

SIDEREAL TIMES

Austin Astronomical Society
keeping astronomy weird since 1969

www.austinastro.org

January 2018

MONTHLY MEETING

January 12, 2018
ETC 2.136 - UT Campus
Engineering Teaching Center
Dean Keeton and Speedway

6:30PM
PRACTICAL ASTRONOMY
Dark Sky Round Table and Q & A
Featuring: Texas IDA Chapter
President - Cindy Luongo Cassidy,
Texas IDA Liaison to AAS - John
Cassidy, Chair of the River Hills
Neighborhood Association - Susan
Silberman

7:30 PM
GENERAL ASSEMBLY
Harun Mehmedinovic, SKYGLOW
Project
"Protecting Our Night Skies"



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Sidereal Times is the official monthly publication of the Austin Astronomical Society.

PRESIDENT'S NOTES

By Tim Brown, President

The New Year- 2018

Happy New Year! I wish the best of health and happiness to all in 2018. Let's join in wishing the AAS the best in this New Year by committing to make 2018 AAS's best year.

That's a tall order. What do we need to make this "dream" a reality?

- Innovative Ideas from our officers and members
- Star parties that are fun observing and social events
- Interesting General Assembly Meetings – great speakers
- Exciting educational opportunities – deepen your understanding of our hobby
- Opportunities for outreach
- Opportunities to join the leadership and set the future direction for growth



Being involved in the governance and guidance of the club's activities is rewarding and gives you the opportunity to make the AAS experience better and more fun. I've had the honor and often the pleasure to have served the AAS in many capacities. There is nothing like being involved.

We need VOLUNTEERS for outreach, member services, dark-sky site search committee and the nominating committee for the April election Executive Committee officers for 2018-19.

Current Openings

Unfortunately, this month we have had two unexpected resignations from important positions.

David Mathias, our *Sidereal Times* editor has given notice that he will resign as

Banner: January 2017 Image of the Month: Jon Etkins, "Camped Under The Stars"

soon as we have a new editor for the newsletter. David has done an excellent job as editor and he will be missed.

Also, our hard-working Outreach Chair, Jim Lynch, has resigned. Jim took on this difficult position and continued AAS' record of exceptional service to the communities we serve. I'm sure that Jim will remain active in our outreach efforts. Jim and Joyce have been Outreach stars for many years. Thank you, Jim for serving under difficult circumstances. Dawn Davies, our Vice President, has graciously volunteered to serve as temporary Outreach Chair.

Nominating Committee

It's that time again. The President, me, has the duty of appointing a three-person committee which will be charged with searching for and accepting the nominations of persons anxious, or at least willing, to stand for election to the 2018-19 Executive Committee.

I'll be reaching out soon to ask for volunteers to serve on the nominating committee. Please consider serving on this vital committee. It doesn't require a long-term commitment.

Executive Committee Positions

Think about running for these positions. The club needs a mixture of experienced and newer members to bring fresh idea to the EC.

Officers: President, Vice President, Secretary, Treasurer

Committee Chairs: Outreach, Members Services

Members at Large: Volunteers from the general membership who serve on the committee(s) of their choice. This is for members who want to volunteer without being bound by the requirements of an officer position

Canyon of the Eagles – Eagle Eye Observatory Agreement

I can't conclude this article without offering an update of the discussions between AAS and Calibre – the company operating Canyon of the Eagles Resort.

This is just a quick note. A longer discussion of the agreement and changes to the agreement will be part of the January General Assembly meeting. I believe that we have made progress toward reaching a mutually satisfactory arrangement that preserves our Members Only Night - although in modified form.

For a more complete description of the issues with Calibre I refer you to my article published on last month's Members Home page.

General Assembly Meeting -Friday January 12th - "Skyglow"

Be sure to join us Friday Night. The Practical Astronomy Session begins at 6:30

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followed by the General Assembly meeting at 7:30. Both sessions are held in the same room (see below). See page 10 of this periodical for more details.

Please Note

We meet in room 2.136 of the Mechanical Engineering Building (the Engineering Teaching Center) on the NW corner of Dean Keeton and San Jacinto, on the UT campus. Parking is free after 6:00 pm on nearby streets. Garage parking (not free) is also available at the Speedway Garage.

I hope to see you Friday night at the monthly meeting and Saturday night at EEO for our Members-Only Star Party.

