



# THE BLUE MOON OBSERVER

NOVEMBER 2018 VOLUME 20, NUMBER 11



## Door Peninsula Astronomical Society

PO Box 331  
Sturgeon Bay, WI  
54235

[www.doorastronomy.org](http://www.doorastronomy.org)

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The November general meeting of DPAS will be held at the Ray and Ruthie Stonecipher Astronomy Center at 7 PM on Tuesday, November 6. The main program will be “Colonizing Mars” by Cody Schwartz who interned at SpaceX last summer and is visiting this month. Learning the Night Sky will be by Tom Gwilym.

### Notes from: DPAS General Meeting October 2, 2018 @ 7 pm:

#### Attendance including board members: 23.

Welcomes and announcements by our President Gary Henkelmann; welcome new members. He mentioned our recent outreach and Tom M. gave a quick report of the astronomy presentation he and Steve Ransom-Jones gave to a group of 7 teens + 2 adult leaders with the Civil Air Patrol at Potawatomi State Park. No viewing because it was cloudy. Astronomy Day is set for Saturday, October 20 and the theme is "Waves", electromagnetic and gravitational. There will be hands-on activities for children and adults and a Micro Dome planetarium demonstration by NJ-based Aram Friedman in the afternoon. At 7:00 pm in the Collins Learning Center, St. Norbert College Associate Professor Dr. Michael Olson will discuss the technology that has most recently demonstrated our ability to measure and “hear” the reverberations of collisions between both black holes and neutron stars.

The new HD TV and sound bar recently installed in the Astronomy Center were self-evident and an amazing addition to our technology suite. Thanks Dave Lenius and helpers!

This month's presentation was the

Electromagnetic Spectrum by Coggin Heeringa. In addition to a terrific overview of the spectrum from radio waves through gamma radiation, she gave special attention to demonstrating hands-on techniques designed to teach children and newcomers alike. Some of her techniques:

- Use toilet paper to measure the length of AM and FM radio waves.
- Images of heat by infrared cameras and thermometers beyond visible light from a prism.
- Ultraviolet images of flowers show how bees see them. Bees don't see reds well.
- X-rays are used for many things: medical imaging, airport security, chemical defraction techniques, etc.
- Use of slinkys (yes, those curly wire thingamajigs) to demonstrate that higher-frequency waves need more energy to be generated and carry that greater energy.

One of Coggin's more interesting anecdotes: She met the NASA employee who picks the colors used in non-visible-light imaging - the pictures we see of planets & moons, galaxies and nebula taken by ground and space-based instruments in infrared, etc. An Art Major!

Snacks and refreshments were provided by Barb Henkelmann, which included spiced Bundt Cake - thanks!

For our monthly Learning the Night *continued on page 3*



## Who We Are

DPAS is a local club and chapter of the Astronomical League. We are also a club member of the International Dark-Sky Association and the Night Sky Network, teaching arm of the Astronomical Society of the Pacific. We meet on the first Tuesday of every month, with rare exception. Meetings are held at the Ray & Ruthie Stonecipher Astronomy Center unless otherwise announced. We operate and maintain the Leif Everson Observatory which houses a 16" Ritchey-Cretien telescope on a sophisticated tracking mount controlled by computer, and a new Maksutov-Cassegrain telescope for planetary viewing. A weather station is housed in the observatory. Current weather readings are shown on our web site:

[www.doorastronomy.org](http://www.doorastronomy.org)

The StarGarden near the observatory is used for viewing the sky with unaided vision, binoculars and members' telescopes. There are also binocular mounts set in concrete which allow viewers of different heights to view the same object through the same binocular.

The Ray & Ruthie Stonecipher Astronomy Center provides for storage, projects, meetings, warm-up and toilet facilities. It also housed a StarLab, an inflatable planetarium with a sophisticated projection system. The planetarium was used for group presentations. See announcements page 6.

An Analemmatic Sundial was dedicated on October 20, 2012.

The "astronomy campus" as described here is reached by taking Utah Street east to the stop sign and turning left through the gate onto Stargazer Way. Or you can set your GPS to 2200 Utah.

