President’s Message June 2017

From Teruo Utsumi

As they say, change is our only constant, and so it is with the SJAA. The annual board of directors and officer elections were held in February and March. With that we welcome our latest group of new board members; Sukhada Palav, Swami Nigam, Wolf Witt and say a warm thank you to our out-going board members Lee Hoglan, a long time club member, Ed Wong, and Dave Ittner.

I want to especially thank Dave. He has most ably served and led the SJAA and the board of directors. One of Dave’s major accomplishments was the switch to Google for Non-profits. This gives us access to the numerous capabilities that Google’s ecosystem offers and allowed us to consolidate the many disparate email and other online resources we had been using. He has stepped down from the presidency and the board but continues to run our well-received Quick STARt program and still plays an active role in other various programs. I for one am especially glad Dave continues to be a part of our organization. Next time you see Dave, do say “Job Well Done!” and give him a (gentle) pat on the back.

A note about my personal role in the SJAA. Two years ago I started to learn Python in order to automate part of our then annual auction. The effort morphed into writing software to automate the process of scheduling the 150+ events we host every year. With the SJAA Coders group, I’m looking to add a few more wrinkles and further automate the management and communication required to run the club. Hope to present what we’ve done at our annual Show & Tell event in September. (If you’re interested in helping with the coding effort or you’re a tech writer, please do contact me!)

In the last five or so years the SJAA has grown, not only in the number of members but also in the number of programs – Starry Night, Quick START, and the Imaging SIG, just to name a few. I’ve always appreciated the enthusiasm of our volunteers in the various programs. Because of you all, we’re able to continue to carry out the club mission – public outreach and education. Thank you! And if you’re not yet involved and want to volunteer and join this merry band of astronomers, talk to a program leader or a board member.

If I have yet to make your acquaintance, please do introduce yourself and say hi. I look forward to seeing you all “out there”!
On behalf of the San Jose Astronomical Association, I am pleased to announce the recipient of the 2016 A. B. Gregory Award.

The award is a plaque which reads “In Recognition of Outstanding Contributions of Time and Effort to Others in Amateur Astronomy”, and I can think of no one in the SJAA who deserves it more than Paul Mancuso.

Paul is in the top three longest members of the SJAA, joining up in the early 1970s. He was a member of the Board of the Directors from 1983 to 1993, then again from 1996 to 1998 and did one more stint from 2001 to 2003. He was Vice President from July 1988 to March 1993, and then again from 1997 to 1998. In addition to these formal administrative roles, Paul has been a stalwart with the School Star Party program, rarely missing a night at a local school to use his scopes to bring the night sky closer to area students, faculty and their families. Paul has also been a reliable regular participant at In Town Star Parties and Solar Days at Houge Park and other local venues.

Paul usually finds his way to the general meeting, or to Auctions and Swap Meets and other SJAA events. When he does, I make a point to come over and say Hi, and see what he’s been up to. It’s great to have him around, and for so long, too, not to mention all his participation and effort he puts into the SJAA.

Paul, thank you for all you do, and congratulations on being the 2016 A. B. Gregory Award recipient!

The award is a plaque including the text “In Recognition of Outstanding Contributions of Time and Effort to Others in Amateur Astronomy”. It is normally presented only once. Dr. Boris Gregory was a professor of French Literature at San Jose State College. He had a lifetime interest in astronomy, and for retirement, was given or bought one of the earliest C-8 telescopes. It was delivered personally by the then-president of Celestron, as he was a long-time friend of Dr. Gregory. After retirement, he taught an introductory astronomy class, part of the Adult Education series. It was in one of these sessions that Bob Fingerhut and other SJAA members met him.

Dr. Gregory was president of SJAA for one term, 1973-1974. He was on the Board from antiquity until his death in March 1979, and was especially adept at welcoming newcomers. With years of experience, he was often asked for advice and help, and his answer was typically, “Come over and we’ll work on it”. At board meetings, he was very often the first to say, “I’ll look into that”.

After his death, SJAA members Bob Fingerhut and Norm Neinchel conceived the Gregory Award. Bob and Norm provided the initial funds, and there was a nomination and a donation (in that order) from Mrs. Gregory a few years later. In addition, one of our members has sometimes chosen to cover the cost instead of asking to be reimbursed for the engraving.

List of Gregory Award Recipients

2016 Paul Mancuso
2012 Dr. Robert Armstrong
2011 Rick Morales
2010 Gary Mitchell
2009 Mark Wagner
2007 Jim Van Nuland
2000 Jane Houston Jones
1999 Ed Erbeck
1998 Jay Reynolds Freeman
1997 Bob Keller
1995 Bob Ashford
1991 Jack Peterson, Paul Barton (2 awards)
1989 Tom Ahl
1987 Don Machholz
1985 Jack Zeiders
1984 Jim Van Nuland
1983 Bob Fingerhut
1982 Gerry Rattley
1981 Denni Frerichs Medlock
1980 Kevin Medlock
Each February, the SJAA hosts its annual membership meeting, where about half of the members of the nine seat board of directors are elected by the members, recognition awards are presented, and everyone brings something to share for the annual potluck.

Lee Hoglan was one of the three deserving recipients of recognition. Before Lee stepped down from the board late last year, he had served for over ten years; he was the longest serving board member in recent memory and stood as vice president for many years. He also managed the Telescope Loaner Program for many years, and was the face of SJAA on the website, in the ‘Ask Lee’ role. For many years, he was also a reliable opener and closer for the In Town Star Parties at San José’s Houge Park. Though he wasn’t there that night to receive the award, he was certainly there in spirit, as everyone, recent members and long timers alike, became just a little bit more aware of his significant contributions.

Ed Wong also received recognition for his work with the club. A board member for several years, Ed also spearheaded several new initiatives that continue today. The idea of Fix It sessions came from Ed, who ran the program for several years before handing it off to others. He also was instrumental in working with the Santa Clara County Parks Department for a permit which allowed nighttime use of Mendoza Ranch, one of the darker sky sites in the south bay. He also established and maintains the relationship with Pinnacles National Park, organizing amateur astronomers from the south bay to participate in public star parties at the National Park, with the idea of being able to use the park on other nights for ‘private’ viewing. He was a docent with the Santa Clara County Open Space Authority and also continues to run the SJAA Binocular Observing program.