Tim Brown

"For my part I know nothing with certainty but the sight of stars makes me dream." (Vincent Van Gogh)

AAS AFFILIATIONS



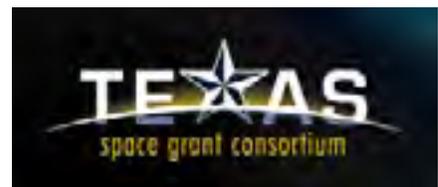
<http://darksky.org/>



<https://nightsky.jpl.nasa.gov>



<https://www.astroleague.org/>



<http://www.tsgc.utexas.edu/>

EXECUTIVE COMMITTEE MINUTES, Nov. 2017

By Sean Leary, Communications Chair

Call to Order November 6 2017, at 7:02pm at The Frisco.

In attendance: Frank, David, Terry, Mark, Joi, Jim, Joyce, Tim, Vanessa,

Dana, Sean, Dawn, Brian (L)

Quorum is met.

Oct 2017 EC minutes moved, seconded, approved with minor typo change.

Reports

Treasurer (Mark): Thanks offered all around for by-laws efforts. Financially running a bit behind last year. Membership card is now available, should be publicized.

Vice president (Dawn): Chuck Baker from San Antonio next speaker at the GA meeting. Jan 2018: An author and documentary producer to speak on light pollution. Feb 2018: Robert Reeves will speak about 365 Moon project (upcoming book), and will be back for a lunar observing workshop in March. March 2018: AoT speaker Bonnie Meinke hoped for. April 2018: Dawn Petitt [sic] ISS astronaut hopefully.

Communications (Sean): Aas-ec mailer should be working. Will be absent (interim secretary) at the next GA meeting.

Equipment (Terry): Lots of telescope equipment stored with Domingo, and Terry. Ordered a Orion 4.5" scope for \$500. All but 1 dob, and 2 SCTs are loaned out. Concerns about loans becoming gifts. Should add a post to the website. SCTs harder to use by newbies than dobs. A 6 month loan period for SCTs is recommended. Discussion of stipulations for equipment loans.

Outreach (Jim): Public party 11th, Outreach opportunities on the 17th and 18th, members only 18th. Questions about 2018 public star party nights. Discussion about attracting more volunteers. Upcoming FT102 should help, an email blast from outreach might help. Maybe an outreach banner (after ft102).

Member Services (Joi): FT102 is this upcoming Saturday. Nov members only party FT will probably have to be cancelled. Dec members party will be David's astrophotography. 2018 gets interesting - candidates include satellite observing, lunar observing, intro to spectroscopy. Practical astronomy Nov 2017 is Dawn on citizen science. Greg is Dec 2017. More PA speakers for upcoming meetings, including making a Galileo. Holiday party is Dec 8, 2017. Discussion of difficulties of image of the month images printed on poster board. A projector would be preferred.

Sidereal Times (David): Working on the next Sidereal Times, needs content, contributions appreciated. UBarU called, has received substantial donation, has observatory set up with some nice scopes. They are trying

CALENDAR OF EVENTS

12 January 2018

Practical Astronomy

6:30 PM

General Assembly Meeting

7:30 PM

ETC 2.136 - UT Campus
Engineering Teaching Center
Dean Keeton and Speedway

13 January 2018

Fast Track 301

4:30 PM - 8:30 PM

Canyon of the Eagles
Burnet, TX

Members' Only Star Party

5:00 PM - ?

1 February 2018

"Starry Nights"

5:30 PM - 7:00 PM

Girlstart

1400 W. Anderson Lane

5 February 2018

Executive Committee Meeting

7:00 PM - 8:30 PM

The Frisco

6801 Burnet Rd

to put together some summer camps at their site next summer.

Members at large (Dana): About 50 kids at Girlstart. Next month will be Native American themed.

Members at large (Vanessa): Would like to help with outreach.

GA Representative (Brian Lippincott): Would like more info about COE. (Current contract expires Jan 1, 2018).

President (Tim): We need to work on re-activating outreach, and the AAS GA meetings. Pros and cons of info in email subject lines, and need for engaging content in posts, events, and emails.

Old Business

By-laws discussion:

Clarification of membership, and late notices text.

Determination of Quorum should be done in April.

Nominations and elections: 14 day notice by email to President for self-nominations. Statement of interest and qualifications highly encouraged. Prior to vote, candidates to be introduced and allowed to speak. Absentee voting submitting up to 24 hours by email only.

Comms dates to be entered into the handbook.

Budget to be presented to EC in July, presented to GA in August.

To be distributed to EC next week, and posted to membership December 22.

COE:

Discussion about the possible loss of members only nights.

Discussion of the need for a contract for the next year, while keeping options open for 2019, including Texas Land Conservancy. Discussion of test runs at alternate sites.