## DOOR PENINSULA ASTRONOMICAL SOCIETY TO UNVEIL NEW TELESCOPES AT ASTRONOMY DAY

### Larger, High Tech Design

After 20 years of operation, the Leif Everson Observatory (L.E.O.) has some new eyes on the night sky. In a move to reach a new and evolving group of enthusiasts, the Door Peninsula Astronomical Society has invested in a larger primary instrument optimized for observing in this digital era. With 30% more light-gathering power, a wider field of view, and a mirror design that produces sharper images without off-axis optical errors, this "beast", as Observing chair Dave Lenius calls it, promises better video and still imaging of the more elusive deep sky objects.

Replacing the L.E.O.'s original 14" Schmidt-Cassegrain reflector with its corrector plate/parabolic primary mirror design, the 16" diameter Ritchey-Chretien (RC) reflector borrows its hyperbolic mirror technology from the Hubble Space telescope and virtually every other high performance professional observatory telescope installed since the 1948 Hale's 200" parabolic mirror design. When Taiwanese instrument manufacturer GSO (Guan Sheng Optical) turned its attention to building a quality, large aperture RC telescope, it opened up the availability of a professional-style, dream telescope to smaller observatories and amateur astronomers. Using funds earmarked for such improvements, the Astronomical Society took this opportunity to keep the observatory equipped with the current state of the art technology.

The new primary scope is a "truss-tube" design which saves the weight of a continuous housing and by using carbon fiber struts, saves additional weight and provides extreme rigidity with low thermal expansion for image stability. Even with all its weight-conscious design, this new "beast" tips the scales 75% heavier than its predecessor. Three healthy and determined astronomer-installers broke a sweat wrestling the unit into what is now a more confining dome. The portable wheeled ladder that previously could be easily positioned for access to the eyepiece will now need to be replaced or rebuilt to remain clear of the motions this longer and wider tool needs to access the Universe.

In addition to the RC scope, a 7.1" Maksutov-Cassegrain companion

scope was installed for planetary and Lunar viewing to provide sharp, high contrast images, free of chromatic or off-axis aberration. The classic long focal length of f/15 produces inky dark background skies so that celestial targets stand out beautifully. Attached "piggy-back" on the Observatory's sturdy Paramount ME computerized mount, both instruments can simultaneously photograph or stream viewing targets, and allow visual observing.

The first public introduction to the new equipment will occur during the Society's 2018 "Waves" Astronomy Day on October 20, 2018 at the Observatory/Astronomy Center on the grounds of the Crossroads at Big Creek, using the entrance at 2200 Utah Street. Also registered as a NASA International Observe the Moon Night event, and as part of the Wisconsin Science Festival, Astronomy Day programs begin at 1:00 PM at the Astronomy Center with unique "Micro dome" planetarium shows until 3:00PM. These shows will be presented by Aram Friedman of Ansible Technologies, who developed this format specifically to bring the Universe into the classroom, and it is something to see! Join us on a tour of the observable universe, from our solar system to the furthest quasar. See the Exo-planets, other solar systems in our back yard, as we hunt for another Earth. View the invisible universe at wavelengths our eyes can't see. See evidence of the big bang. Explore our own Sun.

Continuing on at the Astronomy Center/Observatory from 2:00-4:15PM, tours of the Observatory and the Astronomy Day activities will occur. Family-oriented and hands-on exhibits of wave-related themes in astronomy, a telescope "petting zoo", and other informational resources will be displayed. A 4:30 PM Rocket Launch will signal the transition to NASA's International Observe the Moon Night, where, as the Moon rises we will focus telescopes and binoculars on it, the Sun, and the Planets visible as the sky darkens. The new observatory equipment will point to the Moon with images being streamed into the Astronomy Center's large screen TV where they can be viewed and discussed. A "First Light" ceremony honoring the commissioning of telescopes will be held at 6:00 PM.

