenhurst, North Bay, Sudbury and London. There were no reports of pushing, scalping, or unruly behavior. On the contrary, people were willing to share their glasses and pinhole devices with those who had none. Well done, Hamilton!!

## Letters From HAA Club Members

#### Re. July 29 McQuesten Park Outreach

Hi Bernie, thank you for your support!!! I appreciate ALL who helped us out on our first stargazing night. John sure was courteous and a great instructor, a man with a lot of patience. :) I enjoyed stargazing night. We were a little off but its all good, it is a steep learning curve. I did capture the moon, and it should have been me manning the station, because that's what I do. However, Nelson was new and wanted to experience the telescope, so I let him go at it. I am sure the next time we are out it will be different. I am going to work on my camera settings for the barlows. I believe my next time out will be great! Reach for the stars, because one of them belongs to you. :)

- Sylvie Gionet

#### Re. August 21 Solar Eclipse

I made 3 videos of the eclipse. I had my telescope set up at my trailer at Sauble Beach. I had it connected to my computer and to a big TV set. I put the computer and TV on my covered deck and invited neighbours to view the pictures I was taking on the TV. I also had seven pair of solar glasses so that everyone could view the eclipse for themselves. I took photos every 60 seconds for the duration of the eclipse and I made three videos.

1. Video of the entire eclipse showing the full surface of the sun

https://www.youtube.com/watch?v=0sGIUidU5Ds

2. Same sequence of images only cropped to highlight the sunspots...some completely black cropped images were not included.

https://www.youtube.com/watch?v=iQ6OeJRX0ow

3. Alternated between two photos, one taken at the beginning of the eclipse and the other taken at the end of the eclipse. My goal was to investigate whether the sunspot activity could actually be seen to move. Total time difference was 2.5 hours.

https://www.youtube.com/watch?v=vD6D65LEOZ4

Method:

-I did a quick align of my Celestron CGEM mount and then pointed it to the sun.

-I used my 8" Celestron EdgeHD scope at F7 with my Nikon D5300 DSLR.

-I used a full aperture solar filter.

-Tracking was not great because of the quick align method so I had to re-adjust the pointing several times. -Half way thru the eclipse I had to perform a Meridian Flip.

-Clouds rolled thru a few times.

-The majority of the photos were taken at ISO1600, 1/1000th exposures 2999 x 2000 resolution JPEGs -I wrote a Labview program which allowed me to manually recentre all 170 photos

-The photos were processed in Lightroom where I enhanced detail and added a sight yellow/orange hue. -Cropping was also done in Lightroom.

-Movies were produced using Windows Movie Maker and published to Youtube

– Peter Wolsley

## HAA Elections Notice October 13, 2017 Annual General Meeting



The October 13, 2017 Annual General Meeting marks the end of another fiscal year for the club and as such it is time to select our council for the upcoming year. Posted below are the positions that need to be filled.

- <u>Chair</u> shall preside at all meetings of the Hamilton Amateur Astronomers and the Council. He /She shall organize the general meetings and arrange for speakers. The Chair shall have signing authority for the Hamilton Amateur Astronomers.
- <u>Second Chair</u> shall assist the chair in his/her duties and assume the duties of the Chair in his/her absence.
- <u>Secretary</u> -shall conduct all official correspondence. The Secretary shall keep a true copy of the Constitution and Bylaws of the Hamilton Amateur Astronomers as well as a true record of all annual and council meetings of the organization. Records of any meetings at which a vote is held by the membership shall also be kept by the Secretary. Records must be open at all reasonable times to the inspection of any member. The Secretary shall have signing authority for the Hamilton Amateur Astronomers and shall be responsible for producing meeting agenda.
- <u>Treasurer</u> shall handle all financial affairs of the Hamilton Amateur Astronomers and the care and custody of its funds under the direction of the council. The Treasurer shall have signing authority for the organization and shall keep accurate books of account which must be available for inspection at all reasonable times by any member. The Treasurer shall submit a report including financial statements at the annual meeting.
- <u>Recorder</u> -shall take accurate records of all annual and council meetings of the Hamilton Amateur Astronomers as well as any meeting at which a vote is held by the membership.
- <u>Directors and Councillors</u> -the duties of such council members shall be such as the terms of engagement call for or the council requires of them.
- Education Director
- Event Horizon Editor
- Membership Director
- Observing Director
- Publicity Director
- Webmaster

Please nominate a candidate of your choice for any one or more positions. You may nominate yourself.