Difficulties of negotiating with an organization with different goals. We want to make this work for us, if at all possible. Noted that EC consensus of intent is reached. Getting a conversation going with the EC, and getting email responses would be helpful. Setting up Slack channels for ongoing discussions on this topic, or using our existing forums.

Possible survey to the general membership about what the GA wants in terms of COE.

New Business

(None this month)

Meeting adjourned at 8:38 pm.

Respectfully submitted,

Sean Leary

TREASURER'S REPORT, DECEMBER 2017

By Mark Lyon, Treasurer

Deposits:

Dues payments

Checks \$0.00

Paypal \$0.00

Dues payments totals \$0.00

Interest earned-checking \$1.09

Interest earned-CD \$0.25

Interest earned-CD \$0.25

Total interest earned \$1.59

Total Other Income \$0.00

Deposit Totals September 1st through September 30th, 2017 \$1.59

Expenses:

COE Internet Expense \$69.35

COE Telephone \$76.41

Outreach Total \$38.61

Holiday Party Expense \$52.56

Wild Apricot Software Expense \$1,404.00

Expense Totals December 1st through December 30th, 2017 \$2,040.93

Bank Balances:

University Federal Credit Union Donations Savings \$557.41

Paypal Account \$1,535.28

University Federal Credit Union Checking \$24,994.51

University Federal Credit Union C.D. \$5,813.77

University Federal Credit Union C.D. \$5,794.61

University Federal Credit Union Scholarship \$465.02

Total Cash \$39,160.60

AAS members on 12/31/2017: 486

Total AAS Memberships as of 12/31/2017: 369

The monthly deadline for Sidereal Times submissions is the first day of the month of publication.

Please send submissions to newsletter@austinastro.org.

OUTREACH OPPORTUNITIES, JANUARY 2018

By Dawn Davies, (Acting) Outreach Chair

Hi AAS Outreach Fans,

These opportunities are available for brushing up on your Outreach skills in January. Please contact me if you would like to participate in these events.

Dawn Davies
(Acting) Outreach Chair
outreach@austinastro.org

Saturday, January 13
Skyglow: Under the Stars
River Hills Neighborhood Association
7:00 p.m. - 9:00 p.m.

Thursday, January 16
Astronomy on Tap
North Door
7:30 p.m. - 9:30 p.m.

Friday, January 26
Science Night
Elsa England Elementary
6:00 p.m. - TBD

Thursday, February 1
Starry Nights - Volunteer Opportunity
Girlstart
5:30 p.m. - 7:00 p.m.

Saturday, February 3
Star Party - Volunteer Opportunity
Santa Rita Ranch
6:00 p.m. - 8:00 p.m.

AAS FRIENDS



<http://canyonoftheeagles.com/>



<https://www.parts-people.com/>

COMMUNICATIONS REPORT, DECEMBER 2017

By Sean Leary, Communications Chair

1. Website:
 - a. December Sidereal Times
 - i. Banner with link
 - ii. Static page update with link, image, slider entry
 - b. 2017 Image of the Year
 - i. Banner for Leo Triplet
 - ii. Gallery page update
 - c. Pages
 - i. Rewrote **Your First Star Party** page to viewable to all. Some content is restricted to members only
 - d. Events
 - i. Removed recurring Girlstart events, which were inaccurate. Replaced with individual events for 2018
 - ii. Public and private star party events for Jan, Feb 2018
 - iii. Jan EC meeting updated, also added post
 - e. Banners
 - i. Took down Holiday Party banner
 - ii. Added SkyGlow banner and link
 - f. Fast Track
 - i. FT301 rescheduled for Jan 13. Added post, updated event and signup, updated banner
 - ii. FT204 banner and event set up, then removed for rescheduling
2. Email blasts:
 - a. FT301 Jan 13
 - b. News and notes for Dec 2017/Jan 2018
3. Facebook
 - a. FT301 post
4. Comms
 - a. Update outreach@austinastro.org for Dawn

AAS NEEDS YOU!

Volunteers are needed to serve on the Nominating Committee and as our Outreach Chair. Please share your questions about these open positions and your expressions of interest to contactaas@austinastro.org

MEMBER SERVICES REPORT, JANUARY 2018

By Joi Chevalier, Member Services Chair

Hi everyone!

Here's the Member Services schedule for January and beyond. These are also on the www.austinastro.org site in the Events Calendar - please confirm dates there. You can also subscribe to the AAS Calendar and have the events download/update automatically into your personal calendar.