Dave Ittner was the final recipient of recognition by the club at the February meeting. Dave has an unending reservoir of energy, which he applied for almost too many roles and leadership positions in the club to even name. Most recently, he was president for the past two years before being termed out. He was a lead docent with the OSA, managing the Starry Nights program at Rancho Cañada del Oro, south of San José. He ran the loaner program and continues to manage the stream of incoming donations of astronomy gear. Most significantly, the QuickSTART program was his brainchild. QuickSTART probably does more to help facilitate new people into the hobby of amateur astronomy than any other, and goes a long way to fulfill the club’s mission of bringing astronomy to the public. Dave continues to singlehandedly run this program.

Congratulations, and perhaps more appropriately, Thank You, to Lee, Ed and Dave for the well-deserved recognition they received and for their commitment of energy and time to the local amateur astronomy community.

(For more on the happenings of the 2017 membership meeting, including pictures, please see the cover story in the March 2017 edition of the Ephemeris).
SJAA hosted a "Solar Party" at Berryessa Branch Library (Noble Ave in San Jose), on Saturday, April 1, 2017. Bill & Susan O’Neil began with a PowerPoint show in the Community Auditorium, using NASA slides about “Our Magnetic Sun.” The talk was about the Science of the Sun and included: Have you ever seen a Rainbow? The Sun is like a Boiling Pot of Spaghetti, and Carl Sagan’s famous “We are all made of Star Stuff.”

The ‘Our Magnetic Sun’ slide show SJAA uses, is put together by NASA and the ASP (Astronomical Society of the Pacific).

Bill also talked about the USA Total Solar Eclipse coming up on August 21, 2017, with slides on: Where to see it, what to expect, Totality vs. a Partial Eclipse, how to protect your eyes, etc.

Outside, in the front plaza of the Library, we had 10 Solar Telescopes run by SJAA members: Wolf Witt, Emil Nenov, Paul Colby, Marion Baker, Teruo Utsumi, Terry Kahl, Paul Nowicki, Paul Mancuso, Bill & Susan O’Neil, and Shela Brown.

We had over 170 Library visitors look at our nearest star: the Sun (safely, through special filtered telescopes that block 99.99% of all harmful light). Guests got to see sunspots, flares, prominences and other solar surface features.

Thanks to the Berryessa Library Staff (Candice, Taylor & Jonathan) for organizing this successful Solar event.
A Very Skinny Moon

Editor’s note: please also see Gary Chock’s Panamint Valley star-gazing report on page 7-8 where Gary was observing the same thin crescents a few hundred miles away on the same night!

On 02/27/2017 06:28 PM, Marilyn Perry wrote:
I just viewed a very skinny moon, less than 1 1/2 days old. Look quick, because it will set at 7:28 pm. It is easy to find because it is almost straight down from Venus, just a little bit south of straight down. It is 17.5 degrees away from Venus. It is so nearly due west than I didn't even need to leave my house to view it. My front door faces west, so I can open the door and see the moon from the hallway.

Response: Vini Carter Feb 27, 2017 at 10:12 PM
Leslie and I were looking at Venus just before 7:00. It's the nicest personal viewing of the planet I've ever had. We "magged up" to 200X and It still looked great; a huge, crisp, clean, thin crescent. We were observing from the front yard, so my 7:00 student got to see it too, as well as the Trapezium in the Orion Nebula. We didn't see the Moon until we were headed inside, but it was beautiful to the unaided eye as it set. It was about 17 degrees south of exactly West. So beautiful; two thin crescents.

Just above and slightly south of Venus is Mars, with Uranus very close. I have seen Uranus in my little Sky90. The biggest trick is finding it. These days we can "planet hop" to it from Mars. Jupiter is showing up earlier and earlier in the evenings now; probably pretty good viewing from about 11:00 or 12:00pm on. It's just above Spica.

Response: Rob Jaworski Feb 28, 2017
I like the sound of that, Vini: Planet hopping. Very cool! That's also a nice report in that you were able to see two crescents.

We didn't have a scope out as we were commuting around, but I do tell my kids to "look at Venus!" when we get a good view. We got in the car after the piano lesson, and while driving home, we turned onto a street that heads west. And there was the thin, thin crescent moon, always a delightful surprise.

We got home, I told them to look at it, how thin it is. My boy stared at it for some number of seconds and proclaimed that he could see the entire disk. I looked again, and it seemed to me that I could, too. I only have a few seconds of his attention left so I quickly told him about earthshine, how the light we're seeing bounced off the earth, back to the moon, and back to us on earth, into the backs of our eyes. Yeah, this stuff is cool!

Dark side of moon will occult Aldebaran in a few minutes

Marilyn Perry Mar 4, 6:54 PM wrote:
The dark side of the moon will occult Aldebaran in a few minutes. When I position bright moon just at the edge of the FOV, I can see the dark side of the moon approaching Aldebaran, so I won't be astonished when it blinks out. I hope the clouds stay away for a few more minutes.

Reply Marianne Damon Mar 4, 7:06 PM
I'm on stand-by in Almaden, there's a slim chance I might be able to witness it, either blinking in, blinking out, or both. 7:21 to 7:40.
Marianne

Reply: Marilyn Perry Mar 4, 7:51 PM
Aldebaran blinked out at 7:02 PST and about 30 seconds. The moon was completely in the clear at that moment. There was no surprise because I could see the dark side of the moon getting closer and closer to the star. The star seemed to blink out in an instant, instead of the star gradually disappearing into the glare like when I watched the moon occult a star with the bright side. I was surprised I could see the dark side of the moon so well. Maybe that was because it was just nautical dusk, not yet a completely dark sky. I got the timing for the occultation, approx. 7:03, from Sky Safari and RASC Handbook. I will not try to see the star reappear because the Doppler radar map shows the rain will start here in a couple of minutes. Sky Safari says Aldebaran will reappear about 8:17 - 8:18.

