



PAStimes

Phoenix Astronomical Society

www.pasaz.org

September 2021

Volume 73 Issue 1

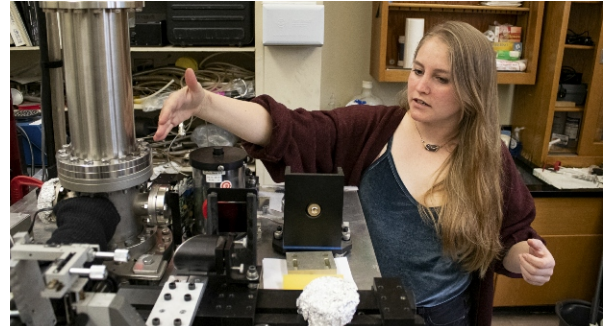
PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Anna Engle to Speak at September Meeting

"The Moon of Saturn: Titan"

Anna Engle is a third year PhD student in the Astronomy & Planetary Science program at Northern Arizona University. She works in the Astrophysical Materials Lab with Dr. Jennifer Hanley (Lowell Observatory, NAU Dept. of Astronomy and Planetary Science) primarily focusing on the interactions of hydrocarbons in Titan's lakes. She was awarded the 2020 NASA FINESST Fellowship for the proposal titled "Experimental Studies to Determine the Impact of Propane, Acetylene, and Ethylene In and Around Titan's Lakes", which I

will be working on for the next three years. She is also fascinated by Pluto's Sputnik Planitia region and has begun work on a side project that involves exploring the delamination sites at the interfaces of electrodes and polymer electrolytes in supercapacitors. When she is not in the lab or office, she enjoys making art, cooking, running, bouldering, and exploring Arizona and the southwest.



Anna Engle comes to PAS Virtually through a Zoom meeting to be held on Sept 2nd. Photo provided by Anna.

September 2nd PAS Meeting

Terri Finch, Event Manager

Please join PAS in welcoming Anna Engle via a Zoom meeting, where she will share some exciting things about "The Moon of Saturn: Titan." The meeting room opens at 7pm and the meeting begins short-

ly after 7:30pm. The Zoom Link for this meeting is here:
<https://www.google.com/url?q=https%3A%2F%2Fus02web.zoom.us%2Fj%2F86256016995%3Fpwd%3DaURYc2RtZzg1ND>

[ZvaUR0Y3hGaVVzQT09&sa=D&ust=1618976673041000&usg=AOvVaw3djCKNAjms0JLwvQiJ008](https://www.google.com/url?q=https%3A%2F%2Fus02web.zoom.us%2Fj%2F86256016995%3Fpwd%3DaURYc2RtZzg1ND). Would love to see you at the meeting. Invite your family and friends. See you there!

May 6th Meeting Review

By Terri, Event Manager

At the May 6th meeting, Dolores Hill did a fantastic presentation on the Osiris REx mission to Bennu. This was a very interesting and fascinating presentation. Those of you who missed it can access it on the pasaz.org website. Click on the words "PAS Monthly Meetings" in the left hand column navigation bar and below it will show "Monthly Meeting Videos" for which you can view previous meeting guest speakers and their presentation. The meeting opened at 7:30pm and by 8:35pm Dolores had concluded her talk and the Q&A. Then, Mike announced that we would take a 5 minute break and asked that anyone not a current PAS Member depart so that the members could vote. All non-mem-

bers had departed by 4 minutes into the break, so when 5 minutes had gone by, the rest of the meeting commenced.

The meeting continued, first with the vote to make Vera Steismeyer and Frank Insana, who are Sam Insana's family members, Honorary Members of PAS. This took some discussion but the final results were voted into a YES. There was no stipulation put on how long the Honorary Membership would last.

Then Mike Marron reviewed a quick Treasury Report on behalf of Eric Steinberg who couldn't make it to this meeting. It was brief.

Then the Elections happened. The results are in a separate article about the May (See "May 6th Meeting" on page 3).



Dolores Hill presented a marvelous talk on the Osiris REx mission. Remember, if you missed the meeting, go to pasaz.org to view its recording. Photo by Dolores.

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Past PAS Recorded Presentations on PASaz.org

By Terri Finch, Event Manager

I'd like to start by thanking Pete Turner, the PAS Webmaster, and Stu Brackney, the Meeting Host of Virtual Zoom Meetings for this wonderful collection and opportunity to enjoy a recording of a past Guest Speaker at a PAS Meeting, that you may have missed or wish to view again. It is the teamwork of these two fantastic PAS Officers that provides the opportunity for everyone to view these PAST PAS Meetings.

You can get to this link any time by going to the left hand navigation tool on the PASaz.org website and clicking on "PAS Monthly Meetings." From there a drop down item will show up and you should

click on "Videos of Speaker Presentations." You will then find recordings of these Past PAS Meetings for your viewing pleasure:

Sept 3, 2020 "Photographic Legacy of Lowell's Great Refractor"

Nov 5, 2020 "Use light instead of a pick axe to unravel planetary surfaces"

Dec 3, 2020 "Titan: The Past & Future Exploration of Saturn's Largest Moon"

Jan 14, 2020 "Update on the James Webb Space Telescope & Black Hole Beauties"

Mar 4, 2021 "The Search for Planet X"

Apr 1, 2021 "CubeSats"

Apr 14, 2021 "Artificial Intelligence

for Astrophoto Imaging"

May 6, 2021 "NASA's Osiris-Rex Mission to Asteroid Bennu"

May 20, 2021 "The Impact History of Earth and the Solar System"

July 15, 2021 "EAA: A Revolution in Astronomy Outreach"

As long as PAS can record the PAS Meetings, PAS will continue to add more recordings to this page: <https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations>.