Sign up here for rescheduled Fast Track 301:

Fast Track 301: <http://austinastro.org/index.php/volunteer-opportunity/sign-up-for-fast-track-301-astrophotography/>

As always, thank you to our Members who graciously offer their time to share their wealth of knowledge!

Joi & the Member Services Team

Fast Track 301: Astrophotography	Star Trails, Exposures, Lighting, Filters	January 13, 2018	EEO	David Ault
Fast Track 307: Intro to Stellar Spectroscopy	Intermediate/Advanced	February 2018	EEO	TBD
Fast Track 204: Satellite Observing	Novice/ Intermediate	March 2018	EEO	Terry Phillips
Fast Track 101: Myth and Sky	Novice	April 2018	EEO	Dawn Davies & Joi Chevalier

BE THE NEW EDITOR OF THE SIDEREAL TIMES!

The position of Editor of AAS' award-winning *Sidereal Times* is now available. If you are interested, please contact Tim Brown, president@austinastro.org.

SKYGLOW!

By Dawn Davies, Vice President



SKYGLOW Special Events January 12 & 13, 2018

Two great nights, one amazing speaker!

Harun Mehmedinovic is a Bosnian American jack-of-all-trades: screenwriter, director, cinematographer, professor and author. More importantly, for the astronomical community he is an advocate for dark skies and a crusader in the battle against light pollution. In partnership with photographer Gavin Heffernan, he launched SKYGLOWPROJECT.COM, an ongoing crowd-funded project about the impact our unnatural light has on North America's night skies.

Harun will be visiting from Arizona to talk about his project, successes, and the threat to which our dark skies are being subjected. Join the members of the Austin Astronomical Society for our monthly meeting and Harun's presentation on Friday. Then come out to the River Hills Neighborhood Association Under the Stars event Saturday to learn more and take in some night time observing.

January 12
Austin Astronomical Society General Assembly Meeting

January 13
River Hills Neighborhood Association Under the Stars Speaker Event

JANUARY OBSERVING TARGETS

By Brian Cuthbertson

Welcome to 2018. What this means for observers is, basically, that the winter Milky Way dominates observing agendas. From Perseus down through Auriga, Gemini, Orion, Canis Major and Puppis, there's plenty to see given cooperative weather. Orion usually takes center stage, but by no means contains the only interesting things worth looking at this month. Hence none of the objects below are in Orion. So get out and point your scope in your preferred direction; you won't be disappointed. Enjoy!

NGC 1647 rating EASY
open cluster in Taurus
RA 04h 46.0m Dec +19d 04' (2000)
Magnitude 6.4, dia 40'

Discovered by William Herschel in 1784, NGC 1647 is a sprawling open cluster in central Taurus easily found about half a binocular field NE of Aldebaran and the Hyades. It's even visible to the naked eye in dark skies, but a moonless night and transparent skies are needed to see it best, since most of the cluster's stars (90 to 200, depending on your source) are fainter than 9th magnitude.

50mm binoculars show about a dozen stars, plus a magnitude 6-7 double on the south edge. But larger binoculars show why NGC 1647 has been called the "Crab Cluster": two curving rows of stars toward the NW and West suggest pincers, four brighter outliers mark the leg tips, and a stellar clump in the middle marks the body.

A 2.4-inch refractor pulls in about 40 stars, a 6-inch gets you 45 or so, and a 10-inch catches about 60 within a minute of the center. In 12-inch scopes and larger, the cluster is too widespread to see in its entirety;

at low powers it's a loose collection of widely separated small groups.

Thought to be about 150 million years old, NGC 1647 lies roughly 1800 light years away. It sits behind the Taurus dark nebula complex, about 500 light years away, which spreads from roughly the California nebula in Perseus, down past the Pleiades, and into central Taurus where NGC 1647 is located.



William Herschel's telescope. From a drawing in 'The Imperial History of England, comprising the entire work of D. Hume,' David Hume, 1891. Credit: openclipart.org

NGC 2392 rating MEDIUM
planetary nebula in Gemini
RA 07h 29.2m Dec +20d 54.9' (2000)
Magnitude 9.2, 47x43"

Appropriately for cold winter skies, NGC 2392 is nicknamed the Eskimo nebula due to its distinctive appearance in images by large scopes. It can be found in Gemini south of Castor and Pollux, about 3 degrees ESE of Wasat (Delta Gem, made famous when Clyde Tombaugh discovered Pluto on a Delta Gem field plate on Jan 29, 1930). The planetary was discovered in 1787 by William Herschel.

