



**Greg Smith – editor**

**Volume 25, No.4  
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**Program: No local program**

**Meeting: August 23-25 2019  
Mt St Helens Star Party**

### **Technology #!?**

Technology is a blessing and a curse. It is a blessing when it works as it should and a curse when it does not.

I had an exasperating experience this past month with my fancy automated telescope. For some reason unknown to me my scope started looking for stars that can only be seen in winter. I checked the computer date and it displayed 13 Dec 1999! What the ... is going on. I tried to manually set the date, but no such luck. How in the world did my telescopes date get stuck back in the 20<sup>th</sup> century? What was going on? I rebooted the scope and the same thing happened. I was really frustrated. Did I now have a very expensive boat anchor?

I contacted the manufacturer about the problems I was having and was told "OH, yeah, the GPS satellites had changed the way they send out information and my telescope was affected. They did have a fix for it, just download the new update and that will take care of it. I tried the download, it failed, and the error message even told me so. I then reformatted the memory card and it still did not work. Again back to emailing the company. One respondent said that the chip had to be formatted in a different

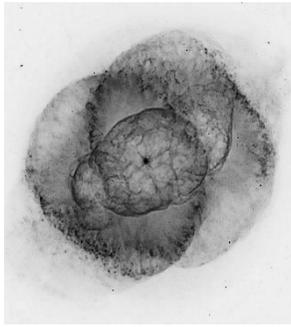
format. I did that and the same results. Emailed again and this time I got a more satisfactory response, we will send you a preloaded chip with the new software.

My question to them was, "With such a major change and software update, why was I, a registered owner of my telescope, did not receive an immediate notification of the problem and instructions on how to get the updated software.?" I still was using the original software that came with my scope, and the new software is obvious many updates later. I had used the application that came with my scope to check on updates, but no new updates were ever mentioned.

I did have one previous error and that was that the scope could not find north. The scope just spun around and around till I turned it off. The next time I used it, north was found. I still do not know what happened.

I have now updated my scope's software and now we will see if it can find north and the correct stars for August rather than December.

**Every Day is a Star Filled Day  
Every Night is a Starry Night**



How many  
Earths are  
nearby?



## How many Earth-like planets are around sun-like stars?

**A new study provides the most accurate estimate of the frequency that planets that are similar to Earth in size and in distance from their host star occur around stars similar to our Sun. Knowing the rate that these potentially habitable planets occur will be important for designing future astronomical missions to characterize nearby rocky planets around sun-like stars that could support life. A paper describing the model appears August 14, 2019 in *The Astronomical Journal*.**

Thousands of planets have been discovered by NASA's Kepler space telescope. Kepler, which was launched in 2009 and retired by NASA in 2018 when it exhausted its fuel supply, observed hundreds of thousands of stars and identified planets outside of our solar system -- exoplanets -- by documenting transit events. Transits events occur when a planet's orbit passes between its star and the telescope, blocking some of the star's light so that it appears to dim. By measuring the amount of dimming and the duration between transits and using information about the star's properties astronomers characterize the size of the planet and the distance between the planet and its host star.

"Kepler discovered planets with a wide variety of sizes, compositions and orbits," said Eric B. Ford, professor of astronomy and astrophysics at Penn State and one of the leaders of the research team. "We want to use those discoveries to improve our understanding of planet formation and to plan future missions to search for planets that might be habitable. However, simply counting exoplanets of a given size or orbital distance is misleading, since it's much harder to find small planets far from their star than to find large planets close to their star."

To overcome that hurdle, the researchers designed a new method to infer the occurrence rate of planets across a wide range of sizes and orbital distances. The new model simulates 'universes' of stars and planets and then 'observes' these simulated universes to determine how many of the planets would have been discovered by Kepler in each 'universe.'

"We used the final catalog of planets identified by Kepler and improved star properties from the European Space Agency's Gaia spacecraft to build our simulations," said Danley Hsu, a graduate student at Penn State and the first author of the paper. "By comparing the results to the planets cataloged by Kepler, we characterized the rate of planets per star and how that depends on planet size and orbital distance. Our novel approach allowed the team to account for several effects that have not been included in previous studies."

