



Close-up of interesting lunar craters made by Ryan Bohner in August 2019

## Upcoming Events

<b>Club Meeting</b> - free and open to the public	14 Feb	7:30 PM at Irvine Lecture Hall of the Hashinger Science Center at Chapman University in Orange. The speaker will be Louis Abramson from Carnegie Observatories. Topic will be "From Apples to Orange Juice: Can We Infer a Galaxy's Biography from Just One Photograph?"
	13 Mar	
<b>Anza star party</b>	22 Feb 21 Mar	Members are encouraged to check the website calendar for updates on star parties
<b>Local (O.C.) star party</b>	15 Feb	
<b>Outreach</b>	Many	Please check the website calendar for the outreach events this month. Volunteers are always welcome
<b>Beginner's class</b>	7 Feb	7:30 to 9:30 PM at the Heritage Museum of Orange County at 3101 West Harvard Street in Santa Ana
<b>Astro Imagers SIG</b>	5 Feb 4 Mar	6:30 to 8:30 pm, at the Urban Workshop in Costa Mesa
<b>Astrophysics SIG</b>	21 Feb	7:30 to 9:30 PM, at the Heritage Museum in Santa Ana
<b>Youth SIG</b>		Contact Doug Millar
<b>Dark Sky Group</b>		Contact Barbara Toy

# President's Message

By Barbara Toy

By the time you see this, the Board for 2020 will be installed and our first meeting of the year will be behind us. We welcome our newest Trustee, David Searle, and also the return of our other hardworking Trustees (in no particular order), John Hoot, Cecilia Caballero, Sam Saeed, Helen Mahoney, Doug Millar and Gary Schones. Our officers remain the same: Reza AmirArjomand as Vice President, Alan Smallbone as Secretary and Charlie Oostdyk as Treasurer. I'm looking forward to working with all of them in the coming year, as I have the privilege of serving you another year as President.

## Looking Ahead for 2020...

We've got a couple of major projects we hope to see through in 2020. One is completion of our club's recent long-overdue redesign of our website. We're happy that the portions of the new website that have been rolled out so far have been working well, including on smart phones and tablets. The Members Section and the portion of the website that will allow payment of membership dues and other fees on line are still in process as they have to mesh correctly with Charlie Oostdyk's records, and we are hoping they will be fully operational soon. In the meantime, please mail any payments you may need to make to the club to Charlie via our P.O. Box or pay him directly at any of the general meetings. He is also probably your best source for any other information or documents you might have wanted from the Members Section.

Another club project that the Board approved a while back but that was put on hold while we were working on the website is getting a new control system for the club's Kuhn telescope. The system we currently have was installed around 2002 and, while it has generally been working well, hardware failures are becoming more of a problem. The actual control program is a DOS program that was never updated to Windows though the designer reportedly planned to do so – unfortunately, he is now deceased, and any prospect of an update has pretty much evaporated.

The fact that the program is archaic wouldn't be so much of a problem except that the hardware needed to keep it working is aging, as are the backups. The program requires a dedicated computer that can take a custom circuit board; the circuit board won't work in modern computers, and we have a couple of older computers we've kept for when the control computer inevitably fails. About two years ago the control computer completely crashed, and we discovered in setting up the replacement that there was a problem with the backup disks for the program itself so getting a working copy of the program on to the replacement computer turned out to be a much bigger challenge than we'd expected. Giving credit where credit is due, the bulk of the work finding an appropriate copy of the program and installing it was done by Alan Smallbone (with, as I recall, input from Pat Knoll).

We got through that episode and through others, but we can foresee the point when we won't be able to recover from a failure. If we wait until then to deal with the issue, we'd be working under pressure to get the Kuhn functional again as soon as possible, with limited time to consider all the options and determine which option would meet our needs best for the long term. Right now, we have the time to consider the options fully, and we've got a crew with an incredible amount of expertise to help make the right choice – Trustee John Hoot, who was a long-time consultant with Meade Instruments and who runs multiple observatories himself, has volunteered to assist on this project, and Pat Knoll and Trey McGriff, who have been instrumental in keeping the Kuhn functional and fine-tuned for almost 15 years now, will also be assisting, along with Alan and me. As a related side note, Pat did telescope repairs for OPT for years, and he and Trey have installed telescopes at the observatories at West Point and Annapolis, among other projects – it's been really great having their expertise to rely on during the years I've been Observatory Custodian!

Our goal, when we get the new system, is to plan the upgrade to minimize the time the Kuhn is out of service. When the new system is in, it should be even easier to use than the current system, requiring only one computer instead of the current two with the need to switch between them periodically. It should also have some features that the current system doesn't have, such as built-in guiding. And – this is high on my own list – it should have a control box with decent sized buttons...