I also wish to thank these awesome Guest Speakers for allowing PAS to record their presentations for everyone to enjoy!

What's Up For September? September 15, 2021

By Don K. Boyd, PAStimes Editor

Name	Date	Rise	Set
Mercury	09-15-21	0823	19:31
Venus	09-15-21	09:37	20:25
Mars	09-15-21	06:49	18:55
Jupiter	09-15-21	17:12	04:00
Saturn	09-15-21	16:18	02:40
Uranus	09-15-21	20:50	10:23
Neptune	09-15-21	18:28	06:12
Pluto	09-15-21	15:37	01:36

All Times Arizona Time

Bold means the object is "visible" in the evening

PAS is incorporated in the state of Arizona as a non-profit, scientific and educational 501(c)(3) organization. Our newsletter PAStimes is published monthly from September to May and distributed via the Internet. All Issues are available for download on our website www.pasaz.org. Ads for astronomy equipment are provided as a courtesy to sellers and buyers, and do not constitute any endorsement by PAS. All Photos by Don Boyd unless otherwise credited. All articles and photos are copyright their authors or PAStimes.

Sunrise: 06:12

Sunset: 18:34

New: September 6

Q1: September 13

Full: September 26

Q3: September 28



May 6th Meeting

(Continued from page 1)

6th Elections. The whole meeting concluded about 9:40pm. It was a great meeting! Thank you all for attending and those who didn't, should read about the Election in the other article in this newsletter.

Did you miss this meeting or would you like to see it again, or share it with friends? Please, find it at this link, where you can find past PAS Meetings with Guest Speakers: <https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations>. Enjoy!

Fall 2021 PAS GUEST SPEAKERS

By Terri Finch, Event Manager

Events@pasaz.org

Due to the Covid-19 pandemic, PAS Meetings are being held via Zoom over the internet. The Zoom link has been added to the calendar listing for that night's meeting and in the Newsletter in the article about the next PAS Meeting. Please visit the PAS calendar at PASaz.org to find out more about these upcoming Meetings and Guest Speakers. If a Meeting will happen In-Person, the Calendar Listing will give you that info. For a complete list of Guest Speakers, visit: <https://docs.google.com/document/d/1OO-UpaYNvW3p7JCRXCKSJdCbsK60DnvWOoifbqPrNp8/edit?usp=sharing>

Do you have an idea for a guest speaker? Email Paul Facuna VicePresident@pasaz.org the details and contact info for that possible Guest Speaker.

Here are the next scheduled guest speakers at PAS:

V = Virtual Meeting through Zoom

P = In Person at PVCC Main Campus

Oct 7 (V): James Lynch "What are Space & Time"

Nov 4: Klaus Brasch "The Search for Life in the Universe"

Dec 2: David Williams, Topic: TBA

Farewell to Bennu

A few days after this meeting, Dolores Hill sent the following info to PAS about the Mission.

By Dolores Hill

Here's some follow-up information to the talk I did for PAS on May 6th. It is about the start of the return flight to earth of the samples of Bennu collected by the OSIRIS-REx mission. NASA had an online broadcast airing Monday May 10, at 1:00 PM MST.

Here's what happened at the online broadcast:

On May 10, the spacecraft of the University of Arizona-led OSIRIS-REx NASA mission said farewell to asteroid Bennu after more than two years snapping photos, gathering data and snagging a sample from the asteroid's surface.

To celebrate the beginning of the return trip to Earth, NASA invites the public and the media to watch www.nasa.gov/live at 1 p.m. (MST). At approximately 1:16 p.m. (MST), the OSIRIS-REx spacecraft will fire its main thrusters for seven minutes and start its long journey home with more than 60 grams of asteroid material in its Sample Return Capsule.

Following the NASA broadcast, University of Arizona mission members will be available to speak with the media in the lobby of the Drake Building, 1415 N. 6th Ave.

University of Arizona planetary sciences professor Dante Lauretta is principal investigator for OSIRIS-REx, which stands for Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer. It is the first NASA mission to visit a near-Earth asteroid, survey the surface and collect a sample to deliver back to Earth. Analysis of the sample could shed more light on the origins of the solar system and life on

Earth. Studying Bennu can also tell scientists more about the likelihood that the asteroid will strike Earth late in the next century during one of its close approaches.

The OSIRIS-REx departure sequence is the mission's largest maneuver since the spacecraft arrived at Bennu in 2018. Thrusters have to change the spacecraft velocity by 266 meters per second, or 0.16 miles per second, for OSIRIS-REx's path to intersect Earth for a successful sample return. The sample is expected to arrive at the Utah Test and Training Range on Sept. 24, 2023, between 5a.m. and 6a.m. (MST).

There is no straight path back to Earth. Like a quarterback throwing a long pass to where a receiver will be in the future, OSIRIS-REx is traveling to where Earth will be in the future. The spacecraft will sling around the sun twice, covering 1.4 billion miles in over two-and-a-half years to catch up with Earth.

During NASA's departure broadcast, scientists will reveal new imagery from the mission's final flyover of Bennu and talk about the hair-raising moments of sample collection and how the team engineered its way out of problems that threatened the mission.

The OSIRIS-REx mission made history many times during its two-and-a-half-years at the asteroid. Bennu is the smallest celestial object ever orbited by a human-built spacecraft. The spacecraft will also bring back the largest sample collected by a NASA mission since the Apollo astronauts brought back moon rocks. Scientists, including those at the University of Arizona, will analyze the sample to learn about the formation of our solar system and the development of Earth as a habitable planet.

NASA will recover and transport the sample return capsule to the curation facility at NASA's Johnson Space Flight Center in Houston. Johnson will manage the sample distribution to laboratories worldwide. NASA will retain 75% of the material for future generations to study with technologies not yet available today.