If YOU feel that you have something to contribute to the club, this is the time to stand and be counted!

If YOU want to be more involved with the activities of the club but don't want to be a council member, we are always looking for good people that want to help out in any way. We call these people Councillors-at-Large. Let us know if YOU are interested in a C-a-L position (not an elected position).

#### *Eligibility to vote:*

An Individual or Honorary member in good standing is entitled to ONE vote. A Family membership in good standing entitles TWO family members to ONE vote EACH.

#### Two Book Reviews by Doug Black



#### Carrie Nugent "Asteroid Hunters" TED books, Simon and Schuster, 2017, ISBN 978-1-5001-2008-4



Dr Carrie Nugent works with a team at Caltech/IPAC using the NEOWISE Infrared satellite to understand asteroid surfaces. The Infrared Processing and Analysis Center works with NASA, NSF, JPL and others on many projects. As she points out, when you observe in the infrared, you can more or less tell how big an asteroid is, because whether its colour is light or dark the Sun makes it glow pretty much the same in the infrared - a definite advantage of infrared observations.

Dr Nugent sends data to the Minor Planet Center, which sends the more exciting bits on to NASA's Planetary Defense Coordination Office, which in turn can alert the White House. Wow. Just like in the 1979 movie "Meteor" with Sean Connery!

**CARRIE NUGENT TED** There is a good 'history' chapter, clear summaries of how to keep an asteroid from destroying the Earth, how to guess how many asteroids are undiscovered, and an especially good description of just how people used to discover asteroids (think Kodak TMAX-400 film, a stereo microscope and lots of work). And lots of nice comparisons with everyday

objects; for example, the Chelyabinsk meteor was "the size of a convenience store". This is a short TED book, paired with what is a quite short TED talk - see TED.com. So what's missing from the book? Lots of things which could never ever fit into one talk - the asteroid families and their

the book? Lots of things which could never ever fit into one talk - the asteroid families and their compositions and possible origins, and the dynamics of their orbits, Kirkwood gaps, resonances, manifolds and other math. Bearing that in mind, Dr Nugent does a really well-written story. She hosts and moderates Spacepod (listentospacepod.com). And Asteroid 8801 Nugent is named after her.

## **Ian Stewart "Calculating the Cosmos - How Mathematics Unveils the Universe"**, 2016, Basic Books, ISBN 978-0-465-09610-7



Dr Ian Stewart is nothing if not ambitious: in about 300 pages he describes not only our understanding of the whole cosmos at all scales, but follows our growing picture of that cosmos from early civilizations right up to 2016. That ought to create a huge set of volumes, say a hundred pages per page of his book!

The main story he's telling is one I agree with completely. The very existence of most of astronomy depends heavily on some form of astrophysics, and that same astrophysics depends on mathematics. Of course, the math gradually developed over time, as we observed more and more things. And indeed some modern observations, such as those confirming General Relativity, would not have been made without some basically mathematical theory to test.

Lots of insights. Dr Stewart notices scientists' occasional tendency to assume too much that early models of an event are 'gospel' as they do more detailed analyses. One example: early 2D simulations of the formation of our Moon seemed to indicate a slowish collision by a Mars-sized object, and this was assumed for a long time. But

later work showed that the Moon should contain a lot of rock from the impactor, and Moon rock is a lot like our mantle! So it's taking a whole lot of effort to work out a better theory, as he describes in more detail.