Reply Marianne Damon Mar 4, 8:27 PM
Thanks for your report. I should have been more careful with my times, somehow I read a Seattle time. But I had intermittent clouds, with cover during the actual time, and now the sky is socked in. I was really looking forward to this. I'm glad you saw it. Last night at the girl scout star party the clouds were intermittent but left the whole section of Orion, moon & Venus open, and later Big Dipper & Polaris, so we had a successful viewing. We broke down as the girls sang around a camp fire. And yes, we each were given a box of cookies!
The Orbits of Jupiter’s Moons Are Tilted
From Marilyn Perry

From the time I got my first telescope in 2012 until I saw Jupiter this 2016-2017 apparition, I thought Jupiter’s Galilean moons were always lined up in a straight line from my point of view.

In March 2015 the moons were so lined up that they were frequently occulting and eclipsing each other in what is called “mutual events”.

But for this 2016-2017 apparition the orbits of Jupiter’s moons are tilted so much that the moons are not lined up, leading to interesting views through the telescope.

When I took my telescope out on my patio April 14, 2017 I decided to sketch the cute pattern that I saw - it looked like an arrow (sketch immediately below).

March 2015 on my patio looking through my 4 inch refractor I had the fun of seeing Callisto transit Jupiter.

I won’t get a chance to see this apparition again because the tilt of Callisto’s orbit is causing Callisto to appear to go above and below Jupiter instead of transiting.

On May 1, 2017 Callisto crossed directly below Jupiter around 18:00 PDT and I took the above photo a couple hours later.

Venus
From Marilyn Perry

About an hour later I observed Jupiter again and was really surprised that the pattern had changed so much (sketch immediately below).
I'm sending this to a few of you as it may interest any?  My friend Nick and I do astrophotography - based in SF, we are known as "Dark Sky Photography" - and we wanted to let you know about an awesome project we have underway -- capturing images through the 129 year old Great Refractor at the Lick Observatory!  We're currently funding this awesome feat on Kickstarter, and it's gaining steam in a hurry as Kickstarter made it Project of the Day yesterday.

You can watch our project video on Kickstarter to learn more visit DarkSky.Me. The resulting images are going to be awesome!  We'd appreciate it if you could help us spread the word if you find it interesting -- it's by far the coolest thing we've done yet.

Thanks for your time, and please let me know if you have any questions.

Response From: SJAA’s Glenn New-ell
February 20, 2017
To: transmit@darksyphotography.com

Hey Scott,  Interesting project.  I have some technical questions.

1) Some of us have looked through that scope, and it seems to have achronic optics, so not really suitable for RGB or OSC imaging.

2) Assuming I did the math right, from your specs that scope is about f18.6.  I'm guessing that is going to require ~30 min exposures, at iso1600.  Are you planning to use a focal reducer? How are you going to guide?

3) Without a focal reducer, your FOV (assuming a crop sensor canon) is going to be 3x4.5 arcsec, and you'd be imaging at 0.05 arcsec per pixel.  I don't know how good the seeing is at Lick but doubt it that good, so you can really "afford" some focal reduction, which will help with the long exposure and guiding challenges you will face.

Given all the challenges, your results vs. money would probably go a lot farther at iTelescope.net or similar.

Response from Scott:
Feb 21, 2017
Hi Glenn,  Thanks for your reply!  Indeed, the archaic lens in the Great Refractor suffers from chromatic aberration and straight-up imperfections, but it's manageable -- especially with deep sky objects.

It's F/19.3 focal length is also indeed slow, but don't forget about the light gathering power of that 36" diameter! :)  When we went to test it out, we were gathering ample information with exposures of just 10 or 20 seconds at ISO 1600/3200/6400 -- so this also solves the problem of having no guidner.  The Canon 6D preforms extremely well at high ISO, and also with exposure times so low we can stack many if needed.

The FOV is very small (about 6x7 arcsec with full frame 6D) as you point out, and we don't plan to use any focal reducers.  Instead we'll capitalize on that, and use it to attack smaller objects such as the Crab and Ring Nebulas (which will fill up the entire camera frame), etc.

Yes, we realize there are better options out there for taking pretty pictures... even Lick has a 40" reflector available which does have an autoguider, and perhaps some day we'll pay with that too, but for now we love the Great Refractor for its history and all that.  It's just such a fun 'scope to use... iTelescope can't even come close in that department. ;)

Perhaps you already saw this on the project page, but I've attached one of our test shots... This is a stack of 40 20-second exposures shot at ISO 6400.  The image (the Blue Snowball Nebula - NGC 7662) has been cropped so it fills more of the frame.  Based on some other test shots, we think we can get the focus a bit tighter, but, of course as we already mentioned, the images which are captured with this telescope won't be the most flawless.

Thanks again for your input!  We can send you some more results after we get in there again.

Panamint Valley Stargazing
From Gary Chock, March 2017

I haven't shared an Observing/Trek Report in a while. Here's the latest one for your entertainment. We initially canceled this last New Moon's Panamint Valley Stargazing Trek because of the weather uncertainty, but then it trended clear for a good stretch and we decided to go for it despite the Moon. Ergo, a rebook - Tue 2/28 to Sat 3/4. New Moon was actually on Sun 2/26. Disperse dry camping on BLM land.

I had a wonderful time at the Feb-Mar post-New Moon Panamint Valley reboot.

I got in late-ish due to a last minute need to register for the Oregon Star Party. Lucky thing I got an inside scoop that they were opening registration at 8am. It sold out of the 900 spots by 12:40 pm that afternoon. OSP is my Plan A for the Great American TSE of 2017. Plan B is the SolarFest being hosted by Madras OR.

I arrived on Tuesday by 6pm, so was able to setup the Dob (slept in the SUV that night). After so many Atmospheric Rivers this Winter, I decided to focus on just visual observing for this trip. We all enjoyed 3 straight nights of very good conditions (once the moon set, that is). To me, transparency peaked on Wednesday while Seeing was best on Thursday (actually Friday very early AM). One of the other astronomers noted a SQM reading of 21.9!