Every year presents us with surprises, and I'm sure 2020 will have its share, but these are our major goals for this year.

## Messier Marathon

If you're thinking of doing the Messier Marathon this year, the formal date for our Marathon would be the Anza star party on March 21, 2020. That should be more than a month away at the time you see this, giving you some time to plan. There should be a Messier Marathon form posted on our website before the Marathon, listing the objects in a recommended order from earliest to latest rise times. There's no requirement that the objects be found in any particular order, but most people seem to find that the recommended order generally makes sense.

For those of you who might not be familiar with the Messier Marathon, some fine folks with perhaps too much time on their hands figured out a while back that it was possible to see all 110 objects on the Messier catalog in one night around the Spring Equinox, and that has become a favorite spring challenge for many amateur astronomers. The earliest and latest objects often are lost in twilight, making them particular challenges (having "go to" capabilities on your scope really helps, even if some people regard that as cheating). There also is generally a "dead" period of a couple hours in the early morning (depending on how fast you are at finding things) when all of the objects that are up have been counted off and the rest of them haven't risen yet – many people take a nap in this period, and a significant number of those that take a nap fail to get up again to finish off the Marathon, making that another major challenge to completing the Marathon. Weather can also be a challenge, and I can recall a number of years when the night of the Marathon was cloudy or even raining.

Hopefully, weather won't be a problem this year, and those who want to do the Marathon will have a clear star party night to do it in. If it's not clear that night, though, you could try it on a different night, and some people have even split the Marathon between two nights, either because of weather or as a way of dealing with the napping issue or because they don't want to deal with essentially an all-nighter. If you do that, it should be noted on your form and, if you split it between dates, the date when you saw each object should be noted.

If you decide to do the Marathon, please fill out the form as you do it and send it in – we try to give recognition to those who participate (another goal this year is to be more rigorous about that than we've been in some of our past years). Martin Cristensen has been the most consistent participant in the Marathon in our club for quite a few years, trying for as many objects as he can even when conditions aren't good, and carefully noting when he extends his Marathon to more than one night.

For those who go to the Orange County Star Party, we don't have access to the site all night, so the most you would be able to do during that March star party would be the first part of the Marathon. You could continue it at home, either that night or a different night – most of the Messier objects are comparatively bright, which is probably why Messier noticed them, so they wouldn't be entirely lost in the sky glow in many parts of Orange County. You don't have to see them well, just enough to be able to identify them. Generally, the goal is just to find/see them, not (for the most part) to spend time looking at each one for details, particularly when you get to busier parts of the Marathon.

It should be noted that purists insist on finding all of the objects by star hopping, which is how they did it in pre-"go to" days. It's certainly more of a challenge, particularly when you're working your way through a lot of similar looking galaxies and your field of view is littered with galaxies that might or might not include the one that is your immediate target. Star hopping is a very useful skill, even in these "go to" intensive times, but if you haven't already developed it the Marathon probably isn't the place to start.

If you haven't ever tried the Messier Marathon, it's worth doing at least once, and can give you a glimpse of some Messier objects you may not have looked at before. Don't be discouraged if you're not able to get all of the objects – you can always try again another night, or try to beat your numbers next year! And, of course, the main goal is to have fun with it.