The University of Arizona leads the OSIRIS-REx science team and the mission's science observation planning and data processing. NASA's Goddard Space Flight Center, located in Greenbelt, Maryland, provides overall mission management, systems engineering, and safety and mission assurance for OSIRIS-REx. Lockheed Martin Space in Denver built the spacecraft and provides flight operations. Goddard and KinetX Aerospace are responsible for navigating the OSIRIS-REx spacecraft.

OSIRIS-REx is the third mission in NASA's New Frontiers Program, which is managed by NASA's Marshall Space Flight Center in Huntsville, Alabama, for the agency's Science Mission Directorate in Washington. |

By Terri, Event Manager

If you missed the May 10th broadcast, I have searched on YouTube for the videos and here is what my search found:

<https://www.youtube.com/watch?v=QeTsPS4KmaA>

<https://www.youtube.com/watch?v=y8RdsPMWxI>

<https://www.youtube.com/watch?v=d-rT8x1fWG8>

https://www.youtube.com/watch?v=oS_GmMsWe34

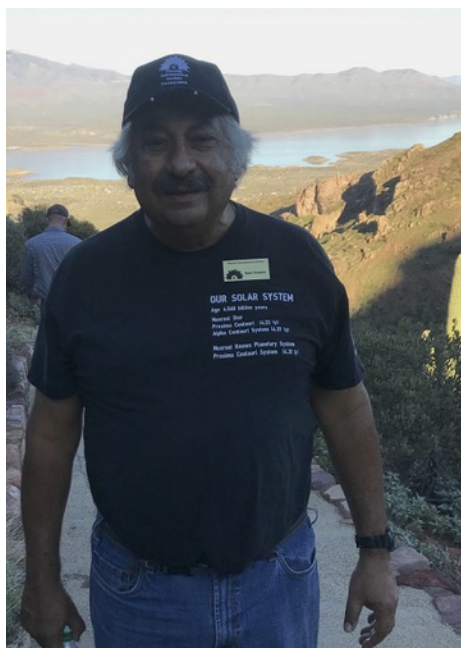
Meet the new Secretary of PAS

Provided by Mel McClure

Mel McClure has a long history of loving astronomy, geology and biology. Mel relocated to Phoenix three years ago, after having been born and raised in Rochester, New York. In Rochester, Mel and her mother, Kim Hollingsworth, were members of AZRAS - Astronomy Section of the Rochester Academy of Science, a club very similar to PAS.

Mel researched for Astronomy clubs here in Phoenix three years ago, and she and her mother both felt right at home here at PAS, and became members. In Mel's young years, at age 4, the Rochester Museum and Science had a 6-month exhibit called "Mission to Mars" - Mel and her mom literally went every single week at least two to three days a week - to experience life on Mars, as an astronaut who traveled there, complete with Sand Storm emergency sirens, and every one ducking for cover under lab consoles. There were geological studies in this museum lab, and this was a very fun and motivating factor in her childhood. When Mel was attending College in Rochester, her Chemistry professor nominated her to NASA to be part of the Mars Rover Student Project. Mel participated in this project for one semester. Mel was a biology major at college, yet has a deep love of astronomy, and geology, fossils, and dinosaur bones! Mel is also an avid bird lover, and she has truly seen how birds indeed seem to be the descendants of dino-

saur. Mel has several beloved pet birds at home. Most are rescues. It is Mel's dream to have her own aviary someday. Mel did her first Occultation in December 2019,



Sam Insana was the recent PAS Secretary. He held the term for not quite a year before passing away on Apr 7, 2021. Read Sam's Celebration of Life article in the May 2021 Issue of PAStimes starting on page 1. Find the newsletter here: <https://www.pasaz.org/newsletters>. Photo provided by Stu Brackney when Sam and Stu took a fun hike at Tonto National Park on Jan 25, 2020. You can read about this hike in the March 2020 issue on page 6.

with Bob Ewing. Mel and Bob also worked with Sam and Kim. It was a very exciting experience for Mel to be a citizen scientist for a NASA project.

Mel and Kim Hollingsworth both acknowledge with a sad and heavy heart, that the position of Secretary is only open due to the sudden and tragic passing of our beloved friend Sam Insana. Those are mighty big shoes to fill... and if given the position of Secretary, it will be done in loving memory and dedication to Sam. He was always so kind and welcoming, and taught us with enthusiasm, as we attended PAS events. Sam will always be with us in spirit as we continue to learn about the sciences and astronomy.



Mel McClure is the New PAS Secretary! At the next in-person PAS Meeting, please take a moment to meet Mel. Photo provided by Mel.

Meet the New PAS Host - Bob Ewing

By Bob Ewing, PAS Member

I became interested in astronomy when I was 6 years old...thanks to my older sister, who was very interested. She taught me star names, and the constellations, and we both had copies of the booklet "Stars", by Zim and Baker. I still have a copy of the 1956 edition, but it is not my original. From then on, I was always interested in reading about anything astronomy related.

The colleges/universities I attended did not have astronomy classes (except for Astronomy 101 type), but I took many upper division and graduate classes in "Earth Sciences".

I was very fortunate to be given the opportunity to teach classes at Portland Community College in Oregon for many years.

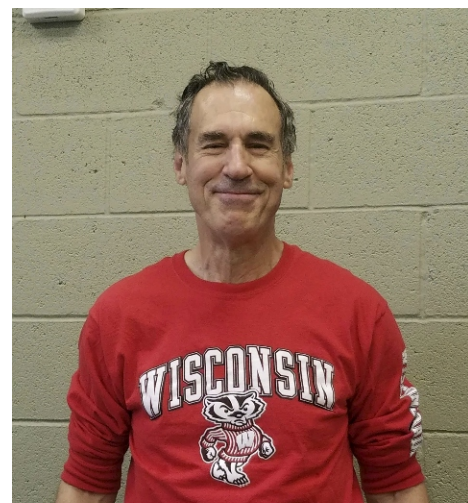
My formal astrophysics classes came later on at the University of Wisconsin-Madison.