Located roughly 5000 light years away, NGC 2392 is a small, bright blue planetary with a 10th magnitude type O8e central star. Visually, it's easily detectable in a 2.4-inch refractor 1.6' south of an 8.3-magnitude star, appearing a bit fainter but clearly larger than the star. The star's orange tint

JANUARY OBSERVING TARGETS, CONTINUED

provides a distinct contrast to the nebula's color, which is variously described as bluish, blue-green or gray-green. In a 6-inch scope the central star becomes very prominent, and in a 12-inch the nebula becomes a bright 45" diameter glow, with a noticeably bright area 15" across surrounding the central star.

The Eskimo consists of gas blown off by a roughly Sun-like star close to the end of its life. The Hubble Space Telescope has resolved the bright inner part of the nebula into a network of fine rings outlining two elliptical bubbles blown on opposite sides of the hot central star about 10,000 years ago. These bubbles (seen overlapping from Earth's vantage point) are about 1 light-year wide.

NGC 2316 rating: MEDIUM-HARD

Nebula in Monoceros

**RA 06h 59.7m Dec -07d 46.0'
(2000)**

NGC 2316 is a combined emission/reflection nebula in southern Monoceros Milky Way, about 10 degrees NNE of Sirius in Canis Major. The nebula is illuminated by a dim binary star which probably requires a 12-inch or larger scope to see. A CCD image will show a distinctly yellow color devoid of any blue nebulosity. This suggests the central star is embedded in a

dust cloud that considerably reddens its light before it is scattered by the surrounding nebula. Surrounding faint red stars may be pre-main-sequence systems.

The nebula itself is fairly easily visible in medium-aperture amateur telescopes, and appears in 8- and 10-inch scopes as an evenly illuminated glow just north of 3 faint stars.

REVISED BYLAWS VOTE ON FEBRUARY 9

By Joyce Lynch

For over a year several members have been working on a revision of the AAS bylaws. The proposed revision is now ready to be presented to the General Assembly for a vote. That vote will take place at the February 9 meeting, and the bylaws and an absentee ballot will be posted on our website by January 19, 21 days before the vote as specified in the current bylaws. Look for an email with the link soon.

Below is a list of major changes that are being proposed.

- Instead of Honorary Members, there will be Honored Lifetime Members who will have all the same privileges of membership as other members. As part of being honored for their contributions to AAS, they will no longer be required to pay dues.
- A household with at least one person eligible for a Senior membership will have dues reduced by 30%.
- There will no longer be a set membership year. Instead, when dues are paid, the membership year for that person (or household) will begin, and renewal will come due in a year.
- The Historian position has been eliminated.
- If an EC position is not filled at the April election meeting, the vacancy will be filled by appointment by the President with the approval of the EC.
- A specific meeting night for the GA is no longer included in the bylaws.
- Absentee voting for officers and bylaws amendments will now take place electronically rather than by U. S. mail.

Thanks to the members who contributed to the revision: Phil Schmidt, Sean Leary, David Mathias, Joi Chevalier, Mark Lyon, Kelley Knight, Tim Brown, Joyce Lynch.

MEMBERSHIP CARDS NOW IN YOUR PROFILES

At last, Wild Apricot, our membership database vendor, has made available to its customers membership card templates. Now, under your AAS membership profile you will see a mockup of a card with your name, Membership ID and membership expiration date. You are offered two options for displaying your card: one which is suitable for displaying from a smartphone, and another printable PDF which you can cut and laminate to your heart's delight.



WELCOME NEW MEMBERS!

Ross Abel
Zoe Amerigian
Ross Baker
Anna Castillo
Justin Elliot
Giri Gondi
Calvin Kelso

Ian Kelso
Thom Pfeil
Eric Ramos
Julia Robbins
Catherine Rothrock
Brandon Scruggs
Morgan Williamson

IMAGE OF THE MONTH

Congratulations to
ROB PETTENGILL, DECEMBER SOLSTICE CRESCENT MOON WITH EARTH-
SHINE!



The crescent Moon from Austin, Texas 2017-12-21 00:14 UT.

Questar telescope f15 1350/89mm with Sony a6300 camera at prime focus.
Foreground single exposure 2.5 sec at ISO 400, Earthshine 20 stacked exposures 0.8sec at ISO 400, Cres-
cent stacked best 16 of 50 exposures 1/25 sec at ISO 400.
Stacked and deconvolved in Lynkeos, HDR stack, and final crop in Photoshop.