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# AstroSpace Update

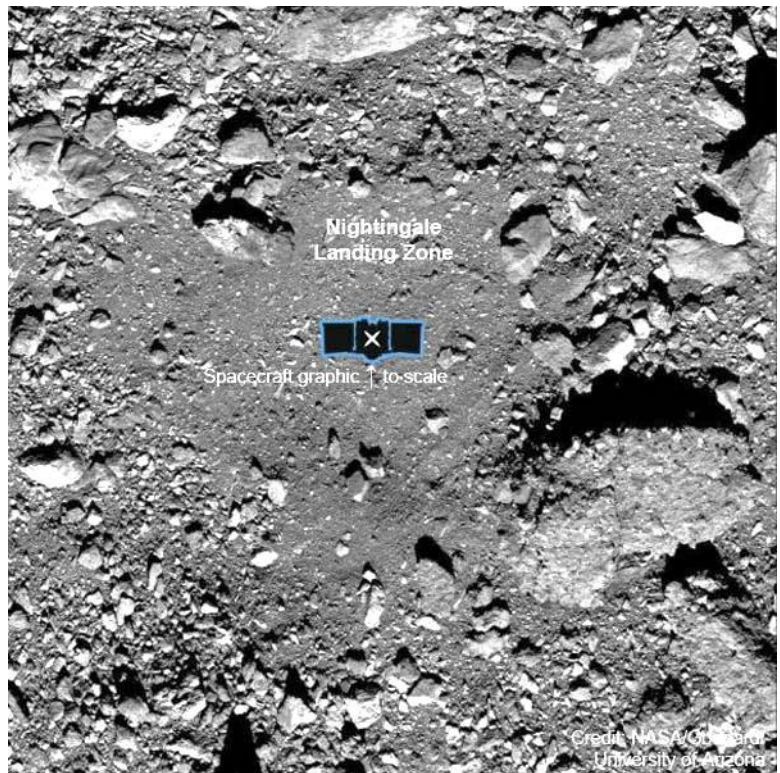
February 2020

Astronomy and space news summarized by Don Lynn from NASA and other sources

**Betelgeuse**, although long known to vary somewhat in brightness, is the dimmest it's been in at least a century. It used to be brighter than Rigel at its brightest, but as I write this is about as dim as Bellatrix. That's not even 1<sup>st</sup> magnitude. People are arguing whether this is just an unusual variability or preparation for exploding as a supernova. But few astronomers expect an explosion before 100,000 years or so. Watch and see.

**Future Star Collision** – A new study of the cataclysmic variable binary star V Sagittae shows that its 2 component stars are slowly moving closer to each other. Computer simulations predict that they will collide with a huge flash about 2083, though that number could be in error by several years. The pair consists of a white dwarf star and a much more massive star that dumps material onto the white dwarf. Occasional flares of fusion of the hydrogen in the dumped material are what make this pair vary in brightness. The pair is about 7800 light-years away, which will make the collision spectacular but not dangerous. The stars now orbit in about 12 hours. Because the dumping star is more massive than those typically found in cataclysmic variable stars, V Sagittae is quite bright for this type. The mass also creates a stronger stellar wind.

**OSIRIS-Rex** has been orbiting asteroid Bennu for about a year, studying it and looking for a place to land and take a sample. 4 sites were chosen, named for birds, and now the landing site has been chosen: Nightingale. The choice was difficult because Bennu is a lot rockier than expected, and there are few places safe to land between rocks. Nightingale is a relatively fresh impact crater, exposing fresh material that is not very aged by radiation exposure. Landing is scheduled for August, and return of the sample to Earth for lab analysis will be in September 2023.



**New Class of Asteroid** – The 1<sup>st</sup> asteroid with its orbit entirely inside Venus's orbit has been found. It was named 2020 AV2. Based on its brightness, it can only be a few miles in diameter. Only a couple of dozen asteroids have been found with orbits inside the Earth's. They are known as Atira asteroids. The new class inside Venus has been called Vatira asteroids. Objects inside the Earth's orbit are difficult to find, since they always appear near the Sun when viewed from Earth.

**CHEOPS**, a European mission, was launched into Earth orbit in December. Its purpose is to study exoplanets that were discovered by other means, such as by Kepler and TESS space telescopes or ground-based telescopes. It should obtain precise sizes for exoplanets. Additionally it could find other planets in the same systems that it is studying, or even rings or moons. If ground based studies of the same planets yield masses, then the precise sizes from CHEOPS would allow calculating densities, which usually tell astronomers what the planet is made of. CHEOPS is planned to operate at least 3.5 years.

**Thuban Eclipses** – TESS was designed to find exoplanets as they pass in front of (transit) stars. But it finds other stuff. Observing an area that included the well-studied star Thuban in Draco, TESS found that its dimmer companion star has mutual eclipses with Thuban. The star was long known to have a companion, but the eclipsing is new knowledge. The eclipses last only 6 hours out of the 51 day orbit. Thuban is so bright, larger telescopes rarely observe it or their sensors are saturated when they do. These probably contributed to no one ever having previously seen the Thuban eclipses. Mutually eclipsing stars are important because they allow astronomers to accurately calculate the sizes and masses of both stars. The TESS data on Thuban was studied because there had been a report that the star pulsates. However, no pulsations were found, only eclipses. About 4700 years ago, Thuban was near the north pole of our sky, due to the slow wobble of Earth's axis, so was then our North Star.

**NEID**, an extreme precision spectrometer, has seen its 1<sup>st</sup> light, mounted on the WIYN 3.5-meter telescope in Arizona. It will be used to detect wobble in stars due to the gravitational effects of exoplanets orbiting those stars. One feature that contributes to NEID's precision is that its optics are kept at constant temperature, within 1/1000 degree.

**Exoplanet Discoveries** – New interesting discoveries were announced by the TESS team:

1) A high-school summer intern at NASA unraveled the causes of TESS observations of a star that the computer analyses could not. He found that the star was an eclipsing binary star with a transiting exoplanet. The stars orbit each other every 15 days, and the planet orbits about the pair in 93-95 days (it varies with the positions of the stars). TESS was only sensitive enough to detect the planet transiting the larger of the stars, not the smaller. The system lies 1300 light-years away in Pictor. The planet has been numbered TOI 1338 b. It is the 1<sup>st</sup> circumbinary planet (one that orbits outside a pair of stars) discovered by TESS, though about a dozen other circumbinaries are known. Lots more circumbinary planets are likely to be found in TESS data. The tilt of the planet's orbit is wobbling, so the transits will disappear from our point of view in November 2023, but will resume about 2031.