I moved to Arizona in late 2011 and the next year was given the opportunity to teach astronomy classes at Maricopa County Community Colleges for 4 years. I was again fortunate to meet PAS members and join in their meetings and star parties.

I returned to Oregon and taught classes there during 2016-18. In Jan. 2019 I returned to Arizona and rejoined PAS.

I have owned several telescopes over the many years, and used the equipment at colleges as well, for viewing sessions with my classes.

I've also done some photoelectric photometry research.



Bob Ewing, an awesome and funny person to know. Meet Bob, the New PAS Host. Photo provided by Bob.

Meet the PAStimes Newsletter Team

By Terri Finch, Assistant Editor

Don Boyd is the Editor of this newsletter. He's an awesome PAS Member and has done a fantastic job of assembling the Newsletter every month for many years.

Cheryl White has been the Article & Caption proof reader for many years. Don and I truly appreciate her assistance with the proofing of the newsletter. Two tired sets of eyes (Don and me), can only find so many mistakes, and Cheryl has been awesome helping create an error free newsletter. And she is awesome with meeting deadlines, as well. Thank you Cheryl.

And then there's me, Terri Finch, Assistant Editor. I collect the articles, format them into the files that Cheryl proofs, then after Don assembles the newsletter, I help him make sure his layout of the articles, photos, captions, etc, are all pleasant to look at on the pages.

This whole process starts with the 10th of the month, which is the Newsletter submission deadline, where I take the time to collect all the submissions from PAS Members and other sources, put them into Google Docs and format them all the same. This can take to the 15th of the month

which is my deadline to gather everything and get it ready for proofing. Then, Cheryl comes along and proofs for typos, punctuation, etc... and she usually finishes in 1 or 2 days. Then it is Don's turn to spend some time putting together a Newsletter that will be interesting to look at, read, and enjoy. And he does his part in a few days. Then it comes back to me to look over the Layout, look for any missed mistakes, make sure articles flow nicely, check captions to be sure they match their photos, and just work with Don for another 2-4 days being sure we caught all the errors possible before considering that edition of the newsletter done and ready for upload. Then Don formats the newsletter as a PDF and uploads it to the PASaz.org site for everyone to enjoy!

Each month's issue of the PAStimes (PAS Club) Newsletter has the goal of being the best it can be. The three Newsletter Team members strive to create a fun, enjoyable reading experience with photos, articles of interest, and submissions by PAS Members. Thank you so much for being a reader of our club newsletter. On Behalf of Don, Cheryl and myself, we thank you for taking the time to enjoy what we have put

together, each month. It is a labor of love. I can't speak for Don and Cheryl, but I enjoy collecting, reading, and putting the submissions into the newsletter, and formatting the files for Don to use. It's important to note that a newsletter like PAStimes doesn't happen all by itself. It takes a Team that can work together, communicate the situation between each other, and have a bit of time to do this project.

I will be assisting Don and Cheryl for this next year and then hopefully I will find someone to take my place as Assistant Editor. Whoever takes over as Assistant Editor needs to access their email on a regular basis, start collecting articles, photos, captions as they come in, rather than waiting until the last minute, and format everything the same for each article so Don doesn't have to do any formatting. He just copies, pastes, and puts the articles, photos and captions into the newsletter quickly. Also, the new Assistant Editor needs to look ahead in their schedule in order to let Don know when they are available for the Layout Proofing of the Newsletter, as that isn't a quick activity. It can sometimes take days to get everything fixed.

The May 2021 PAStimes Newsletter

By Terri Finch

It is always good to get input from our members and visitors checking out our recent issue of the club newsletter "PAS-times." Here are a few great comments that came in shortly after the May 2021 issue of

the newsletter was HOT OFF THE PRESS.

Chris Mahar, PAS Member writes: That really is a great newsletter. Thanks very much.

Howard Moneta, PAS Member writes: Terri, you and Don did a wonderful job on

the newsletter tribute to Sam. Really beautifully put together.

Terri writes: Thank you all for your kind words. Don, Cheryl, and I strive to produce the best Newsletter we can each month.

Your Astronomy Club is Looking for A Volunteer (or 2) Events Manager

By Stu Brackney & Terri Finch

Our always super-efficient and long-time PAS member Terri Finch is scheduled to leave her volunteer position as "Events Manager" for PAS this Fall. Therefore, the organization is looking for one or two members to fill this position. The Events Manager helps schedule and organize events, such as monthly meetings, star parties, special and private events, classes for new telescope owners, events at schools and events for the Scouts.

PAS is a very active club, notwithstanding COVID, so it may be a wonderful opportunity for two people to share these duties. Terri has offered to stay on for the

next year as a second Assistant Events Manager to train the new Events Manager(s), offer advice and help them get to know their positions. This is like the "Past President" position, but supporting the new Events Manager and Assistant Events Manager positions.

With two PAS Members managing it as a team, a suggested breakdown of duties may be as follows:

1) The Events Manager would do the scheduling in the PAS Calendar and manage the Club Member Only events. This would include General Meetings and Meeting of the Minds (MOM - club business), BMC star parties, Telescope Workshops, Private

Member Only Star Parties, etc.

2) The Assistant Events Manager would schedule events and star parties for schools, Scouts, private and corporate groups.

Interested? Don't delay, help lead our club into the 22nd century of exploring our cosmos:

Contact: Mike Marron, Terri Finch or Stu Brackney.