While the crescent Moon was out, we enjoyed its terminator and features. Having a clear view of Venus at the same phase was neat to discover. And Uranus was just below Mars. I dabbled in splitting doubles, comparing star colors, and hunting for carbon stars to bide the time.  (continued on page 8)
Once the moon set, Galaxies Galore! Distinct spiral arms, dust lanes, clumps of huge star formation, tidal tails. M51 Whirlpool, M101, M102 Spindle, M104 Sombrero, NGC4631 Whale + NGC4657 "Hockey Stick", NGC4038 Antennae were memorable. The culmination was dipping my Dob low enough toward the South and viewing Centaurus A and Omega Centauri despite Trona's light dome.

I was surprised to see the entire eastern horizon brightening after 2am - until I realized the entire Milky Way was rising horizontally from North to South.

Friday night was cloudy, so it was good to start packing up and having a good night's sleep. I had loaded and staged my stuff enough to be comfortable sleeping during the windy conditions in the early AM hours. My final packing and departure at 10am was between a couple of wind events. It can get very windy there when fronts move through.

I arrived in SJ by 6pm, just in time to enjoy the Lunar Occultation of Aldebaran after 7pm. The predictions were for it to happen at 7:03 pm, but I noticed Aldebaran blinked out 15 to 30 seconds before that.

### 2016-2017 School events as of April 5, 2017

From Jim Van Nuland

Completed school events as of Aug '16 - April 4, 2017

<table>
<thead>
<tr>
<th>Total sched</th>
<th>Good sky</th>
<th>Partial success</th>
<th>Cloudy failed</th>
<th>Cancelled at noon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0 (at Yosemite, 2016)</td>
</tr>
<tr>
<td>Sep 0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Oct 4</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Nov 8</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Dec 5</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Jan 5</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Feb 4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Mar 4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Apr 7</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>1 (to Apr. 5)</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>15</td>
<td>6</td>
<td>0 18</td>
</tr>
</tbody>
</table>

Scheduled events as of Feb 11, 2017

<table>
<thead>
<tr>
<th>Total</th>
<th>Firm</th>
<th>Working</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Apr</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>May</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>

"Working" means that a date has been chosen, but not all approvals have been obtained. With a firm date, some details may remain to be worked out.

### History

#### The SJAA’s Past

In the Nov.8 1954 issue of the San Jose Evening News, columnist Dick Barrett ran a small article asking "Any Amateur Astronomers?" at the behest of William Weller. The item brought a positive response.

Weller called the first meeting at Herbert Hoover Jr. High in San Jose, on December 6, 1954. Twenty people were present. A member of the Peninsula Astronomical Society spoke on astronomy clubs, then gave a discussion of the two main types of astronomical telescopes, listing the advantages and disadvantages of each. Next, Dr. Eggen of Lick Observatory spoke on "The Star of Bethlehem", listing various possible astronomical explanations.

The meeting was a success, and the time and place for the next meeting were decided.

By May, the first Board of Directors and officers were elected, and by August 26, Articles of Incorporation were written and submitted to Sacramento, bringing the club into legal existence.

Jump to October 1978, when the name was changed to "San Jose Astronomical Association", at the suggestion of past-president A. Boris Gregory. His concern was that the word "amateur" is often interpreted in a negative way, as in “mere amateur” or “amateurish”. That may well be the public's impression, but it's not always correct.

Consider that Galileo and William Herschel were amateurs; the former was a college professor and the latter the music director and organist of a church in Bath, England. Albert Einstein was a patent inspector when he wrote his papers on special and general relativity. There are many other examples.

Over the years, the SJAA has met at schools, city parks, colleges, libraries, as conditions permitted. The move to Houge Park is the newest of those, in May 1995; though Houge had been used for public star parties from April 1992.

Many years ago, the calendar on the first page of our newsletter was marked "Ephemeris", to mean a table of coming events. One day we received a request from the librarian at NASA/AMES, asking for certain month's issues of the "SJAA Ephemeris". That's how it came to be named that; before, it had no actual title.

There is (or was) a club in Arizona, Prescott, I think, that also names its newsletter "Ephemeris". Put out by an ex-SJAA member!
Total Solar Eclipse

On Monday, August 21, 2017, all of North America will be treated to an eclipse of the sun. Anyone within the path of totality can see one of nature's most awe-inspiring sights - a total solar eclipse. This path, where the moon will completely cover the sun and the sun's tenuous atmosphere - the corona - can be seen, will stretch from Lincoln Beach, Oregon to Charleston, South Carolina. Observers outside this path will still see a partial solar eclipse where the moon covers part of the sun's disk.

Image Credit: Rick Fienberg, TravelQuest International and Wilderness Travel

Figure 1- In this series of still from 2013, the eclipse sequence runs from right to left. The center image shows totality; on either side are the 2nd contact (right) and 3rd contact (left diamond rings that mark the beginning and end of totality respectively).

Who Can See It?

Lots of people! Everyone in the contiguous United States, in fact, everyone in North America plus parts of South America, Africa, and Europe will see at least a partial solar eclipse, while the thin path of totality will pass through portions of 14 states.

Image Credit: NASA's Scientific Visualization Studio

Figure 2- This map shows the globe view of the path of totality for the August 21, 2017 total solar eclipse. You can find more information at: https://svs.gsfc.nasa.gov/4518 (link is external)
What is It?

This celestial event is a solar eclipse in which the moon passes between the sun and Earth and blocks all or part of the sun for up to about three hours, from beginning to end, as viewed from a given location. For this eclipse, the longest period when the moon completely blocks the sun from any given location along the path will be about two minutes and 40 seconds. The last time the contiguous U.S. saw a total eclipse was in 1979.

Where Can You See It?