2) The 1<sup>st</sup> Earth-sized planet discovered by TESS in a star's habitable zone (the distance where its star's heat will make the planet's temperature suitable for liquid water) has been announced, though a few such have been discovered by other telescopes. The planet is called TOI (TESS Object of Interest) 700 d. It is 20% larger in diameter than Earth and orbits every 37 Earth days. It lies somewhat over 100 light-years away in Dorado, a far southern constellation. Its star is a dim red dwarf with 2 other planets orbiting. All 3 of the planets are likely tidally locked, that is, they keep one side always facing their star. In other words, night and day are places there, not times. This could make climate and weather there far different than on Earth. In 11 months of observations, the red dwarf was remarkably calm, with no flares seen.

3) A planet in a system of 3 red dwarf stars was found. The star system is known as LTT 1445ABC. The planet orbits the primary of the 3 stars. It is more than 30% larger in diameter than Earth. It is not clear if it is a rocky planet or a sub-neptune gas planet. It is only about 22 light-years away, making it the 2<sup>nd</sup> closest transiting planet known. Its proximity makes it a great planet for further study.

### **Central Milky Way Study** –

Astronomers have released a new mosaic image of the center of our Milky Way galaxy, taken in infrared by the Very Large Telescope in Chile. The wavelengths of infrared used penetrate the dust in our galaxy well, revealing some features never seen before. Over 3 millions stars are in the image. Findings from analyzing this image: 80% of the stars in this region formed early in our galaxy's history, in the range 8-13.5 billion years ago; another burst of star formation occurred in this region a billion years ago, which included many very massive stars, that soon (millions of years) afterward exploded as over 100,000 supernovas.



**Carbon Clouds** – Huge clouds of gaseous carbon have been found about young galaxies in data gathered by ALMA (radiotelescope array in Chile). Although some stars are known to produce a lot of carbon, theory had not predicted that the carbon would spread out beyond the edges of such galaxies. The carbon was found by combining archived ALMA data observing many very distant galaxies, so that we are seeing them as they were when the light left them, early in each galaxy's life. It is believed that the carbon was spread outside the galaxies by jets or radiation from black holes or by supernovas. More work is needed to explain how so much carbon was spread.

**Neutron Star Collision** – LIGO (gravitational wave detector) has observed its 2<sup>nd</sup> ever collision of 2 neutron stars. All LIGO detections other than these 2 have been of colliding black holes. Unlike the 1<sup>st</sup>, the 2<sup>nd</sup> neutron star collision has not been found in any form of light. The calculated mass of the neutron stars was much larger than the 1<sup>st</sup> instance, and this may be related to why a visible explosion was not seen. There are 17 known close binary neutron stars that will likely one day collide, and the mass of this new collision is higher than the masses of those known pairs. More work is needed to determine how this collision had such a large mass. Computer simulations of the new collision showed it may have formed a black hole.

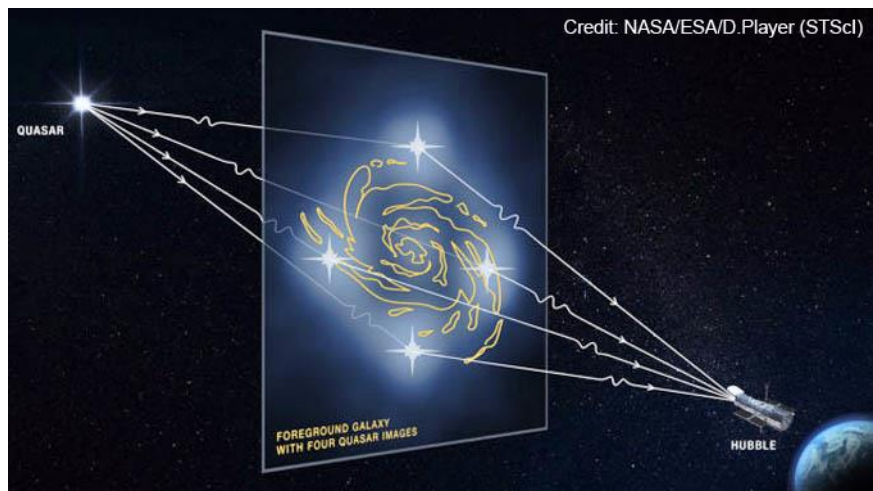
**Pulsars and Cosmic Rays** – Observations of Geminga, a nearby pulsar, using the Fermi Gamma-ray Space Telescope, found a faint but large halo of gamma rays. The pulsar is about 800 light-years away in Gemini. Because the halo is faint, it was necessary to remove all known sources of gamma rays from the observations, to see what remained. It is believed that the gamma ray halo is caused by high-speed electrons and positrons colliding with light photons and boosting their energies to gamma rays. The energies of gamma rays in the observations match this theory. The high-speed electrons and positrons near pulsars are believed to be a source of cosmic rays, but this has been difficult to prove because cosmic magnetic fields bend the paths of such charged particles, so that they arrive at Earth from different directions than they would if they traveled directly from their sources. The strength of the Geminga halo indicates this could be the source of as much as 20% of high-energy positron cosmic rays that have been measured arriving at Earth. This supports the theory that pulsars are the major source of this type of cosmic ray.