The Events Manager or Assistant Events Manager position requires that you be a current PAS Member who has time to schedule events. You need basic computer skills, the ability to write emails, have phone skills, and be able to keep on top of the upcoming and recently "happened" events.

May 6th Annual PAS Election Results

By Terri Finch, Event Manager

After the awesome and wonderful Dolores Hill concluded her part of the evening presentation + Q&A, the Elections of the new officers for PAS were held. Here are the results of those elections...

Mike Marron and Stu Brackney ran for President. Stu won - meet our new President - Stu Brackney.

Mike will be the Past President for one year to help Stu learn the ropes as the New President.

Paul Facuna was re-elected as Vice President.

The position of Editor will continue to be filled by Don Boyd for another year.

Eric Steinberg continues as Treasurer. As Eric was not present at this meeting, President Mike presented the End of the PAS Year Treasury Report to the attendees at the meeting.

The Webmaster position remains with Pete Turner.

The position of Librarian is open and currently not filled. One member suggested that if PAS would pay for a small storage unit, William Finch would manage the PAS Library.

The Event Manager position is also open at the moment, but I am (Terri Finch) staying on a little longer to hopefully find someone who wants to take the position and I could train them. I'd be Past Event Manager or Assistant Event Manager for a little while.

The Host position was filled by Bob Ewing. Bob has been a long-time friend of PAS.

The Secretary position was taken by Mel (short for Melody) McClure who has been a member of PAS for about 3 years. We welcome her to the Secretary position.

Member at Large is Bruce Wurst. This wasn't voted on, as Bruce has one more year in his 2-year term.

Member at Large Jenny Newjoy was voted back in for another 2-year term.

A motion was made and passed to give Sam Insana's family members Honorary Membership, that's Vera Steismeyer and Frank Insana with a family membership.

Quick note: New officers / Directors do not take over their positions until September. Past officers / Directors give up their positions at the September meeting. Anyone giving up a position and having a position badge furnished by PAS, must pass that position badge on to their successor. We will do that at the first possible in-person PAS Meeting, which could be October 2021, or possibly at a September in-person Meeting of the Minds.

PAS Telescope Teachers are Available!!!

By Terri, Event Manager

Do you have a telescope you need assistance with, whether it is to get it aligned, get it running, or just get help finding objects in the night sky? PAS Members can assist you for a fee.

Email me today to set up your Telescope Help Session with qualified, very knowledgeable and friendly PAS Members.

Email Terri at StarStuff@gmail.com.

Include the make and model of your telescope as well as your main cross streets where you wish to meet the Telescope Teacher for help (your home location is preferred). Then fill out and send back the booking document and I will find you a telescope teacher who knows how to help you with your model telescope.

Kris Mlak, PAS Member writes: Hello Terri!

I had my telescope training session with Mark on Monday and it was a great experience. He was helpful and instructive and I benefited from his explanations and suggestions about my startup. We even visualized my first nebula (Orion!!!!) . Amazing!

Fireside by Norterra June 6

By Ted Blank, PAS Member

The event went very well! I would say there were at least 50 people at the peak. Here are some pictures, though unfortunately we were too busy to take pictures when the guests were there! (Which I guess is a good thing). And thank you Karen for the water!

I was able to show Venus, Mars, epsilon Leonis double star, M57, and Mizar. I had very long lines so the number of objects I could show was limited.

By Pete Turner, PAS Member

We looked at quite a few objects

over the two-hour period, some twice as people came at different times. Here's a list of the objects I observed: Venus, M35, Mars, Castor, Algieba, M13, M57, Double Double, Mizar. We were looking through

my Orion 12" Dob. Ted looked at some of these and at others through his 14" Orion Goto Dob.



Ted Blank provides this photo of himself and his equipment on June 6th at Fireside. It was a very successful event.



Pete Turner sets up his equipment at Fireside by Norterra. It's a hot June evening. Photo provided by Ted.

Place your Astronomy Equipment Ad in this Newsletter

Do you have some astronomy related items you'd like to sell? Prepare an ad and send it my way so that Don and I can help you sell it through the club newsletter. PAS Members get this service for free. Items you may wish to sell: Books, Star Charts, Telescopes, Eyepieces, Finder Scopes, and more. As long as it is astronomy related, I will happily add it to the newsletter. Please include all items you wish to sell, and what is included with those items. Price them, and provide the contact info for the way you wish to be notified, such as email or phone number. I await your submissions to

Starstuff@gmail.com. Items for Sale listed in PAStimes Newsletter are written by the seller of the equipment being sold. PAS is not responsible for the ads and asks that anyone making a purchase from these ads, do your research and purchase at your own risk. PAS does not guarantee the quality of the items for sale.

Ads in PAStimes run for 1 month and may be renewed on a month-by-month basis, if the request to run the ad again is submitted by deadline (10th of month), space permitting, and renewed each month by 10th of month. Ads in PAStimes are

FREE for members. All others are asked to make a small donation to PAS. Donations are to be sent to Terri, the Assistant Editor, who will prepare your article for submission into the next month's issue. Non-PAS Members: to place an ad and get details on where to send the donation via a check or money order and made out to Phoenix Astronomical Society, please Email Terri, Assistant Editor at Starstuff@gmail.com. The deadline for the October issue will be Sept 1st. These items can also be seen on the PASaz.org website here: <https://www.pasaz.org/items-for-sale>

FOR SALE: Meade RCX-400 14 inch telescope. Condition is like new. Prices listed are the originally purchase price – Asking price is at end of this Ad:

1. Enhanced diagonal 2 inch Series 5000 (\$180)
2. Meade 24mm wide angle eyepiece

FOR SALE: A lot of Astronomy Equipment.