The results of this study are particularly relevant for planning future space missions to characterize potentially Earth-like planets. While the Kepler mission discovered thousands of small planets, most are so far away that it is difficult for astronomers to learn details about their composition and atmospheres.

"Scientists are particularly interested in searching for biomarkers -- molecules indicative of life -- in the atmospheres of roughly Earth-size planets that orbit in the 'habitable-zone' of Sun-like stars," said Ford. "The habitable zone is a range of orbital distances at which the planets could support liquid water on their surfaces. Searching for evidence of life on Earth-size planets in the habitable zone of sun-like stars will require a large new space mission."

How large that mission needs to be will depend on the abundance of Earth-size planets. NASA and the National Academies of Science are currently exploring mission concepts that differ substantially in size and their capabilities. If Earth-size planets are rare, then the nearest Earth-like planets are farther away and a large, ambitious mission will be required to search for evidence of life on potentially Earth-like planets. On the other hand, if Earth-size planets are common, then there will be Earth-size exoplanets orbiting stars that are close to the sun and a relatively small observatory may be able to study their atmospheres.

"While most of the stars that Kepler observed are typically thousands of light years away from the Sun, Kepler observed a large enough sample of stars that we can perform a rigorous statistical analysis to estimate of the rate of Earth-size planets in the habitable zone of nearby sun-like stars." said Hsu.

Based on their simulations, the researchers estimate that planets very close to Earth in size, from three-quarters to one-and-a-half times the size of earth, with orbital periods ranging from 237 to 500 days, occur around approximately one in four stars. Importantly, their model quantifies the uncertainty in that estimate. They recommend that future planet-finding missions plan for a true rate that ranges from as low about one planet for every 33 stars to as high as nearly one planet for every two stars.

"Knowing how often we should expect to find planets of a given size and orbital period is extremely helpful for optimize surveys for exoplanets and the design of upcoming space missions to maximize their chance of success," said Ford. "Penn State is a leader in bringing state-of-the-art statistical and computational methods to the analysis of astronomical observations to address these sorts of questions. Our Institute for CyberScience (ICS) and Center for Astrostatistics (CASt) provide infrastructure and support that makes these types of projects possible."

The Center for Exoplanets and Habitable Worlds at Penn State includes faculty and students who are involved in the full spectrum of extrasolar planet research. A Penn State team built the Habitable Zone Planet Finder, an instrument to search for low-mass planets around cool stars, which recently began science operations at the Hobby-Eberly Telescope, of which Penn State is a founding partner. A second Penn State-built spectrograph is in being tested before it begins a complementary survey to discover and measure the masses of low-mass planets around sun-like stars. This study makes predictions for what such planet surveys will find and will help provide context for interpreting their results.

In addition to Ford and Hsu, the research team includes Darin Ragozzine and Keir Ashby at Brigham Young University. The research was supported by NASA; the U.S. National Science

Foundation (NSF); and the Eberly College of Science, the Department of Astronomy and Astrophysics, the Center for Exoplanets and Habitable Worlds, and the Center for Astrostatistics at Penn State. Advanced computing resources and services were provided by the Penn State Institute for CyberScience, including the NSF funded CyberLAMP cluster.

### **Story Source:**

[Materials](#) provided by [Penn State](#). Original written by Sam Sholtis.

### **Minutes of the July Meeting**

Ted Gruber called the meeting to order. He thanked Bill Norvell for reserving the room at The Canterbury. Ted then introduced the guests.

Roy Gawlick talked about this year's Solstice Walk. The goals are to get more sponsors, more activities, more school involvement, and expand luminaries along the path. We need 3-4 people for "Mission Control" (organizers). Roy would like pre-authorization for up to \$250 for expenditures such as permits and porta-potties that come up between meetings. A motion was made and passed.