You can see a partial eclipse, where the moon covers only a part of the sun, anywhere in North America (see “Who can see it?”). To see a total eclipse, where the moon fully covers the sun for a short few minutes, you must be in the path of totality. The path of totality is a relatively thin ribbon, around 70 miles wide, that will cross the U.S. from West to East. The first point of contact will be at Lincoln Beach, Oregon at 9:05 a.m. PDT. Totality begins there at 10:16 a.m. PDT. Over the next hour and a half, it will cross through Oregon, Idaho, Wyoming, Montana, Nebraska, Iowa, Kansas, Missouri, Illinois, Kentucky, Tennessee, Georgia, and North and South Carolina. The total eclipse will end near Charleston, South Carolina at 2:48 p.m. EDT. From there the lunar shadow leaves the United States at 4:09 EDT. Its longest duration will be near Carbondale, Illinois, where the sun will be completely covered for two minutes and 40 seconds.
Ocean Worlds Are All Around Us

Two veteran NASA missions are providing new details about icy, ocean-bearing moons of Jupiter and Saturn, further heightening the scientific interest of these and other "ocean worlds" in our solar system and beyond. The findings are presented in papers published Thursday by researchers with NASA’s Cassini mission to Saturn and Hubble Space Telescope.

In the papers, Cassini scientists announce that a form of chemical energy that life can feed on appears to exist on Saturn's moon Enceladus, and Hubble researchers report additional evidence of plumes erupting from Jupiter's moon Europa.

“This is the closest we've come, so far, to identifying a place with some of the ingredients needed for a habitable environment,” said Thomas Zurbuchen, associate administrator for NASA's Science Mission Directorate at Headquarters in Washington. “These results demonstrate the interconnected nature of NASA’s science missions that are getting us closer to answering whether we are indeed alone or not.”

The paper from researchers with the Cassini mission, published in the journal Science, indicates hydrogen gas, which could potentially provide a chemical energy source for life, is pouring into the subsurface ocean of Enceladus from hydrothermal activity on the seafloor.

The presence of ample hydrogen in the moon's ocean means that microbes – if any exist there – could use it to obtain energy by combining the hydrogen with carbon dioxide dissolved in the water. This chemical reaction, known as "methanogenesis" because it produces methane as a by-product, is at the root of the tree of life on Earth, and could have been critical to the origin of life on our planet.

Life as we know it requires three primary ingredients: liquid water; a source of energy for metabolism; and the right chemical ingredients, primarily carbon, hydrogen, nitrogen, oxygen, phosphorus and sulfur. With this finding, Cassini has shown that Enceladus – a small, icy moon a billion miles farther from the sun than Earth – has nearly all of these ingredients for habitability. Cassini has not yet shown phosphorus and sulfur are present in the ocean, but scientists suspect them to be, since the rocky core of Enceladus is thought to be chemically similar to meteorites that contain the two elements.

"Confirmation that the chemical energy for life exists within the ocean of a small moon of Saturn is an important milestone in our search for habitable worlds beyond Earth," said Linda Spilker, Cassini project scientist at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California.

The Cassini spacecraft detected the hydrogen in the plume of gas and icy material spraying from Enceladus during its last, and deepest, dive through the plume on Oct. 28, 2015. Cassini also sampled the plume's composition during flybys earlier in the mission.

From these observations scientists have determined that nearly 98 percent of the gas in the plume is water, about 1 percent is hydrogen and the rest is a mixture of other molecules including carbon dioxide, methane and ammonia.

The measurement was made using Cassini's Ion and Neutral Mass Spectrometer (INMS) instrument, which sniffs gases to determine their composition. INMS was designed to sample the upper atmosphere of Saturn's moon Titan. After Cassini's surprising discovery of a towering plume of icy spray in 2005, emanating from hot cracks near the south pole, scientists turned its detectors toward the small moon.

Cassini wasn't designed to detect signs of life in the Enceladus plume – indeed, scientists didn't know the plume existed until after the spacecraft arrived at Saturn.

"Although we can't detect life, we've found that there's a food source there for it. It would be like a candy store for microbes," said Hunter Waite, lead author of the Cassini study.

The new findings are an independent line of evidence that hydrothermal activity is taking place in the Enceladus ocean. Previous results, published in March 2015, suggested hot water is interacting with rock beneath the sea; the new findings support that conclusion and add that the rock appears to be reacting chemically to produce the hydrogen.

This graphic illustrates how Cassini scientists think water interacts with rock at the bottom of the ocean of Saturn's icy moon Enceladus, producing hydrogen gas. Credit: NASA.gov

These composite images show a suspected plume of material erupting two years apart from the same location on Jupiter's icy moon Europa. Both plumes, photographed in UV light by Hubble, were seen in silhouette as the moon passed in front of Jupiter. Credit: NASA.gov

Ocean Worlds Are All Around Us

Two veteran NASA missions are providing new details about icy, ocean-bearing moons of Jupiter and Saturn, further heightening the scientific interest of these and other "ocean worlds" in our solar system and beyond. The findings are presented in papers published Thursday by researchers with NASA’s Cassini mission to Saturn and Hubble Space Telescope.

In the papers, Cassini scientists announce that a form of chemical energy that life can feed on appears to exist on Saturn's moon Enceladus, and Hubble researchers report additional evidence of plumes erupting from Jupiter's moon Europa.

“This is the closest we've come, so far, to identifying a place with some of the ingredients needed for a habitable environment,” said Thomas Zurbuchen, associate administrator for NASA's Science Mission Directorate at Headquarters in Washington. “These results demonstrate the interconnected nature of NASA's science missions that are getting us closer to answering whether we are indeed alone or not.”

The paper from researchers with the Cassini mission, published in the journal Science, indicates hydrogen gas, which could potentially provide a chemical energy source for life, is pouring into the subsurface ocean of Enceladus from hydrothermal activity on the seafloor.

The presence of ample hydrogen in the moon's ocean means that microbes – if any exist there – could use it to obtain energy by combining the hydrogen with carbon dioxide dissolved in the water. This chemical reaction, known as "methanogenesis" because it produces methane as a by-product, is at the root of the tree of life on Earth, and could have been critical to the origin of life on our planet.

Life as we know it requires three primary ingredients: liquid water; a source of energy for metabolism; and the right chemical ingredients, primarily carbon, hydrogen, nitrogen, oxygen, phosphorus and sulfur. With this finding, Cassini has shown that Enceladus – a small, icy moon a billion miles farther from the sun than Earth – has nearly all of these ingredients for habitability. Cassini has not yet shown phosphorus and sulfur are present in the ocean, but scientists suspect them to be, since the rocky core of Enceladus is thought to be chemically similar to meteorites that contain the two elements.