- * Asking \$1800.00 Takahaski scope
- * \$250.00 Takahaski Finder Scope #552
- * \$400.00 Takahaski Extender-Q 1.6x
- * \$120.00 Takahaski Tube holders of which there are two and a small one
- A Starlight 2" Feather Touch Focuser \$344.00
- B Celestron #94175 Reducer \$110.00
- C Tele Vue 2" Mirror Diagonal DPC-2002 \$120.00
- D Meade #918A Diagonal Prism \$25.00

(\$225.00)

3. Meade Model 1220 Field De-Rotator (\$600)
4. SBIG ST-7XME CCD Dual Sensor USB Camera with case (\$2000)
5. Meade manual and other pertinent manuals/software.

E Meade Series 4000 8-24mm Zoom Eye piece \$66.00

F Meade #918A Diagonal Prism \$24.00

G Meade Ultra-Wide angle 8.8 \$40.00

H Celestron # 93506 1 1/4 Japan \$60.00

I Meade #8x50 Finder scope #544 Blue Japan \$34.00

J Mack 111 Hyperion Zoom 8-24m \$266.00

K Orion 9x50 Right- angle Image finder \$54.00

L Scope Tronix Max View 40mm eye piece \$34.00

M Orion Black Right-Angle Correct

Equipment can be seen & picked up from location in North Scottsdale, Arizona. Prefer not to ship. Local Pickup please.

I will be glad to answer any questions. Asking Price is \$6,000.00 plus any shipping/packing costs if required / but not preferred. Contact: Richard rjkarizona@cox.net

Image \$30.00

N Vixen LV 15mm Lanthanum Eye Piece 08626 \$36.00

* Celestron Mount with Pelican Case. Also has a Pier made of 1/4" heavy case pipe. The plate is 1/2 inch. Asking \$1800.00 for all three.

Contact Marge at lovins50@aol.com to set up a visit to see the items you are interested in. Pick up location will be near McDonald Drive & Granite Reef Rd in Scottsdale.

See ad with photos at this link: https://www.dropbox.com/sh/wwwyi1pfkb11jn9/AABMsoxs_cvpcagtEhQnNVSa?dl=0

PAS Meeting July 15 Mark Johnston

By Don K. Boyd, PAStimes Editor
Thursday July 15 PAS hosted a presentation through Zoom by PAS Member, Mark Johnston, of a new type of outreach program using cameras attached to a telescope in place of an eyepiece to project images onto a TV monitor using software which integrates several seconds of images into one enhanced image which shows greatly enhanced detail and color of faint fuzzies. It can in fact generate almost real time images which are neither faint nor particularly fuzzy. Mark is a very good

speaker and the over 30 members of PAS and guests greatly enjoyed his talk. We look forward to more presentations by Mark in the future.

Did you miss this meeting? Would you like to see it again? PAS records as many Guest Speakers as we can and you can find past PAS Meetings with Guest Speakers at this link on the PAS website: <https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations>. Enjoy!



Photo provided by Mark Johnston



Virgo's Galactic Harvest

By David Prosper

May through the end of September is a good month for fans of galaxies, since the constellation Virgo is up after sunset and for most of the night, following Leo across the night sky. Featured in some ancient societies as a goddess of agriculture and fertility, Virgo offers a bounty of galaxies as its celestial harvest for curious stargazers and professional astronomers alike.

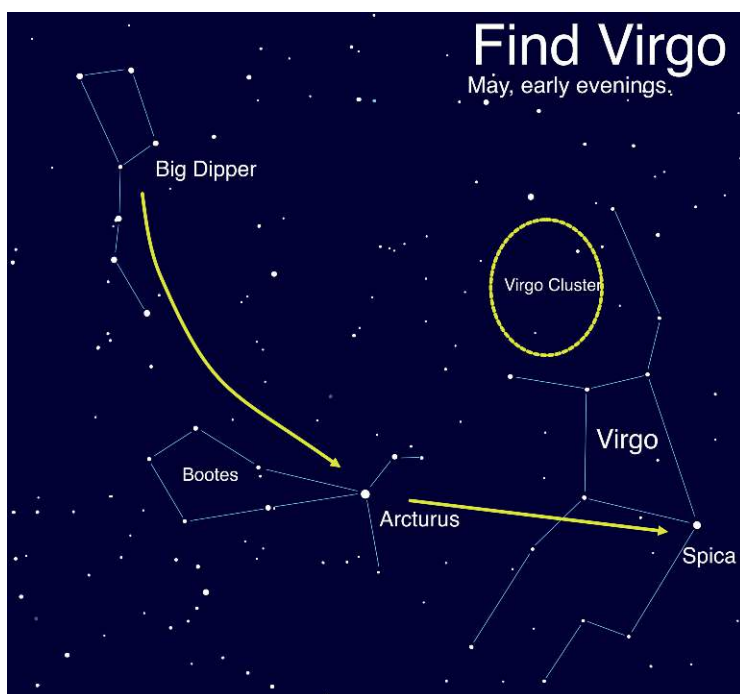
Virgo is the second-largest constellation and largest in the Zodiac, and easily spotted once you know how to spot Spica, its brightest star. How can you find it? Look to the North and start with the Big Dipper! Follow the general curve of the Dipper's handle away from its "ladle" and towards the bright orange-red star Arcturus, in Boötes – and from there continue straight until you meet the next bright star, Spica! This particular star-hopping trick is summed up by the famous phrase, "arc to

Arcturus, and spike to Spica."