**Triggered Reconnection** – A magnetic explosion in the Sun’s atmosphere that differs from any seen before has been observed by the Solar Dynamics Observatory (SDO). Magnetic field lines in the Sun’s atmosphere often get twisted and break, reforming in a new configuration. This is known as a magnetic reconnection. This SDO observation was the 1<sup>st</sup> reconnection observed to be triggered by another event, in this case a prominence, a large loop of material ejected from the surface. The prominence was hotter after the reconnection, indicating that the reconnection added heat energy to the prominence.

**Off Center Black Holes** – A new study using the Jansky Very Large Array (radiotelescope array in New Mexico) has discovered 13 supermassive black holes in dwarf galaxies. Most of the known supermassive black holes are in large galaxies, few in dwarf galaxies. A surprise was that about half of the new discoveries are not in the centers of the dwarf galaxies. Supermassive black holes in large galaxies are almost always in the centers. It is believed that previous mergers with other galaxies pushed the black holes off center. The new discoveries are among the smallest galaxies known to harbor black holes. The discoveries were made by observing 111 galaxies that had been found in a visible-light catalog, were known to be small (dwarf) galaxies, and also were in a catalog of radio galaxies. Probably more of the 111 have supermassive black holes, but are not currently feeding on enough material to generate strong radio emissions.

**Swan Nebula** – How did the Swan (or Omega or M17) Nebula get its unique shape? A new study in infrared using SOFIA (flying observatory) may have the answer. The ages of various parts of the nebula were calculated from the observations, and it was found that 3 parts formed at different times. The central part is the oldest, then the northern area formed, and finally the southern area. Essentially the shape is the result of 3 different, but adjacent, nebulas forming over time. It has long been known that the Swan is about 5000 light-years away and contains over 100 very massive young stars. The new observations discovered 9 new protostars (stars still forming). SOFIA used infrared wavelengths different than those used in previous Swan observations, so was able to see more details within.

**Dark Matter Study** – Dark matter is usually found by its gravitational influence on galaxies or clusters of galaxies. Thus known dark matter clumps are larger than galaxies. It was an unanswered question whether smaller clumps of dark matter exist. A new study using the Hubble Space Telescope observed 8 distant quasars whose light happened to pass through nearer galaxies, so that the quasar light was gravitationally bent such that it formed multiple images of each quasar. If the quasar light also happened to pass through small clumps of dark matter, not just the huge clump about the nearer galaxy, then those small clumps would influence the appearance of the multiple quasar images. Indeed such differences in the multiple images were found, indicating that small dark matter clumps exist. The clumps were calculated to be of mass 1/10,000 to 1/100,000 the mass of the Milky Way’s dark matter. This is likely small enough mass that many of the clumps couldn’t contain even a tiny galaxy, so these dark matter clumps could not have been found by conventional searches for dark matter. Why is it important whether small clumps of dark matter exist? Because the Cold Dark Matter theory (which says dark matter is made of relatively slow-moving particles) predicts that small clumps would have formed by gravitationally-induced collapses, while the competing Warm Dark Matter theory says such would not have formed. This study supports the Cold Dark Matter theory.



**Early Galaxies** – A study using the Very Large Telescope in Chile looked at 31 very distant quasars, so distant the light left there 12.5 billion years ago. We are seeing these quasars as they were very early in their lives. 12 of them were found to be surrounded by huge halos of cool dense gas. These halos contained enough material to both form large numbers of new stars and feed the central black holes, which produces the prodigious light of the quasars. This is more gas (billions of solar masses) than previous observations of early galaxies have found. The study is one step in explaining how early galaxies developed huge populations of stars and huge central black holes.