"Confirmation that the chemical energy for life exists within the ocean of a small moon of Saturn is an important milestone in our search for habitable worlds beyond Earth," said Linda Spilker, Cassini project scientist at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California.

The Cassini spacecraft detected the hydrogen in the plume of gas and icy material spraying from Enceladus during its last, and deepest, dive through the plume on Oct. 28, 2015. Cassini also sampled the plume's composition during flybys earlier in the mission.

From these observations scientists have determined that nearly 98 percent of the gas in the plume is water, about 1 percent is hydrogen and the rest is a mixture of other molecules including carbon dioxide, methane and ammonia.

The measurement was made using Cassini's Ion and Neutral Mass Spectrometer (INMS) instrument, which sniffs gases to determine their composition. INMS was designed to sample the upper atmosphere of Saturn's moon Titan. After Cassini's surprising discovery of a towering plume of icy spray in 2005, emanating from hot cracks near the south pole, scientists turned its detectors toward the small moon.

Cassini wasn't designed to detect signs of life in the Enceladus plume – indeed, scientists didn't know the plume existed until after the spacecraft arrived at Saturn.

"Although we can't detect life, we've found that there's a food source there for it. It would be like a candy store for microbes," said Hunter Waite, lead author of the Cassini study.

The new findings are an independent line of evidence that hydrothermal activity is taking place in the Enceladus ocean. Previous results, published in March 2015, suggested hot water is interacting with rock beneath the sea; the new findings support that conclusion and add that the rock appears to be reacting chemically to produce the hydrogen.

This graphic illustrates how Cassini scientists think water interacts with rock at the bottom of the ocean of Saturn's icy moon Enceladus, producing hydrogen gas. Credit: NASA.gov

These composite images show a suspected plume of material erupting two years apart from the same location on Jupiter's icy moon Europa. Both plumes, photographed in UV light by Hubble, were seen in silhouette as the moon passed in front of Jupiter. Credit: NASA.gov
Crab Nebula

Astronomers have produced a highly detailed image of the Crab Nebula, by combining data from telescopes spanning nearly the entire breadth of the electromagnetic spectrum, from radio waves seen by the Karl G. Jansky Very Large Array (VLA) to the powerful X-ray glow as seen by the orbiting Chandra X-ray Observatory. And, in between that range of wavelengths, the Hubble Space Telescope's crisp visible-light view, and the infrared perspective of the Spitzer Space Telescope.

The Crab Nebula, the result of a bright supernova explosion seen by Chinese and other astronomers in the year 1054, is 6,500 light-years from Earth. At its center is a super-dense neutron star, rotating once every 33 milliseconds, shooting out rotating lighthouse-like beams of radio waves and light -- a pulsar (the bright dot at image center). The nebula's intricate shape is caused by a complex interplay of the pulsar, a fast-moving wind of particles coming from the pulsar, and material originally ejected by the supernova explosion and by the star itself before the explosion.

This image combines data from five different telescopes: The VLA (radio) in red; Spitzer Space Telescope (infrared) in yellow; Hubble Space Telescope (visible) in green; XMM-Newton (ultraviolet) in blue; and Chandra X-ray Observatory (X-ray) in purple.

Credits: NASA, ESA, NRAO/AUI/NSF and G. Dubner (University of Buenos Aires)
Dumbell Nebula, M27
By Swaroop Shere

Date: March 31, 2017
Location: Home, Dublin, CA
Telescope: Stellarvue 102 mm apo triplet
Imaging camera: QSI 683 wsg-8
Mount: Orion Atlas EQ Atlas EQG
Guiding: Starlight Express Lodestar X2
Focal reducer: Stellarvue 0.8X
Software: Cartes du Ciel, Astrotortilla, PHD2 Guiding, PixInsight 1.8
Resolution: 1920x1388

Frames:
Astrodon Gen 2 Tru-Balance 31mm Blue Filter: 7x300" -25C bin 1x1
Astrodon Gen 2 Tru-Balance 31mm Green Filter: 7x300" -25C bin 1x1
Astrodon Gen 2 Tru-Balance 31mm Red Filter: 7x300" -25C bin 1x1
Integration: 1.8 hours
Darks: ~9, Flats: ~10, Bias: ~10

Leo Triplet
By Swaroop Shere

Date: March 31, 2017
Location: Home, Dublin, CA.
Telescope: Stellarvue 102 mm apo triplet
Imaging camera: QSI 683 wsg-8
Mount: Orion Atlas EQ Atlas EQG
Guiding camera: Starlight Express Lodestar X2
Focal reducer: Stellarvue 0.8X
Software: Cartes du Ciel, Astrotortilla, PHD2 Guiding, PixInsight 1.8
Resolution: 2591x1980

Frames:
Astrodon Gen 2 Tru-Balance 31mm Blue Filter: 7x300" -25C bin 1x1
Astrodon Gen 2 Tru-Balance 31mm Green Filter: 8x300" -25C bin 1x1
Astrodon Gen 2 Tru-Balance 31mm Red Filter: 8x300" -25C bin 1x1
Integration: 1.9 hours
Darks: ~8 Flats: ~10 Bias: ~10
From: Seth Eddy (SIG Guest Speaker from MIRA Astro Club on 2/21/2017)
Location: Marina, CA backyard
Date: March 2, 2017
‘My First long integration LRGB’

Imaging telescope: MallinCam VRC-10 RC
Imaging camera: QSI 583wsg
Mount: Astro-Physics AP900
Guiding: Orion 80mm Short Tube; Orion SSAG Pro Mono
Focal reducer: Astro-Physics ccdf67
Software: Seqence Generator Pro, PixInsight 1.8, Adobe PhotoShop, Deep Sky Stacker (DSS)
Resolution: 2811x2116
Frames:
Blue: 11x600” -20C bin 2x2, Green: 11x600” -20C bin 2x2, Lum: 16x900” -20C bin 1x1
Red: 11x600” -20C bin 2x2
Integration: 9.5 hours
Darks: ~30, Flats: ~30, Bias: ~100
Kid Spot Jokes:

- What do you do when you see an aggressive alien? Give it some space.
- Where are black holes most commonly found? In black socks.
- What kind of songs do planets like to sign? Nep-tunes.