This large constellation is home to the Virgo Cluster, a massive group of galaxies. While the individual stars in Virgo are a part of our own galaxy, known as the Milky Way, the Virgo Cluster's members exist far beyond our own galaxy's borders. Teeming with around 2,000 known members, this massive group of galaxies are all gravitationally bound to each other, and are themselves members of the even larger Virgo Supercluster of galaxies, a sort of "super-group" made up of groups of galaxies. Our own Milky Way is a member of the "Local Group" of galaxies, which in turn is also a member of the Virgo Supercluster! In a sense, when we gaze upon the galaxies of the Virgo Cluster, we are looking at some of our most distant cosmic neighbors. At an average distance of over 65 million light years away, the light from these galaxies first started towards our planet when the

dinosaurs were enjoying their last moments as Earth's dominant land animals! Dark clear skies and a telescope with a mirror of six inches or more will reveal many of the cluster's brightest and largest members, and it lends itself well to stunning astrophotos.

Virgo is naturally host to numerous studies of galaxies and cosmological research, which have revealed much about the structure of our universe and the evolution of stars and galaxies. The "Universe of Galaxies" activity can help you visualize the scale of the universe, starting with our home in the Milky Way Galaxy before heading out to the Local Group, Virgo Cluster and well beyond! You can find it at bit.ly/universeofgalaxies. You can further explore the science of galaxies across the Universe, along with the latest discoveries and mission news, at nasa.gov.



Find Virgo by "arc to Arcturus, then spiking on to Spica." Please note that in this illustration, the location of the Virgo Cluster is approximate - the borders are not exact. This image is also for the month of May, but this CAN be seen in September, as well.



The first image of a black hole's event horizon was taken in the center of one of the most prominent galaxies in Virgo, M87! This follow up image, created by further study of the EHT data, reveals polarization in the radiation around the black hole. Mapping the polarization unveils new insights into how matter flows around and into the black hole - and even hints at how some matter escapes! More details: apod.nasa.gov/apod/ap210331.html

Credit: Event Horizon Telescope Collaboration



Astrophotography With Your Smartphone

By David Prosper

Have you ever wanted to take night time photos like you've seen online, with the Milky Way stretched across the sky, a blood-red Moon during a total eclipse, or a colorful nebula? Many astrophotos take hours of time, expensive equipment, and travel, which can intimidate beginners to astrophotography. However, anyone with a camera can take astrophotos; even if you have just a smartphone, you can do astrophotography. Seriously!

Don't expect Hubble-level images starting out! However, you can take surprisingly impressive shots by practicing several basic techniques: steadiness, locked focus, long exposure, and processing. First, steady your smartphone to keep your subjects sharp. This is especially important in low light conditions. A small tripod is ideal, but an improvised stand, like a rock or block of wood, works in a pinch. Most camera apps offer timer options to delay taking a photo by a few seconds, which

reduces the vibration of your fingers when taking a shot. Next, lock your focus. Smartphones use autofocus, which is not ideal for low-light photos, especially if the camera readjusts focus mid-session. Tap the phone's screen to focus on a distant bright star or streetlight, then check for options to fine-tune and lock it. Adjusting your camera's exposure time is also essential. The longer your camera is open, the more light it gathers - essential for low-light astrophotography. Start by setting your exposure time to a few seconds. With those options set, take a test photo of your target! If your phone's camera app doesn't offer these options, you can download apps that do. While some phones offer an "astrophotography" setting, this is still rare as of 2021. Finally, process your photos using an app on your phone or computer to bring out additional detail! Post-processing is the secret of all astrophotography.

You now have your own first astrophotos! Wondering what you can do next?

Practice: take lots of photos using different settings, especially before deciding on any equipment upgrades. Luckily, there are many amazing resources for budding astrophotographers. NASA has a free eBook with extensive tips for smartphone astrophotography at bit.ly/smartastrophoto, and you can also join the Smartphone Astrophotography project at bit.ly/smartphoneastroproject. Members of astronomy clubs often offer tips or even lessons on astrophotography; you can find a club near you by searching the "Clubs and Events" map on the Night Sky Network's website at nightsky.jpl.nasa.gov. May you have clear skies!

This article is distributed by NASA Night Sky Network

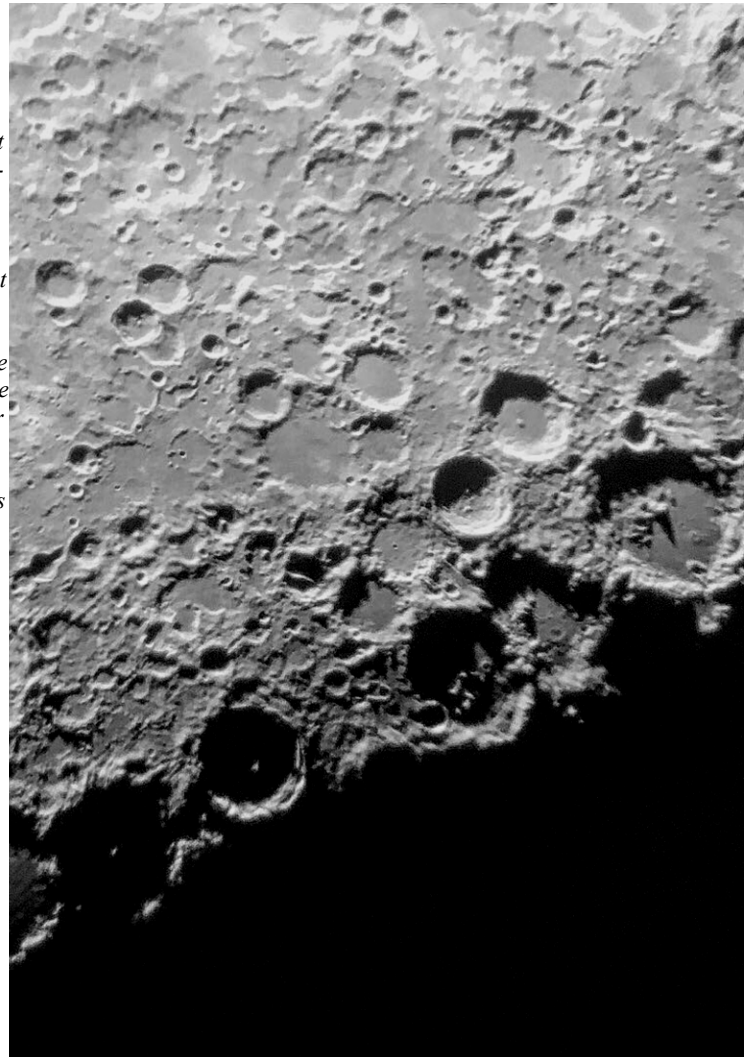
The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more!