This book contains hardly any math at all, although it's by a mathematician.

The writing is excellent, and there is a real depth to his knowledge. The only negatives are publishing issues, rather than being any reflection on Dr Stewart, but the small rudimentary graphics hold the book back a bit. And the colour photos are nice but 'standard'. Ideally author and publisher should work with a graphics person such as Edward Tufte who wrote "Envisioning Information", or ten other experts today, and get great graphics. Publishers and the actual book market today constrain all that for lots of science books.

"Calculating the Cosmos" - Most Inspiring Book About Astronomy This Year!



## Dundas Eclipse Report by Kevin Salwach

The much anticipated solar eclipse on August 21st turned out to be a spectacular event from the top of the escarpment in Dundas. Although totality was only visible from south of the border, 72% obscuration from Hamilton made this an event worth watching.

I was unable to make it down to the States with other members of the club to see totality, but I made sure that I booked the day off work months in advance for whatever I planned to do to observe the eclipse. Some of the club's members made their way to McQuesten Park across from Limeridge Mall for the HAA Public Event, but I decided I wanted to watch the eclipse at a more private locale. Dundas Peak at the end of the Dundas Valley is one of my favourite spots in Hamilton, and seeing as it was a non-holiday Monday with 35° heat I figured it would be a good spot to set up camp for a quiet view of the eclipse, with perhaps a few passersby coming over for a look. Boy was I wrong!

I packed up my small NexStar 114GT scope and mount into a backpack, and with my tripod, solar glasses, some books and lunch took the bus out to Dundas. From the bus stop, I made my way to the foot of the escarpment off of Brock Street and King, and from there hiked up the cliff through the woods to the top of the Peak. Usually a relatively easy climb without a pack, making my way up the thin trail past the railway tracks and up the sheer rock to the top of the escarpment with a telescope and tripod in tow proved to be a challenge, but I soon made it up to the top around 1:00, just as the eclipse was about to begin.

Setting up my scope for solar projection at the observation point, I waited for the eclipse to begin with only one other couple taking in the views from the edge of the escarpment. I caught first and second contact through projection, and began to observe the eclipse and make sketches with my solar glasses. Within 15 minutes however, lines of hikers began showing up at the Peak, some coming for the eclipse and some just hiking the trails from Webster's Falls. Between first contact and maximum eclipse, a duration of about 1h20m, over 100 people came to the observation point. I gladly gave them all views of the *(Continued on page 8)* 



#### Hamilton Eclipse Report (continued)

projection and handed out several pairs of glasses to pass around the crowd so everyone could take in views of the Sun. Although it was scorching hot, there wasn't a cloud in the sky to obstruct our views. Several people showed up with binoculars for projection, and one with a pinhole projector and a welder's mask. I continued giving our views and speaking to many interested hikers as maximum past and we came to last contact just before 4:00. All in all, about 200 different people showed up on top of the escarpment, and at least 120 of then took a look at my projection and through my glasses. I handed out brochures to anyone who was interested, and then packed up my gear and headed back to the bus stop sweaty and exhausted after the climb down at 5:00.

This was the third solar eclipse I have seen in my decade of stargazing, and all in all it was the best yet, definitely one for the books. It may not have been as peaceful and quiet as I had anticipated, but it was a great time nonetheless.



#### The Totally Awesome Total Eclipse by Jo Ann S. and Joanne Y.

What makes a total eclipse totally awesome? We experienced our first total eclipse and found that the journey, great people, and mixing music, science and fun was totally awesome!

Our journey began in Ancaster, Ontario where we began a 2-day drive to Hallsville, Missouri. The same sun that would be eclipsed appeared before us. We packed our very special, valuable solar glasses, along



with lots of snacks, our road atlas, and our phones with our music playlists.

The journey itself was lots of fun, as along the way we listened to our playlists, imagining the music that would be great for the eclipse. Choices included "Fly Me to the Moon", "Catch a Falling Star", and the theme song from "2001: A Space Odyssey". We talked about Baily's Beads and the Diamond Ring that we would see. We were eager to experience the environment during the eclipse as well.