Kid Spot Quiz:

1. What are stars primarily made of?
2. Is green dwarf a type of star?
3. How many stars are in our Milky Way Galaxy?

Kid Spot Quiz Answers:

1. Hydrogen and Helium
2. No
3. 300 Billion

100 Years of Astronomical Discovery:

1913 Astronomers George Ritchey and Henry Chretien invent the Ritchey-Chretien telescope, an error correcting telescope that inspired NASA’s Hubble Space Telescope.

1914 Slipher discovers that “spiral nebulae” rotate.

1915 Astronomy popularizer and the inventor of the Dobsonian mount, John Dobson, is born.

1915 American astronomer Walter Sydney Adams determines that Sirius B is a white dwarf star, the first ever found.

1915 Scottish astronomer Robert Innes discovers Proxima Centauri (Alpha Centauri C), the nearest star to the Sun.

1916 German physicist Karl Schwarzschild solves Einstein’s general relativity field equations and derives the size of the event horizon of a non-rotating black hole.

1916 American astronomer Edward Emerson Barnard discovers the star with the largest known proper motion, thereafter called Barnard’s star.

1917 The 100-inch (2.5m) Hooker Telescope sees first light at Mount Wilson Observatory in California. It is the largest telescope in the world for nearly 30 years.

1919 Barnard creates the first catalog of dark nebulae.
From the Board of Directors

Announcements

None

Board Meeting Excerpts

February 11, 2017

In attendance
Dave Ittner, Ed Wong, Rob Chapman, Rob Jaworski, Bill O’Neil, Vini Carter, Glenn Newell, Teruo Utsumi, Wolf Witt
Guest: Swami Nigam

SJAA Membership Database
Ongoing discussion from the November 2016 board meeting, regarding SJAA Membership Database which could be accessed through a web interface to make it easier for new/existing members to pay dues and sign up. Rob J will look into mobile payment options.

Publicity Report
Rob Jaworski unveiled the new table skirt. The designs were well received by the board members.

Solar Program
Bill O’Neil provided an update on purchase of 2 new 35AH batteries and chargers for the solar program. They are up and running along with some repairs to the existing batteries. Bill is also investigating an iOptron mount to carry the club’s Lunt solar telescope as the existing Sirus mount will not carry the load.

Speaker System
Vini Carter noted that the new system the board previewed has some issue with long cable runs. A few more parts are required to get the sound quality up to Vini’s standards, the purchase of which the Board approved.

March 11, 2017

In attendance
Teruo Utsumi, Sukhada Palav, Rob Chapman, Rob Jaworski, Bill O’Neil, Glenn Newell, Wolf Witt, Swami Nigam
Excused: Vini Carter
Guest: JvN.

Officer Election
Nominations for open Board Officer positions and approval by the Board: Rob Jaworski; Treasurer
Rob Chapman: Secretary
Teruo Utsumi: President
Bill O’Neil; Vice President

Coders Review
The Coders have posed some questions for Board consideration; 1) Is the Sign-in App really needed? The Board decided that there is no reason to keep this data since meetup.com RSVPs are used as a proxy for attendance. 2) Library App will be discussed at a future meeting.

Solar Program
Bill O’Neil requested and received Board approval for purchase of a new iOptron Alt-Az mount to carry the solar Lunt scope. The existing Sirus mount will be transferred to the Imaging Group.

Houge Star Party Cancellations Due to Weather
Teruo Utsumi will write up a cancellation procedure to address who cancels and cutoff times for the announcements.

San Jose Public Library
Rob Jaworski presented that the City of San Jose Public Library has contacted him about partnering on a few programs. Rob will follow up and report back.

Astrophotography at OSP Sites
Glenn Newell will contact OSP regarding whether their no overnight stay policy can accommodate the imagers who like to stay until dawns early light. Glenn to report back at next meeting.

Imaging Gear Recommendation coordination with Orion Store Manager
Glenn Newell indicated a need to coordinate SJAA imaging gear recommendations to the imagers versus conflicting recommendations sometimes given by the Orion store. Glenn will research presenting Orion with a general guide for SJAA members to avoid the recommendation conflicts.

April 8, 2017

In attendance
Guest: Dave Ittner

Bi-Annual Swap Meets
With the decision to postpone the March swap meet discussion ensued on whether swap meets should be held twice per year. A decision was made to hold the regularly scheduled Fall swap meet on October 29, 2017 and decide on whether to hold the Spring swap meet at the November Board meeting.

Club Donations to Astronomy programs
Status of donations to identified astronomical programs whose literature the club uses at club sponsored Public Star Parties was discussed. Bill O’Neil confirmed a What’s Out Tonight donation along with Rob Jaworski who confirmed a donation to SkyMaps.com. Both items are now considered closed.

Astrophotography at OSP Sites
Glenn Newell reported that OSA is OK with SJAA imagers staying late but not the entire night...so leaving before sunrise. Additional action items: Glenn will write up a set of guidelines for the astrophotographers and work towards getting more SJAA imaging members approved as OSA docents. Sukhada to provide the OSA docent guidelines to Glenn.

Houge Park Emergency Contact List
The Hogue Park emergency contact list will be updated. Name/Phone #s are: Rob Jaworski, Rob Chapman, Teruo Utsumi, Vini Carter.

Club Address Update
Teruo Utsumi will look into replacing the current PO box address with a UPS box / street address. Teruo and Rob Jaworski to continue discussion offline and report back.

Securing sjaa.org domain
Rob Jaworski will kick off research and future discussion on establishing SJAA.org as the domain name for the club. The thought being that the name change would give the club a more professional non-profit on-line organization. Price versus value will be reviewed for ‘SJAA.org’ versus ‘sjaastronomy.org’ which is far less money.

Complimentary & 5 year Memberships
Rob Jaworski presented the idea of complimentary memberships and if so and how many the club would donate in a year. Also discussed was an idea to include a Galileo scope (pack of 6 is $150, according to Wolf) with any donated membership. Wolf Witt will pursue these ideas and report back at a future meeting.