Then, at 7:00 PM at the Crossroads' Collins Learning Center, 2041  
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## DPAS BOARD

Gary Henkelmann, President  
president@doorastronomy.org

David Lenius, Vice President

Thomas Minahan, Outreach  
Coordinator

Susan Basten, Secretary,  
Membership Chairperson, and  
ALCOR.  
treasurer@doorastronomy.org

Jacque Axland, Membership  
Chairperson and Recording  
Secretary of the Board

John J. Beck, Past President  
and Editor  
editor@doorastronomy.org

John W. Beck, Past President  
and Webmaster

Dennis Sundin, Member at  
Large

Ray Stonecipher, in spirit

Barbara Henkelmann serves as  
the DPAS Archivist.

The business of the DPAS is largely conducted at the Board meetings to leave the general meetings open for programs. The Board meetings are held at the Astronomy Center at 7 PM on Monday, 8 days prior to the following general meeting. Members of DPAS are invited to attend Board meetings.

### *Meeting notes from page 1.*

Sky segment, John Beck gave us a tour of the Milky Way via the simulation software Starry Night v7. As he demonstrated, Starry Night is intuitive to use and is packed with many features including the ability to click on any object from its large database and pop up information about the object. The tour tonight included the following deep-sky targets, almost all of which are easy to bag with good binoculars or a decent telescope: the Omega or Swan nebula in Sagittarius, M44 globular cluster, the Eagle nebula in Serpens, Sagittarius A\* the center of our galaxy, the Lagoon and Trifid nebulae, the North American nebula in Cygnus, the Andromeda galaxy pointed to by Cassiopeia, the double cluster in Perseus, the open clusters M37 and M38 in Auriga, and Albireo, the yellow & blue double star which is the "head" of Cygnus the Swan.

Thomas Minahan

### **NASA Retires Kepler**

After nine years in deep space collecting data that indicate our sky to be filled with billions of hidden planets – more planets even than stars – NASA's Kepler space telescope has run out of fuel needed for further science operations. NASA has decided to retire the spacecraft within its current, safe orbit, away from Earth. Kepler leaves a legacy of more than 2,600 planet discoveries from outside our solar system, many of which could be promising places for life.

"As NASA's first planet-hunting mission, Kepler has wildly exceeded all our expectations and paved the way for our exploration and search for life in the solar system and beyond," said Thomas Zurbuchen, associate administrator of NASA's Science Mission Directorate in Washington. "Not only did it show us how many planets could be out there, it sparked an entirely new and robust field of research that has taken the science community by storm. Its discoveries have shed a new light on our place in the universe, and illuminated the tantalizing mysteries

and possibilities among the stars."

Kepler has opened our eyes to the diversity of planets that exist in our galaxy. The most recent analysis of Kepler's discoveries concludes that 20 to 50 percent of the stars visible in the night sky are likely to have small, possibly rocky, planets similar in size to Earth, and located within the habitable zone of their parent stars. That means they're located at distances from their parent stars where liquid water – a vital ingredient to life as we know it – might pool on the planet surface.

The most common size of planet Kepler found doesn't exist in our solar system – a world between the size of Earth and Neptune – and we have much to learn about these planets. Kepler also found nature often produces jam-packed planetary systems, in some cases with so many planets orbiting close to their parent stars that our own inner solar system looks sparse by comparison.

"When we started conceiving this mission 35 years ago we didn't know of a single planet outside our solar system," said the Kepler mission's founding principal investigator, William Borucki, now retired from NASA's Ames Research Center in California's Silicon Valley. "Now that we know planets are everywhere, Kepler has set us on a new course that's full of promise for future generations to explore our galaxy."

Launched on March 6, 2009, the Kepler space telescope combined cutting-edge techniques in measuring stellar brightness with the largest digital camera outfitted for outer space observations at that time. Originally positioned to stare continuously at 150,000 stars in one star-studded patch of the sky in the constellation Cygnus, Kepler took the first survey of planets in our galaxy and became the agency's first mission to detect Earth-size planets in the habitable zones of their stars.