MEMBERS' GALLERY - NATHAN MORGAN



The Dumbbell Nebula (also known as Apple Core Nebula, Messier 27, M 27, or NGC 6853) is a planetary nebula in the constellation Vulpecula, at a distance of about 1,360 light-years. This object was the first planetary nebula to be discovered; by Charles Messier in 1764. At its brightness of visual magnitude 7.5 and its diameter of about 8 arcminutes, it is easily visible in binoculars and a popular observing target in amateur telescopes.

*Dumbbell Nebula M27
Williams Optics 81GTF 81mm Refractor
Nikon D90 Mono TEC Cooled
Ha 16x900s (4 Hours)
OIII 15x900s / 5x600s (4.58 Hours)
SII 8x900s (2 Hours)*

*Total Integration = 10.58 Hours
30 Dark Frames
30 Flat Frames
200 Bias Frames
Processed In PixInsight*

MEMBERS' GALLERY - LAURIE ALLAI



NGC7635 The Bubble Nebula

OTA 1: Stellarvue SVQ100 F-5.8

Mount 1: CGX

Cameras: Canon 5DMkII, modified by Hap Griffin

Guided by: Stellarvue SV60 EDS and Starshoot Autoguider, PHD2.6

21 frames of 300 Sec at ISO2500

OTA 2: Celestron Edge 9.25 F/2.3 Hyperstar

Mount 2: CGE-Pro

Camera: Canon T2i, modified by Hap Griffin

Guided by: Astro-Tech AT60EDT and Starshoot Autoguider, PHD2.6

31 frames of 300 Sec at ISO2500



NGC7293 Helix Nebula

OTA: Stellarvue SVQ100 F-5.8

Mount: Celestron CGX

Camera: Canon 5D MkII, modified by Hap Griffin

Guided by: Stellarvue SV60 EDS and Starshoot Autoguider, PHD2.6

Oct. 21, 2017:

12 frames of 300 Sec at ISO3200

6 frames of 360 Sec at ISO3200

Oct. 23, 2017:

18 frames of 720 Sec at ISO3200

Captured with Images Plus Camera Control 6.0

Processed with Images Plus 6.5, Photoshop CS 6.0

COAT POCKET ASTROPHOTOGRAPHY

By Rob Pettengill

My affection for the miniature led straight to my interest in ultra-light astrophotography. I intend to push my boundaries and see just how portably I can configure an astrophotography kit that will take good images.

My current kit is based on an update to a camera that I've had good experience taking nightscape images with in the past. The Sony RX100 V has full manual controls and a 1" sensor with a crop factor of 2.7. This is one of the very smallest cameras with full manual controls. I've taken nightscape images with the first RX100. The updated camera has features that make it even better for astrophotography including: BSI sensor for better low light capability, a full electronic shutter for vibration free bursts, screen that swivels to face the front, time lapse support, and tethered wireless live view remote control software for a smart phone or tablet.

Lonely Speck (<https://www.lonelyspeck.com>) has a couple of articles that look at the astrophotography performance of the RX100 and other small cameras: *Photographing the Milky Way with a Point and Shoot: A Five Camera Low Light Battle* and *Sony RX100 Series Astrophotography Review*.

There are three configurations of different weights and capabilities that I use for camera lens based astrophotography:

1. Hand held - The lightest kit is to use the camera hand held or resting on a sandbag for long exposures. Weight is less than 9 oz including unfilled sandbag and easily fits in a roomy pocket.
2. Mini tripod - A mini-tripod and ball head gives more control and convenience adding 6 to 8 oz. Both can easily fit in a jacket pocket at a total weight of only 1 lb.
3. Star tracking drive - a driven mount allows longer exposures and can add panning to time laps video. I use the very compact Vixen Polaris star tracker which weights about 2 lbs with a ball head. This extra weight requires a tripod with a larger stance. I use a ZOMEI Z699C Carbon Fiber Portable Tripod with Ball Head which weighs 2.5 lbs. With the camera the total weight is about 6 lbs and easily fits in a day pack with room left for dinner and a coat. At this point a larger mirrorless camera and lenses (e.g. Sony a6000 series) will give improved image quality with about 2 lbs. additional weight for a total of about 8 lbs.

A coat pocket kit with mini-tripod is the sweet spot for a small camera. Adding even a very compact tracking drive makes stepping up to a larger size higher quality APS-C mirrorless camera logical.