**Tektite Crater** – Tektites, glassy objects that somewhat resemble meteorites, are believed to be splashed earthly surface material melted and scattered by huge meteorite impacts. Much of the areas where tektites are found comprise a huge (about 10% of the Earth's surface) region centered on Southeast Asia. The tektites of this region have been dated as about 790,000 years old. But the proof of this belief would be to find an impact crater of the right size, age, and location to have scattered tektites over this region. Scientists believe they have now found that crater. Evidence was found for a crater of size 8x10.5 miles in southern Laos. It was not found before because it is covered by a lava flow. The lava cover was found to be the right age. More work will be done around the lava flow, but no one has committed the cost to drill down to the probable crater.

Tektite



Credit: James St. John/Flickr

**FRB Source Located** – Astronomers have located the source of a 2<sup>nd</sup> repeating fast radio burst (FRB). The locations are hard to pin down because the bursts last only a tiny fraction of a second, and most FRBs are one-time occurrences, though a few repeat. The discovery of the location was made using the European Very Long Baseline Interferometer (widely separated radiotelescope array). The newly located FRB source is in a star-forming region of a faint spiral galaxy about 500 million light-years distant. This is different than the source of the 1<sup>st</sup> located repeating FRB, which was in a fairly distant dwarf galaxy, though both are believed to be star-forming regions. 2 non-repeating FRB sources have been located to large distant galaxies. The situation remains confused as to the cause or causes of FRBs. It is hoped that because this newly located FRB is closer than others, further observations may tell astronomers more about a cause of FRBs.

## We Loved RTMC

Robert Kneebone - OCA member since 1975 January 2020

So many of us must feel sadness with the end of Riverside Telescope Makers Conference.

Meeting John Dobson, and the discoverer of Pluto and the discoverer of its satellite, Charon, and so many more never-to-be-forgotten experiences. Some had lasting results.

There were several members of OCA and other groups clustered near the meeting hall. The subject of parallax came up. It had come to my mind previously, so I brought up the idea that "there must be quite a spread of parallax on objects viewed at the two extremities of earth's orbit separated by six months. Could photos or even diagrams be paired in stereo pairs so we could see for ourselves the great distance differences between nearby and distant objects". The group agreed it wouldn't be difficult to try such a demonstration. I needn't have worried, since an article with illustrations showed up a year or two later in *Sky & Telescope* or *Astronomy* magazines, together with means to view them.

With a forum such as RTMC we could float ideas and compare notes with some very accomplished astronomers. We dined with the famous, heard them speak, sometimes hearing new proposals for the first time. Yes, I presume there will never again have anything so available and inspiring for SW USA residents.

Others must feel my sadness at the passage of this fine institution.

# Cor Simon's Memorial Space Flight

Kandra Kargo (Simons)

Since the January 2020 issue of *Sirius Astronomer* featured an article by David Fischer recounting the manned Apollo missions; And, since our current issue will continue this fascinating history, I thought it would be appropriate to share with the OCA, an account of my late husband's Memorial Space flight from the same historical pad 39A at Kennedy Space Center, Cape Canaveral, Florida on June 25, 2019.

A former international member of the OCA, Cornelis Simons (from The Netherlands), passed away in May 2012. He had relocated to Fullerton, California, four years earlier. He had founded the "Fullerton Amateur Observatory" in our backyard.

Although his death was too soon, and heartbreaking, I was able to make arrangements to launch into orbit, aboard the General Atomics, Orbital Test Bed (OTB) satellite, an engraved capsule containing a sample of his remains. The little capsule - one among 150 others in a compartment attached to the top of the satellite and under its solar panels had a purpose, to function as ballast for the satellite in flight.

The Celestis Memorial Spaceflights website [www.celestis.com](http://www.celestis.com), provides live tracking of "his" satellite. The OTB is currently over Honolulu, Hawaii, in a high, equatorial orbit, mid-Pacific, as I write this memo. His was the Heritage Flight mission.



It took seven years for "Cor's" launch to actually happen. Most NASA people, and space program designers understand the astronomical time schedules for launches. I was prepared for a wait, but admit that seven years was a stretch for his space memorial-farewell. It was certainly worth the wait. The engraved capsule was attached to the satellite in 2017, in Englewood, Colorado. And, there the OTB remained until 2019. Meanwhile, the assembly facility was sold, and changed from Surrey Technologies US LLC, to General Atomics (before OTB was even shipped to Kennedy Space Center).

In July 2017, the Celestis memorial families met in Englewood, CO, to view the space craft inside a clean room. Scientists were present to explain the mission of the Orbital Test Bed, and the plug-in payloads it would host. They explained that the OTB is a chassis like vessel, that hosts smaller components, like cube satellites-that plug into a shared power supply. Aboard this chassis, they orbit together, but perform science for different companies and departments.

Two years later, this payload, and the Celestis Memorial participants were prepared to launch. The OTB was one of 24 satellites (and in the second stage of deployment) riding on SpaceX's Falcon Heavy Rocket, last June. The other satellites on the Falcon Heavy included Planetary Society's, Lightsail2, and NASA's new 'improved' Atomic clock.