Upon arrival in Hallsville, Missouri, we were greeted by friendly HAA Club members who had arrived before us. They, too, were eager to experience the power of a total eclipse and had all their equipment already set up. We pitched our tent and quickly dealt with our hosts, the ants and spiders

whose homes we invaded! The cicadas were loud as our evening drifted from daylight to dusk. The sunset proved to be beautiful and one photo of it was not enough!

Monday, August 21, 2017 finally arrived and our gracious B&B hosts Barbara and Ray, ensured that we were fed breakfast and lunch before the eclipse began. We eagerly watched for the shadow to come across the valley as the eclipse approached. At approximately 11:45 am Central Time, the moon began its journey across the sun. Daylight began to dim gradually. The cicadas were suddenly heard. So were the roosters! They were crowing, thinking that it was dusk! We saw bats flying as well. During totality at 1:13 pm Central time, sunset and sunrise could be seen at the same time! Daylight turned to nighttime darkness as a cooling breeze was felt by all. For over 2 minutes we experienced this cosmic event, accompanied by the music from the theme of "2001: A Space Odyssey"! We were in solidarity as we stood under the eclipsed sun and were in awe of our solar system's cosmic power that we were experiencing.

In the end, 33 hours on the road was well worth every minute as it meant we could experience the cosmic event of 2017 with great people, great music and great fun! Thanks to HAA for organizing this experience for us!



### Experiencing Totality by Bruce Pawlett

Editor's Note: See Bruce's masthead collage on page 1, and his image of totality on page 16.

Experiencing a total solar eclipse is definitely one of those life experiences that should be on everyone's bucket list. Many thanks are in order to Matthew Mannering and Steve Germann for pitching the trip during our HAA meetings. In January, I approached my wife (Janet) about the trip. MISSOURI in August, are you CRAZY? Do you know how hot and humid it gets in Missouri in the summer? She is not as heat tolerant as I am but she is very supportive so eventually she warmed up to the idea and helped to plan the trip.

Lucky for me Janet is very skilled at that. We decided to take our time and spend a full day at the Canyon Inn that is located right in the McCormick State Park near Spencer, Indiana (about 2/3rds of the way to Hallsville, MO). The reasonably priced inn was built in 1915 and had much character. The park had many hiking trails, waterfalls and a nature center. It was very relaxing and enjoyable, a great place to stop.

Our plan was to get an early start on Sunday morning on our trek to Hallsville. Obviously, I was constantly checking the weather forecast for Monday the 21st, Eclipse Day. Saturday evening - PANIC! Cloudy Monday morning and the rain/thundercloud icons for the afternoon! There was some clearing in between but it didn't look good. I really wanted to share the eclipse experience with the other members of the HAA, but ultimately decided the iffy forecast was not worth taking a chance for a bucket list experience.

I loaded the NASA interactive eclipse map on my I-Pad and checked out other locations and weather forecasts. Nashville looked great but a 12-hour drive, finally I discovered that Princeton KY was about 3 hours due south, had a reasonable forecast and it was closer than the 5-hour drive to MO. We cancelled our reservations in MO, reserved our room in the Canyon Inn for another 2 nights and notified everyone that our plans had changed.

We left for Kentucky at 5:40 am Monday morning and were among the first to arrive at Ratliff Park (9:00 am). The parking lot began to fill up and about 5 or 6 charter buses arrived. The park was large and easily accommodated everyone, lots of room. Everyone was very friendly; there were a few telescopes and many cameras on tripods. Janet's January weather prediction as smack on. Do you know how hot it gets in Missouri; well it is even hotter in Kentucky as in 40 degrees C. It was KFP, Kentucky Fried People. There were a few wispy clouds around the horizon but it was very clear in around the sun. Yeah!