My coat pocket sized kit includes a tripod. Most mini tripods are designed for views near the horizon and have balance or clearance problems when aimed at the zenith. My solution combines the very light and rigid Minox Pocket

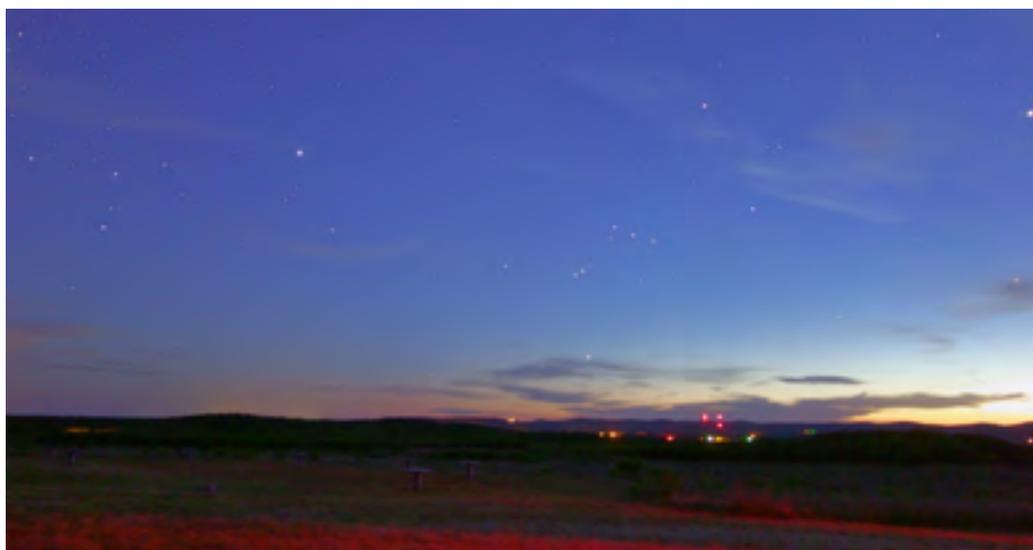
Tripod with an Oben BD-0 Mini Ball Head. The combination ensures that the camera will be balanced on the small tripod no matter



where I point it in the sky.



Venus and the moon with earthshine at the Austin City Limits Music Festival, exposed f/3.5 at ISO 800 for 1/13 sec zoomed to 20.6 mm without tripod.



Canis Major and Orion at sunset exposed f/1.8 at ISO 400 for 30 sec zoomed to 10.4 mm on a fixed tripod.

I plan to try the RX100V on the Polaris tracking mount. With the camera intervalometer app this should make longer exposure and stacked images easier, improving quality.

(images provided by author)

11TH IOAA

By Shubhanga Ballal

The 11th International Olympiad on Astronomy and Astrophysics (IOAA) was held from November 12-21 in Phuket, Thailand. Team USA placed 2nd out of the 44 countries, taking 2 gold medals and 3 honorable mentions.

The team was selected through exams administered by the USA Astronomy and Astrophysics Olympiad (USAAAO). High scorers on the first round of exams are invited to take the National Astronomy Olympiad (NAO) exam. The top five scorers on the NAO are invited to represent the USA at the international olympiad. The top fifteen scorers are invited to attend a training camp held during the summer at MIT to prepare for the IOAA, especially with respect to the observation portion.



Opening Ceremonies

The team was trained by Ioana Zelko and Roxana Pop, both graduate students studying astrophysics at Harvard.



Princess Galyani Vadhana

There are three separate exams counting toward an individual's score at the IOAA. The data analysis exam was a four hour exam testing the competitors' ability to interpret and graph astronomical data, and use this to analyze astronomical phenomena. The theoretical exam was a five hour exam which tested competitors' skills to solve problems in all areas of astronomy and astrophysics, like celestial coordinates, cosmology, stellar properties and evolution, binary systems, exoplanets,

optics, instrumentation, celestial mechanics, spectroscopy, etc. The observational exam tested competitors' skills in practical astronomy, such as identifying objects in the night sky, using telescopes, etc.

The IOAA was kicked off with an opening ceremony attended by Princess Maha Chakri Sirindhorn, who also delivered the keynote speech. During the week, competitors and coaches were taken on excursions to places around Phuket like a botanical garden, a dolphin show, and the beach. Other festivities included a cultural night in which there were presentations depicting Thai culture, as well

as small performances by various participating countries.

The USAAO is an organization run by undergraduate and graduate students across the nation, and the majority are former olympiad competitors. The website is usaaao.org



Closing Ceremonies

(images provided by author)

GIRLSTART OUTREACH REPORT

By Dana Leary

In 2016 we started a partnership with **Girlstart** in which monthly we provide an astronomy activity for girls ages 5 to 14. Each activity we share with them takes 5 to 10 minutes to complete.