The date of June 24, 2019 was finally scheduled for a nighttime launch from pad 39A, Kennedy Space Center. Preceding the actual launch, Celestis organized several events in Cape Canaveral, Florida, for the families. Tours of Kennedy Space Center were conducted, (Bill Nye from the Planetary Society was on hand at KSC to discuss science of the Lightsail2), and a formal banquet featuring speaker, Winston Scott (NASA Astronaut from shuttle program), was held in the Radisson Convention Center. Scott's jazz band also provided music entertainment for our first gathering.



The following day, our memorial service was a three hour long marathon. There were about one hundred and fifty Celestis 'participants' to be honored. Smithsonian Channel was filming a documentary of our experience. All family members were included and invited to speak about their loved ones at the ceremony. The audience I spoke to numbered about five hundred. Included in the audience was the Neil Diamond family, and his wife was the speaker eulogizing her brother. Speaking a few people before me, Mrs. Diamond mentioned that she was intimidated by the sheer size of the crowd, the spotlights, and television cameras. I shared her jitters, but, was happy to announce that my late husband, Cor, would be enjoying this chance to share his flight with so many Astro enthusiasts! (Confident he was smiling down on me).

Soon after the memorial ceremony, it was the launch evening. Celestis families boarded busses to Jetty Park, Cape Canaveral. That night, Jetty Park was teeming with viewers, from NASA, SpaceX, other aerospace businesses, and local residents. We were told that the T-0 would be 11:00PM EST, but of course, with such a big rocket, hosting so many different payloads, and complicated technicalities, the actual countdown didn't start until after 2:00 AM, June 25. We were anxious and frustrated that the flight would be scrubbed for the night, but when the fire of rocket engines thundered through the dark, SONIC BOOMS, and the orange streaking booster rockets returned to the KSC's pad, we were collectively ecstatic. The tension, exhilaration and frantic activity surrounding this long awaited memorial did not disappoint.

With all the excitement, it was a fitting, final memorial to my outgoing, night-sky-loving husband, Cor Simons--who also longed for the peaceful reaches of space!

The OTB will orbit earth for about twenty five years. Celestis will notify the families of those aboard, of its dissent into Earth's atmosphere, when it is decommissioned. They will organize a tour to the geographic location of entry.

Until then, dear Cor, Ad Astra! Enjoy the view!

## **Laguna Woods Astronomy Club**

The Laguna Woods Astronomy Club, a 50-year-old non-profit group of seniors, meets at 7:00 p.m. the third Wednesday of each month except for December, July, and August. You can see astronomy club videos on YouTube including Paul Gracey who is a Mt. Wilson docent; Michael Luna, Ph.D., a guidance control engineer for JPL's Europa Clipper; Allan White; Chris Butler; and Scott Mitchell, Director of the Orange Coast College Planetarium. Just go to YouTube and search for Laguna Woods Astronomy Club. Please Like and Subscribe. Contact John Hagge for more information at 949-951-1523.

## **OCA Loaner Scope Program**

Telescopes are checked out only on one designated weekend every 3 months. The loan period is 6 months. Available scopes are listed on the club website. Reservations will be accepted until 7 days prior to the next pickup day. To reserve one, send the program director an email at [scopes@ssccorp.com](mailto:scopes@ssccorp.com)

The request should contain the desired scope's inventory number, the member's name, address, telephone number and email contact address. Pick up time and location will be sent to the borrower via email. Please bring proper identification and sign the club's loan agreement at the time of scope pickup. When ready to return a borrowed scope, please contact John Hoot to make arrangements. He may be able to accept the scope at the OCA general meeting.

### **NEXT SCOPE EXCHANGE DATES**

**April 2020 – Returns**

**April 2020 – Pickups**

**Email: [scopes@sscorp.com](mailto:scopes@sscorp.com)**

## Advertisements

Buy, Sell or Trade some of your gear ? This is where club members can place advertisements. Please contact the editor at [newsletter@ocastronomers.org](mailto:newsletter@ocastronomers.org) to place an advertisement or to learn more about placing one. There is no cost to club members for non-commercial advertisements in the newsletter.