I programmed my Solar Eclipse Timer app by picking up our exact GPS location. The app would now very accurately indicate the contact times of the eclipse and provide verbal queues to warn of eclipse stages to help me time when to make setting changes on my camera. I practiced my sequence many times (and messed it up lots of times during those sessions). I used exposure bracketing to automatically take 7 different exposures for each set. At specific times, I had to adjust the bracketed amount and/or the shutter speed. Once totality hit I had it timed so that I would spend 1 minute on photography and the remainder 1 minute and 39 seconds on enjoying the view.

Eclipse Timer app: "One minute to first contact". I was ready to capture the sequence from the start. "Ten seconds". A gentleman walked past and asked, when is it supposed to start. I replied 7, 6, 5 ..... as in now. Eclipse Timer app: "First Contact". Click, click, click.... I looked up and just the plain fat old sun was in the sky. Hmmm! Then suddenly I saw the top right corner starting to be obscured. The app was bang on, it just took a few seconds for the sun to be obscured enough for it to be visual.

The next hour and a bit was fairly relaxed and as the sun became more obscured, the moon's shadow became commensurately darker. The accompanying temperature drop was a welcome relief from the blistering Kentucky heat. As the total eclipse neared, the shadow dramatically darkened and began to overwhelm the environment, it significantly cooled and a breeze picked up. Eclipse Timer app: "60 seconds to second contact".

(Continued on <u>page 11</u>)

#### Experiencing Totality (continued)

I removed the filter from my camera and readied it for the next series of photos (Diamond Ring, Baily's Beads). Eclipse Timer App: "30 seconds to second contact, watch for shadow bands"..... "10 seconds to second contact"...... "Glasses Off, Glasses Off". The total eclipse had started. I finished my series of transition photos and looked up. Shivers travelled my down my spine as I gazed at the wonderment in the sky. If I wasn't so dehydrated from the Kentucky heat I probably would have peed myself.

I saw a few faint stars and Venus was very prominent to the right. I needed to start my next series of photos but I was no longer in control... this thing in the sky owned me, my eyes were riveted to the spectacle. After so much practice I wasn't sure if I would bother with the remaining photos. Finally, I regained control and diverted my attention back to my camera, but fine motor movement was not possible. I was shaking so much, I struggled to adjust the exposure bracketing.

Success finally, now I just had to worry about shutter speed adjustments. Eclipse Timer app: "10 seconds to maximum totality". I finished my photo sequence for the totality just after the maximum totality so I didn't lose as much time as I thought. (When I first saw the eclipse, it was an episodic event that distorted my perception of time and my personal reality occurred in high def. slow motion). No time to waste, I grabbed my binoculars and the view was indescribably awesome. The chromosphere was visual around much of the circumference of the moon with prominences here and there. The white strands of the Sun's corona swirled out their delicate magnetic patterns in their successful ploy to hypnotize anyone that happened to glance at them.

"Ten seconds to third contact. Glasses on, glasses on!" Not already, I need more time to gaze at this wonderment. As I put my glasses on I glimpsed the diamond ring without eye protection. It was stunning. I didn't worry about photographing the Baily's Beads and Diamond Ring at third contact because I wanted the precious time to enjoy the view. Many packed up and left the park after third contact but we stayed so I could photograph the final partial eclipse sequence. The blistering heat returned.

Although it took us only  $3\frac{1}{2}$  hours to drive to Princeton KY, due to "eclipse traffic" it took over 6 hours to drive back. But it was worth every second. My advice to everyone, add viewing a total solar eclipse to your bucket list and when the opportunity arises do whatever it takes to make it happen.

(Continued on page 12)

Some photos of the ground activities.....



Eclipse Watchers and sharing the view through my telescope. I had a Kendrick solar filter on the front made with Baader Mylar. I also had a narrow band H-alpha filter on that allows one to observe the detail of the sun's activity. The red image of the sun contrasted against the black moon was very nice. I didn't use the telescope during the total eclipse – not enough time.