AskSJAA - How is it working?
A discussion was held on how well the new ‘AskSJAA’ is working. The new format was never intended to be a long term solution so Bill O’Neil offered to take the lead on answering the initial email and forward questions to the Board members if he needs help with the answers. Teruo and Dave Ittner to take the lead on resolution.

Citizen Science, tracking meteorites
Glenn Newell presented on a sky camera setup that tracks meteorite tracks and indicates where the expected land-fall might be. The results could possibly be posted on the SJAA webpage as an outreach possibility. Glenn will research and report back.
SJAA Library

SJAA offers another wonderful resource; a library with good astronomy books and DVDs available to all of our members that will interest all age groups and especially young children who are budding astronomers!

Please check out our wish list on the SJAA webpage:
http://www.sjaa.net/sjaa-library/

Telescope Fix It Session

Fix It Day, sometimes called the Telescope Tune Up or the Telescope Fix It program is a real simple service the SJAA offers to members of the community for free, though it’s priceless. Headed up by Vini Carter, the Fix It session provides a place for people to come with their telescope or other astronomy gear problems and have them looked at, such as broken scopes whose owners need advice, or need help with collimating a telescope.

http://www.sjaa.net/programs/fixit/

Solar Observing

Solar observing sessions, headed up by Bill O’Neil, are usually held the 1st Sunday of every month from 2-4 pm at Houge Park weather permitting. Please check SJ Astronomy Meetup for schedule details as the event time/location is subject to change.

http://www.meetup.com/SJ-Astronomy/

Quick STARt Program

The Quick STARt Program, headed up by Dave Ittner, helps to ease folks into amateur astronomy. You have to admit, astronomy can look exciting from the outside, but once you scratch the surface, it can get seemingly complex in a hurry. But it doesn’t have to be that way if there’s someone to guide you and answer all your seemingly basic questions.

The Quick Start sessions are generally held every other month.

http://www.sjaa.net/programs/quick-start/

Intro to the Night Sky

The Intro to the Night Sky session takes place monthly, in conjunction with first quarter moon and In Town Star Parties at Houge Park. This is a regular, monthly session, each with a similar format, with only the content changing to reflect what’s currently in the night sky. After the session, the attendees will go outside for a guided, green laser tour of the sky, along with a club telescope to get a better look at celestial objects.

http://www.sjaa.net/programs/intro-to-the-night-sky/

Loaner Program

Muditha Kanchana (Kanch) heads up this program. The Program goal is for SJAA members to be able to evaluate equipment they are considering purchasing or are just curious about by checking out loaners from SJAA’s growing list of equipment. Please note that certain items have restrictions or special conditions that must be met.

If you are an SJAA member and an experienced observer or have been through the SJAA Quick STARt program please fill this form to request a particular item. Please also consider donating unused equipment.

http://www.sjaa.net/programs/loaner-telescope-program/

Astro Imaging Special Interest Group (SIG)

SIG has a mission of bringing together people who have an interest in astronomy imaging, or put more simply, taking pictures of the night sky. The Imaging SIG meets roughly every month at Houge Park to discuss topics about imaging. The SIG is open to people with absolutely no experience but want to learn what it’s all about, but experienced imagers are also more than welcome, indeed, encouraged to participate. The best way to get involved is to review the postings on the SJAA Astro Imaging mail list in Google Groups.

http://www.sjaa.net/programs/imaging-sig/

Astro Imaging Workshops & Field Clinics

Not to be confused with the SIG group this newly organized program championed by Glenn Newell is a hands on program for club members, who are interested in astro-photography, to have a chance of seeing what it is all about. Workshops are held at Houge Park once per month and field clinics (members only) once per quarter at a dark sky site. Check the schedule and contact Glenn Newell if you are interested.

http://www.sjaa.net/programs/school-star-party/

SJAA Contacts

President/Dir: Teruo Utsumi
Vice Pres/Dir: Bill O’Neil
Treasurer/Dir: Rob Jaworski
Secretary/Dir: Rob Chapman
Director: Vini Carter
Director: Glenn Newell
Director: Wolf Witt
Director: Swami Nigam
Director: Sukhada Palav

Ephemeris Newsletter -
Editor: Sandy Mohan
Prod. Editor: Tom Piller
Fix-it Program: Vini Carter
Imaging SIG: Bruce Braunstein
Intro to the Night Sky: David Grover
Library: Sukhada Palav
Loaner Program: Muditha Kanchana
Memberships: Anand Rajagopalan
Publicity: Rob Jaworski
Questions: Quick STARt Dave Ittner
Solar & Starry Nights: Bill O’Neil
School Events: Jim Van Nuland
Speakers: Sukhada Palav
E-mails: http://www.sjaa.net/contact

School Star Party

The San Jose Astronomical Association conducts evening observing sessions (commonly called “star parties”) for schools in mid-Santa Clara County, generally from Sunnyvale to Fremont to Morgan Hill.

Contact SJAA’s Jim Van Nuland (Program Coordinator) for additional information.

http://www.sjaa.net/programs/school-star-party/

SJAA Ephemeris, the newsletter of the San Jose Astronomical Association, is published quarterly.

Articles for publication should be submitted by not later than the 20th of the month of February, May, August and November. (earlier is better).
San Jose Astronomical Association Annual Membership Form

P.O. Box 28243 San Jose, CA 95159-8243

Membership Type:

☐ New  ☐ Renewal (Name only if no corrections)

☐ $20 Regular Membership with online Ephemeris

☐ $30 Regular Membership with hardcopy Ephemeris mailed to below address

The newsletter is always available online at:  http://www.sjaa.net/sjaa-newsletter-ephemeris/

Questions? Send e-mail to:  memberships@sjaa.net

Bring this form to any SJAA Meeting or send to the address (above). Make checks payable to “SJAA”, or join/renew at:  http://www.sjaa.net/join-the-sjaa/

Name: ____________________________________________

Address: ____________________________________________

City/ ST/ Zip: ____________________________________________

Phone: ____________________________________________

E-mail address: ____________________________________________