"The Kepler mission was based on a  
*Continued on page 4*

## Astronomy Quiz

1. Of these 4, which is closest to the sun?

- Orbit of Jupiter
- Orbit of Saturn
- Asteroid Belt
- Kuiper Belt

2. When we view the rings of Saturn edge-on, it's difficult to see them at all. How thick are the rings?

3. Regarding the Drake Equation, which of the elements is most critical in predicting the number

### DRAKE EQUATION

$$N = R \times f_s \times f_p \times n_c \times f_l \times f_i \times f_c \times L$$

- R average rate of star formation
- $f_s$  fraction of good stars that have planetary systems
- $n_c$  number of planets around these stars within an "ecoshell"
- $f_l$  fraction of those planets where life develops
- $f_i$  fraction of living species that develop intelligence
- $f_c$  fraction of intelligent species with communications technology
- L lifetime of the "communicative phase"

(N) of planets in the galaxy that harbor civilizations that are capable of communicating with civilizations on other planets?

4. Saturn will spend November in what constellation?

5. The positions where the gravitational pull of two large masses such as the sun and earth precisely equals the centripetal force required for a small object to move with them are called what?

6. On October 13, 2018, NASA celebrated what birthday?

7. A femtometer is what part of a meter?



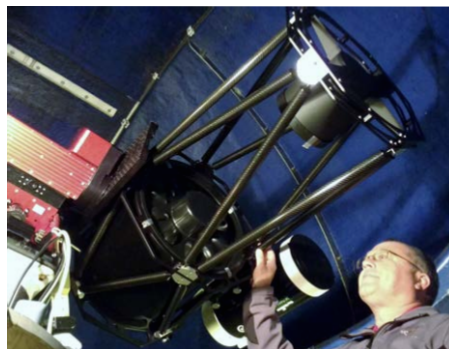
### New Telescope from page 2

Michigan St., A special Demonstration/Lecture by Dr. Michael Olson of St. Norbert College will address Einstein's "Spacetime": Detecting Gravitational Waves. After 20 years of searching without success for these waves, or ripples in Spacetime, that were predicted 100 years earlier by the Theory of General Relativity, a newly modified LIGO, for the first time ever, detected the "echo" of the collision of two "black holes". Dr. Olson will describe this feat, and demonstrate the technology, streaming live video from his tabletop detector, and playing audio of what the Gravity Waves might sound like, if we could hear them. All events are free and open to the public. For more information visit the DPAS website at

[www.doorastronomy.org](http://www.doorastronomy.org)  
or contact

[president@doorastronomy.org](mailto:president@doorastronomy.org).  
The Door Peninsula Astronomical Society holds monthly membership meetings at the Astronomy Center at 2200 Utah St, Sturgeon Bay, WI 54235 on the first Tuesday of each month (except January) beginning at 7:00 PM, where beginning and advanced astronomy programs are offered. Viewing nights are also scheduled monthly on Saturday nights, usually nearest the New Moon. Times and dates can vary. Both activities are open to the public

Gary Henkelmann



DPAS Observing Chair Dave Lenius inspects the new telescopes in the Leif Everson Observatory

The preceding article by Gary Henkelmann was published in the Peninsula Pulse on October 19, 2018, and is used by permission of the Peninsula Pulse and doorcountypulse.com.

### Kepler continued from page 3.

very innovative design. It was an extremely clever approach to doing this kind of science," said Leslie Livesay, director for astronomy and physics at NASA's Jet Propulsion Laboratory, who served as Kepler project manager during mission development. "There were definitely challenges, but Kepler had an extremely talented team of scientists and engineers who overcame them."

Four years into the mission, after the primary mission objectives had been met, mechanical failures temporarily halted observations. The mission team was able to devise a fix, switching the spacecraft's field of view roughly every three months. This enabled an extended mission for the spacecraft, dubbed K2, which lasted as long as the first mission and bumped Kepler's count of surveyed stars up to more than 500,000.

The observation of so many stars has allowed scientists to better understand stellar behaviors and properties, which is critical information in studying the planets that orbit them. New research into stars with Kepler data also is furthering other areas of astronomy, such as the history of our Milky Way galaxy and the beginning stages of exploding stars called supernovae that are used to study how fast the universe is expanding. The data from the extended mission were also made available to the public and science community immediately, allowing discoveries to be made at an incredible pace and setting a high bar for other missions. Scientists are expected to spend a decade or more in search of new discoveries in the treasure trove of data Kepler provided. "We know the spacecraft's retirement isn't the end of Kepler's discoveries," said Jessie Dotson, Kepler's project scientist at NASA's Ames Research Center in California's Silicon Valley.