#### Experiencing Totality (continued)



This is the pin location of where we were in the park. As per the eclipse timer application: 37.09996 degrees latitude and -87.88278 degrees longitude. 1st contact time: 11:55:33, 2nd contact: 13:23:35, 3rd contact: 13:26.14, 4th Contact: 14:40:41 and total eclipse duration 2 minutes 39 seconds.



Concentrating on Preparation

I purposely wore a grey shirt and had the black backdrop to help me see the camera's LCD flip screen so I could reframe the image into the center (reduced reflections). The laminated sheet on my leg is my very large font cheat sheet with my sequence. I knew exactly what to do without it but having it in front of me helped me keep focused. Practice under different conditions helped tremendously. In one of my inside practice sessions in dim light I noticed I couldn't easily see the shutter speed on the display. I used a small flashlight on a retractable badge holder. The same conditions arose during the total eclipse and I was prepared.

Camera: Canon EOS 70D Lens: Canon EF 100-400 mm 1:4.5-5.6 L IS II USM Aperture set at 8.0, ISO 100 various shutter speeds Tripod: Manfrotto Fotopro with a Manfrotto bridged fluid pan head – weighted for increased stability.

## NASA's Space Place

National Aeronautics and Space Administration



## NASASpacePlace

#### The Shape of the Solar System

By Marcus Woo

This article is provided by NASA Space Place.

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With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit <u>spaceplace.nasa.gov</u> to explore space and Earth science!



When Stamatios (Tom) Krimigis was selected for the Voyager mission in 1971, he became the team's youngest principal investigator of an instrument, responsible for the Low Energy Charged Particles (LECP) instrument. It would measure the ions coursing around and between the planets, as well as those beyond. Little did he know, though, that more than 40 years later, both Voyager 1 and 2 still would be speeding through space, continuing to literally reshape our view of the solar system.

The solar system is enclosed in a vast bubble, carved out by the solar wind blowing against the gas of the interstellar medium. For more than half a century, scientists thought that as the sun moved through the galaxy, the interstellar medium would push back on the heliosphere, elongating the bubble and giving it a pointy, comet-like tail similar to the magnetospheres bubbles formed by magnetic fields—surrounding Earth and most of the other planets

"We in the heliophysics community have lived with this picture for 55 years," said Krimigis, of The Johns Hopkins University Applied Physics Laboratory in Laurel, Maryland. "And we did that because we didn't have any data. It was all theory."

But now, he and his colleagues have the data. New measurements from Voyager and the Cassini spacecraft suggest that the bubble isn't pointy after all. It's spherical.

Their analysis relies on measuring high-speed particles from the heliosphere boundary. There, the heated ions from the solar wind can strike neutral atoms coming from the interstellar medium and snatch away an electron. Those ions become neutral atoms, and ricochet back toward the sun and the planets, uninhibited by the interplanetary magnetic field.

(Continued on page 14)

## NASA's Space Place (continued)

Voyager is now at the edge of the heliosphere, where its LECP instrument can detect those solar-wind ions. The researchers found that the number of measured ions rise and fall with increased and decreased solar activity, matching the 11-year solar cycle, showing that the particles are indeed originating from the sun.

Meanwhile, Cassini, which launched 20 years after Voyager in 1997, has been measuring those neutral atoms bouncing back, using another instrument led by Krimigis, the Magnetosphere Imaging Instrument (MIMI). Between 2003 and 2014, the number of measured atoms soared and dropped in the same way as the ions, revealing that the latter begat the former. The neutral atoms must therefore come from the edge of the heliosphere.

If the heliosphere were comet-shaped, atoms from the tail would take longer to arrive at MIMI than those from the head. But the measurements from MIMI, which can detect incoming atoms from all directions, were the same everywhere. This suggests the distance to the heliosphere is the same every which way. The heliosphere, then, must be round, upending most scientists' prior assumptions.