Ted gave the Sky Report. The evening sky hosts Jupiter, visible as darkness falls until it sets in the southwest just before 3:00 am, and Saturn, which is also visible as the sun sets until about 5:00 am. In the morning sky we have Mercury that rises in the east-northeast about an hour before sunrise. The Persied Meteor Shower is active from July 17 - August 24 with the peak on August 13th. The Messier of the Month is M29. It is a magnitude 6.6 to 7.1 open cluster in the constellation Cygnus. It contains about 50 stars and is estimated to be about 10 million years old. Through binoculars it appears as a tiny group of stars that look like a small box. Any size telescope resolves the clusters individual stars. It is best viewed at lower magnification.

After a quick break, Mark Thorson gave a presentation called University of Arizona Steward Observatory Mirror Lab. Mark and his wife Karen were able to tour the mirror lab where they had the opportunity to learn how innovative engineering and optical technology melds with manufacturing techniques to produce the largest and most advanced giant (8.4 meters / 27 ft) telescope mirrors in the world on the University of Arizona campus. They were also able to see the unparalleled technology and revolutionary processes involved in making the next generation of telescopes that will explore deep into outer space and produce cutting-edge scientific research. The University of Arizona, College of Science is ranked #1 among observational, theoretical, and space astronomy programs in the U.S.

Steve Powell gave the Treasurers Report. We are in the black.

Ted talked about the Summer Reading Program at the Longview and Kelso Libraries that the club participated in. He thanked those who helped.

The next star party is scheduled for July 26/27 at Mike Fiests's home. August 2/3 is the back up weekend in case July is washed out.

The August 21st meeting will be here here again.

Mark talked about the Mt. St. Helen's Institute Star Party. It is the 4th weekend in August. There will be 3 speakers. This is the 4th Annual Star Party. If we have clear skies it is great viewing.

Meeting adjourned

☞ **AUGUST 2019 Meeting** ☞

DATE: **Fri 23<sup>rd</sup> - Sun 25<sup>th</sup>**  
TIME  
PLACE: MT. ST HELENS SKY PARTY  
PROGRAM:  
SNACKS:  
DRINKS:

**2019 FoG Activities and Viewing Schedule**

**AUG MOON: FULL=15, NEW=30**

2>3 Club Star Party if 7/26+7/27 cancel (Mike's)

9>10 Sidewalk Astronomy (Starbuck's, 808 OB Hwy)

21 Club Meeting Canceled due to nearness of Mt. St. Helens Sky & Star Party

23-24 Mt. St. Helens Sky & Star Party (Coldwater SLC)

**SEP MOON: FULL=14, NEW=28**

2 Labor Day

6>7 Sidewalk Astronomy (Starbuck's, 808 OB Hwy)

18 Club Meeting (MMHS)

27>28 Club Star Party (Mike's)

**OCT MOON: FULL=13, NEW=27**

4>11 Sidewalk Astronomy (Starbuck's, 808 OB Hwy)

16 Club Meeting (MMHS)

**NOV MOON: FULL=12, NEW=26**

11 Transit of Mercury (TBA)

20 Club Meeting (MMHS)

28 Thanksgiving Day

**DEC MOON: FULL=12, NEW=26**

11>18 Annual Christmas Party (Location TBA)

21 Solstice Lantern Walk (Lake Sacajawea)

## Friends of Galileo Club Officers

PRESIDENT	Ted Gruber
VICE-PRESIDENT/ PROGRAM CHAIR	Mark Thorson
SECRETARY	Becky Kent
TREASURER	Steve Powell
WEBSITE	Ted Gruber
NEWSLETTER ED.	Greg Smith
ALCOR	Tom Meek

## Next Month's Newsletter Deadline

The deadline for items in next month's newsletter is:

**Wednesday: seven days before next meeting.**

**Please feel free to send in your thoughts and experiences about your astronomical adventure.**

Submit your material by E-mail to:

[grlyth@msn.com](mailto:grlyth@msn.com)

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Longview, WA 98632