For Sale	contact	Jeff Gortatowsky	<a href="mailto:jeff.gortatowsky@gmail.com">jeff.gortatowsky@gmail.com</a>	
<ul style="list-style-type: none"> <li>• Jupiter Ridge pad 5 lease privilege – for sale to any OCA member This is a pad with no pier on it.</li> </ul>				\$1200 Price is negotiable

For Sale	contact	Val Akins	<a href="mailto:vlakins@comline.com">vlakins@comline.com</a>	
<ul style="list-style-type: none"> <li>• Celestron piggyback mount for 35mm DSL cameras or finderscopes</li> <li>• Orion Astro View 120ST f/5.0 Richfield refractor OTA with two inch mirror star diagonal, rings and dove trail attached.</li> </ul>				\$20 \$175

For Sale	contact	Bill Prats	<a href="mailto:b.bill.p@gmail.com">b.bill.p@gmail.com</a>	
<ul style="list-style-type: none"> <li>• Meade LX-70 Tripod &amp; Mount 20lb capacity, Meade Polar Scope (#670010), Dual axis motor drive with Controller (#670011), original accessories, fresh 6 volt battery. Very clean, Used 1 year.</li> </ul>				\$300 OBO

For Sale	contact	Catherine Bailey	<a href="mailto:oneleaf1@cox.net">oneleaf1@cox.net</a>	
<ul style="list-style-type: none"> <li>• Astrophysics Mach 1 GTO mount, control box, keypad, counter weights, shaft, pier adapter, 2-12v power supplies, Y cable for RA &amp; Dec</li> <li>• TEC 140 APO Refractor, Starlight Feathertouch focuser, tube rings, dew strap, Scopeguard case, Losmandy dovetail plate, 7x50 viewfinder. Has just been cleaned and serviced by manufacturer; optics tested as "near-perfect performance."</li> <li>• Denkmeier Bino-viewer and 2 SW 6 mm eyepieces.</li> <li>• CG-4 Equatorial Mount with CG-4 stainless steel tripod, dual axis drive, motors, hand controller, eyepiece tray, Losamandy vixen style saddle, shaft &amp; weights</li> <li>• ST-4 autoguider system with flip mirror, complete with case</li> <li>• Orion Short Tube 80 mm telescope</li> <li>• Binoculars, eyepieces, and accessories also for sale. Send inquiries to: <a href="mailto:oneleaf1@cox.net">oneleaf1@cox.net</a></li> </ul>				\$6,174 \$5,010 \$690 \$395 \$200 \$80

## Advertisements - continued

For Sale      contact      Rick Hull      [hull3@cox.net](mailto:hull3@cox.net)

Prices are for OCA members and local pickup. Get these now before I place ads on CN / Astromart

- Stellarvue SFF-3 Field Flatteners for refractors, threaded metal dust caps, supports Full Frame image circle > 43mm, 63mm threaded fit to FeatherTouch 2.5", can use adapter for other large focusers, Camera side is M48 threads \$225
- Losmandy DVR-108mm Guide Scope Rings, like new never used, work with both Losmandy D and Vixen V plates \$80
- Losmandy DUP-14inch Universal Dovetail Plates, like new never used. These are the newer version with Scale imprinted, 2 plates available \$65 for one  
\$120 for pair
- Lymax R1 SCT Cat Cooler / Ventilator, new in box never used. C11 size, should also work on Meade10 / 12 or larger Mak \$65
- Refractor hard shell carrying case, printed with Astro Tech sized nominally for 4" to 5" scopes. Inside padded dimensions: 30x7.5x7.5 inches \$65
- For the ATMs in the group contemplating a large Newtonian: I have a Carbon Fiber / Kevlar tube, mirror cell, and spider sized nominally for a 22 inch. Inquire if interested in knowing more Email me

Contact Rick Hull      [hull3@cox.net](mailto:hull3@cox.net)      for more info, to request photo, etc.

## From the Editor

### Sirius wants photograph submissions from club members

We need submissions for this year. I will also pull some from the OCA members images section on our website but those will be at my discretion. If you would like your picture on the cover, do send it to me along with a brief description of the subject, where the image was taken, and the equipment used.

### Ideas for Future articles

The newsletter includes articles from members and / or about subjects suggested by our members. We seek ideas and writers to cover them. To contribute an article or work with the editor to produce one, please contact me at [newsletter@ocastronomers.org](mailto:newsletter@ocastronomers.org) .

### Due dates for submission of articles, pictures and advertisements

<u>Issue</u>	<u>Due date</u>
March	22 Feb
April	21 Mar
May	18 Apr

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www.ocastronomers.org



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## HANDY CONTACT LIST

OCA WEBSITE: <http://www.ocastronomers.org> STARLINE 24-HR. Recording: 714-751-6867 ANZA OBSERVATORY: 951-763-5152

**CLUB OFFICERS (to contact the entire board at once, send an email to [board@ocastronomers.org](mailto:board@ocastronomers.org))**

President	Barbara Toy	btoy@cox.net	714-606-1825
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Trustee	John Hoot	jhoot@ssccorp.com	949-498-5784

## COMMITTEES, SUBGROUPS, AND OTHER CLUB VOLUNTEERS

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## SPECIAL INTEREST GROUPS (SIGS)

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