It's a discovery more than four decades in the making. As Cassini ends its mission this year, the Voyager spacecraft will continue blazing through interstellar space, their remarkable longevity having been essential for revealing the heliosphere's shape.

"Without them," Krimigis says, "we wouldn't be able to do any of this."

To teach kids about the Voyager mission, visit the NASA Space Place: <u>https://spaceplace.nasa.gov/voyager-to-planets</u>



Caption: New data from NASA's Cassini and Voyager show that the heliosphere — the bubble of the sun's magnetic influence that surrounds the solar system — may be much more compact and rounded than previously thought. The image on the left shows a compact model of the heliosphere, supported by this latest data, while the image on the right shows an alternate model with an extended tail. The main difference is the new model's lack of a trailing, comet-like tail on one side of the heliosphere. This tail is shown in the old model in light blue. **Image credits: Dialynas, et al. (left); NASA (right)** 

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### Public Outreach Gallery Lakeland, McQuesten, Eclipse





Above: Public Outreach at McQuesten Park

Credit: Karen O'byrne

Left: Bernie Venasse at his Coronado Solar Scope During Eclipse at McQuesten Park

Credit: Mark Newman

![](_page_15_Picture_0.jpeg)

![](_page_15_Picture_1.jpeg)

![](_page_15_Picture_2.jpeg)

Partial Eclipse, by Bernie Venasse Location: Hamilton, Ontario Partial Eclipse, by Tom Steckner Location: Hamilton, Ontario

## Eclipse Gallery August 21, 2017

![](_page_16_Picture_1.jpeg)

![](_page_16_Picture_2.jpeg)

Above: **Partial Eclipse**, by **Sylvie Gionet** Location: Hamilton, Ontario

Left: **Projection of Partial Eclipse**, by **Kevin Salwach** Location: Dundas, Ontario

![](_page_16_Picture_5.jpeg)

![](_page_16_Picture_6.jpeg)

Less Than 4 Minutes After Totality, by Bob Christmas Location: Hallsville, Missouri

The Diamond Ring Effect, by Doug Turner Location: Grand Island, Nebraska

## Eclipse Gallery August 21, 2017

![](_page_17_Picture_1.jpeg)

Left: Partial Eclipse with Sunspots, by Bernie Venasse

Location: Hamilton, Ontario

#### Below: Eclipse Totality, by **Doug Turner**

Location: Grand Island, Nebraska

![](_page_17_Picture_6.jpeg)

![](_page_18_Picture_0.jpeg)

# William J. McCallion Planetarium

McMASTER UNIVERSITY, HAMILTON, ONTARIO

- Public shows every Wednesday (7:00pm)
- Public transit available directly to McMaster campus
- Tickets \$7 per person; private group bookings \$150
- Different shows every week
- Upcoming shows include:
  - Sept 6: Introductory Astronomy for Kids
    Solar System
  - Sept 13: Reflection in the Planetarium
  - Sept 20: Matters of Size
  - Sept 27: Life in the Universe
- For more details, visit <u>www.physics.mcmaster.ca/planetarium</u>

## **UPCOMING EVENTS**

September 8, 2017 - 7:30 pm - HAA Meeting at the Hamilton Spectator Auditorium. Our speaker will be HAA Chair Bernie Venasse, who will talk about what HAA membership brings for new members as well as for longtime members. Bernie has been an active astronomer since the days of Mercury, Gemini and Apollo. He is an active member of the British Astronomical Association, The International Dark Sky Association, the Astronomical League and Astronomers without Borders.

September 30, 2017 - 8:00 pm - 11:00 pm – *Public Stargazing Night* at Bayfront Park, Hamilton, ON.

**October 13, 2017** - 7:30 pm – Annual General Meeting at the Hamilton Spectator Auditorium.

2016-2017 Council		Check out the H.A.A. Website
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Second Chair	Mike Jefferson	<u>Contact Us</u> Hamilton Amateur Astronomers PO Box 65578 Dundas, ON L9H 6Y6
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