The Moon is large and bright, making it a great target for beginners. The author took both of these photos using an iPhone 6s. The crescent moon at sunset (left) was taken with a phone propped on the roof rack of a car; the closeup shot of lunar craters (right) was taken through the eyepiece of a friend's Celestron C8 telescope.



A small tripod for a smartphone. They are relatively inexpensive – the author found this at a local dollar store!





Catch Andromeda Rising

David Prosper

If you're thinking of a galaxy, the image in your head is probably the Andromeda Galaxy! Studies of this massive neighboring galaxy, also called M31, have played an incredibly important role in shaping modern astronomy. As a bonus for stargazers, the Andromeda Galaxy is also a beautiful sight.

Have you heard that all the stars you see at night are part of our Milky Way galaxy? While that is mostly true, one star-like object located near the border between the constellations of Andromeda and Cassiopeia appears fuzzy to unaided eyes. That's because it's not a star, but the Andromeda Galaxy, its trillion stars appearing to our eyes as a 3.4 magnitude patch of haze. Why so dim? Distance! It's outside our galaxy, around 2.5 million light years distant - so far away that the light you see left M31's stars when our earliest ancestors figured out stone tools. Binoculars show more detail: M31's bright core stands out, along with a bit of its wispy, saucer-shaped disc. Tele-

scopes bring out greater detail but often can't view the entire galaxy at once. Depending on the quality of your skies and your magnification, you may be able to make out individual globular clusters, structure, and at least two of its orbiting dwarf galaxies: M110 and M32. Light pollution and thin clouds, smoke, or haze will severely hamper observing fainter detail, as they will for any "faint fuzzy." Surprisingly, persistent stargazers can still spot M31's core from areas of moderate light pollution as long as skies are otherwise clear.

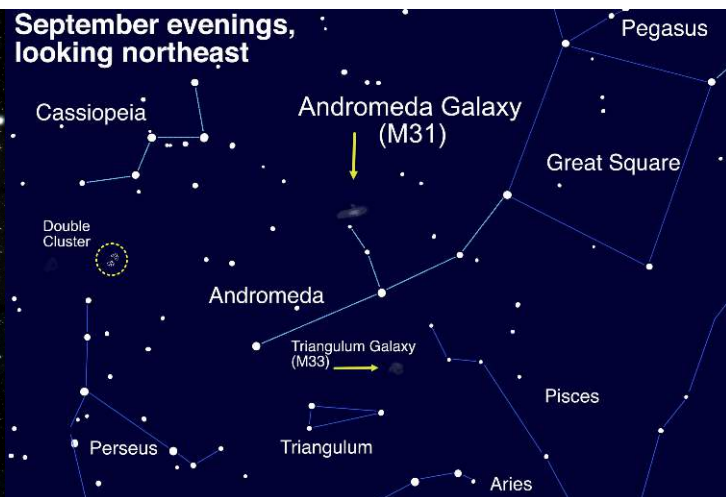
Modern astronomy was greatly shaped by studies of the Andromeda Galaxy. A hundred years ago, the idea that there were other galaxies beside our own was not widely accepted, and so M31 was called the "Andromeda Nebula." Increasingly detailed observations of M31 caused astronomers to question its place in our universe - was M31 its own "island universe," and not part of our Milky Way? Harlow Shapley and Heber Curtis engaged in the "Great Debate" of 1920 over its nature. Curtis

argued forcefully from his observations of dimmer than expected nova, dust lanes, and other oddities that the "nebula" was in fact an entirely different galaxy from our own. A few years later, Edwin Hubble, building on Henrietta Leavitt's work on Cepheid variable stars as a "standard candle" for distance measurement, concluded that M31 was indeed another galaxy after he observed Cepheids in photos of Andromeda, and estimated M31's distance as far outside our galaxy's boundaries. And so, the Andromeda Nebula became known as the Andromeda Galaxy.

These discoveries inspire astronomers to this day, who continue to observe M31 and many other galaxies for hints about the nature of our universe. One of the Hubble Space Telescope's longest-running observing campaigns was a study of M31: the Panchromatic Hubble Andromeda Treasury (PHAT): bit.ly/m31phat. Dig into NASA's latest discoveries about the Andromeda Galaxy, and the cosmos at large, at nasa.gov.



While M31's disc appears larger than you might expect (about 3 Moon widths wide), its "galactic halo" is much, much larger - as you can see here. In fact, it is suspected that its halo is so huge that it may already mingle with our Milky Way's own halo, which makes sense since our galaxies are expected to merge sometime in the next few billion years! The dots are quasars, objects located behind the halo, which are the very energetic cores of distant galaxies powered by black holes at their center. The Hubble team studied the composition of M31's halo by measuring how the quasars' light was absorbed by the halo's material. Credits: NASA, ESA, and E. Wheatley (STScI) Source: <https://bit.ly/m31halo>



Spot the Andromeda Galaxy! M31's more common name comes from its parent constellation, which becomes prominent as autumn arrives in the Northern Hemisphere. Surprising amounts of detail can be observed with unaided eyes from dark sky sites. Hints of it can even be made out from light polluted areas. Image created with assistance from Stellarium