For more information about the Kepler mission, visit:

<https://www.nasa.gov/kepler>

## Poetry Corner

### The Sol of Poetry

The Moon reflects the Sun.  
The Sun is life.  
The moon is life's  
Light reflected.  
Poetry reflects life,  
Brings life to light  
And light to life.  
Poetry captures the Sun  
So we can see,  
Burns with passion  
So we can feel,  
Radiates truth  
So we can know.  
Poetry is the man  
And the woman  
In the Moon.

Chris Brockman

*Chris Brockman is a published poet and kindly gave his permission to post this poem in our Blue Moon Observer. He posts his poetry on Facebook under his name and under Real Poetry for Real People. He has published four books including a poetry collection titled "I Used to be Old".*

## Astronomy Day October 20

Our Autumn Astronomy Day was planned with outdoor activities in mind. Unfortunately, low temperatures, clouds, and strong winds forced the programs to move inside and the rocket launch to be cancelled. Nevertheless, public attendees including children took part in a number of activities, most of which were related to the theme: Waves. Tom Minahan used a Slinky to demonstrate the relationship between wavelength and energy. Coggin Heeringa related colors to wavelength. Jim Goodwin gave demonstrations related to radio waves. Spectrometers were used to show the difference between the spectra of different light sources.

At the welcome desk, a small beginner telescope and a library loaner telescope were displayed. In the Telescope Petting Zoo, John Beck explained different types of telescope including a refractor, a Newtonian, a Schmidt-Cassegrain, and a Maksutov-Cassegrain. He also showed the difference between "one x" finders and optical finders. Alt/Az mounts on a tripod and Dobsonian style were compared to fork mounts used either in Alt/Az or equatorial configuration, and German equatorial mounts used manually or with a clock drive.

A highlight was the dedication of the new Ritchey-Cretien telescope which members

have installed into the Leif Everson Observatory. Prior to that a novel approach to planetarium-like projection using a convex screen was demonstrated in the Astronomy Center. The board will be discussing the pros and cons of purchasing such a system.



The evening program was introduced by Gary Hankelmann and featured Dr. Michael Olson of St. Norbert College speaking on the topic, "Einstein Space-time: Detecting Gravitational Waves". He began by explaining that he is not an astronomer but is a teacher, so that what he *continued on page 6*

## Astronomy Quiz Answers

1. The answer is c. The Asteroid Belt is between the orbits of Mars and Jupiter. The Kuiper Belt is beyond the orbit of Neptune.
2. The rings of Saturn are approximately 10 meters in vertical height, or roughly 30 feet.
3. The answer is "L". By plugging various numbers into each element of the equation, it turns out that the length of time that planet harbors a civilization capable of communicating trumps all of the other factors.
4. Saturn will spend November in Sagittarius.
5. Lagrange points.
6. On October 13, 2018, NASA celebrated its 60th birthday.
7. A femtometer or fermi is one quadrillionth of a meter or  $1 \times 10^{-15}$  meter.

## Viewing Nights 2018

November 10  
December 8

### New Members

Welcome:  
Jennifer Mackenzie

*Astronomy Day from page 5* presents is from his reading from sources which are equally available to us. His strength is in getting concepts across to his students and audience. He explained how gravity bends spacetime and how massive bursts of energy cause ripples in the curvature of spacetime which propagate outward.



Even though there were some breaks in the clouds at times, there was far too much wind for viewing of the sun, the moon, or deep sky objects. An exception was a glimpse of the sun from inside the "telescope petting zoo" but there were no sunspots.

John J Beck

### Announcements

The Star Garden has been renovated to allow drainage so that pressure will not build up and loosen the masonry.

The inflatable planetarium has been loaned to Geneva Lake Astrophysics and STEAM (GLAS) as of October 20 with a purchase option as DPAS explores alternative systems.

The new telescopes have been mounted in the Leif Everson Observatory and are being fine tuned.

The Board will be setting a tentative schedule of programs for 2019 and asks that members make suggestions regarding what types of programs they would like to have at our monthly meetings.