Emphasis is placed on careers that the girls may consider; on encouraging the girls to ask questions and to answer them; and, to do their own work. Each month we provide information on AAS and our public star parties.

In 2017 we drew the Big Dipper and colored the stars; we talked about the Orion myth and the stars in Orion; made paper rockets and comets; drew Saturn and its rings; we used UV beads to emphasize the importance of protecting our skin in the sun; drew our galaxy and made 'you are here' points on the drawings; colored our solar system; and, made moon flip-charts.



NASA SPACE PLACE - STUDYING STORMS FROM THE SKY

By Teagan Wall



*This article is provided by **NASA Space Place**. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!*

The United States had a rough hurricane season this year. Scientists collect information before and during hurricanes to understand the storms and help people stay safe. However, collecting information during a violent storm is very difficult.

Hurricanes are constantly changing. This means that we need a lot of really precise data about the storm. It's pretty hard to learn about hurricanes while inside the storm, and instruments on the ground can be broken by high winds and flooding. One solution is to study hurricanes from above. NASA and NOAA can use satellites to keep an eye on storms that are difficult to study on the ground.

In Puerto Rico, Hurricane Maria was so strong that it knocked out radar before it even hit land. Radar can be used to predict a storm's path and intensity—and without radar, it is difficult to tell how intense a storm will be. Luckily, scientists were able to use information from a weather satellite called GOES-16, short for Geostationary Operational Environmental Satellite – 16.

The "G" in GOES-16 stands for geostationary. This means that the satellite is always above the same place on the Earth, so during Hurricane Maria, it never lost sight of the storm. GOES-16's job as a weather satellite hasn't officially started yet, but it was collecting information and was able to help.

From 22,000 miles above Earth, GOES-16 watched Hurricane Maria, and kept scientists on the ground up to date. Knowing where a storm is—and what it's doing—can help keep people safe, and get help to the people that need it.

Hurricanes can also have a huge impact on the environment—even after they're gone. To learn about how Hurricane Irma affected the Florida coast, scientists used images from an environmental satellite called Suomi National Polar-orbiting Partnership, or Suomi-NPP. One of the instruments on this satellite, called VIIRS (Visible Infrared Imaging Radiometer Suite), took pictures of Florida before and after the Hurricane.

Hurricane Irma was so big and powerful, that it moved massive amounts of dirt, water and pollution. The information captured by VIIRS can tell scientists how and where these particles are mov-



These images of Florida and the Bahamas were captured by a satellite called Suomi-NPP. The image on the left was taken before Hurricane Irma and the image on the right was taken after the hurricane. The light color along the coast is dirt, sand and garbage brought up by the storm. Image credit: NASA/NOAA

ing in the water. This can help with recovery efforts, and help us design better ways to prepare for hurricanes in the future.

By using satellites like GOES-16 and Suomi-NPP to observe severe storms, researchers and experts stay up to date in a safe and fast way. The more we know about hurricanes, the more effectively we can protect people and the environment from them in the future.

To learn more about hurricanes, check out NASA Space Place: <https://spaceplace.nasa.gov/hurricanes/>

JOINING AAS OR RENEWING MEMBERSHIP

To join or renew your membership to AAS, please visit: <http://austinastro.org/index.php/why-should-you-be-a-member/> AAS memberships run from 9/1 to 8/31, and there are five membership levels to choose from:

Household Bundle (up to 6 members) \$40.00 (USD)
Subscription period: 1 year on September 1st
No recurring payments. For members of a household living at the same address.

Junior \$15.00 (USD)
Subscription period: 1 year on September 1st
No recurring payments. For members up to age 18.

Students \$15.00 (USD)
Subscription period: 1 year on September 1st
No recurring payments. For members age 18 and older.

Regular \$25.00 (USD)
Subscription period: 1 year on September 1st
No recurring payments. For individual members.

Seniors \$15.00 (USD)
Subscription period: 1 year on September 1st
No recurring payments. For members 65 years of age or older.



Artwork courtesy of Mark "Star Man" Johnston



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Visit Dawn Davies' *Earthbound Astronomer* website at <https://www.earthboundastronomer.com/>

Amy Jackson's website is <http://www.starryskyaustin.com/>. Learn more about her children's book about astronomy at <http://www.starryskyaustin.com/childrens-book-project/>

Rob Pettengill's site can be found at <http://astronomy.robpettengill.org/>. Rob's material shared per CC BY-NC-SA 4.0 license.

Celestial Teapot's product catalog can be found at <http://messierplanisphere.com/>

Joseph Macry writes a weekly column for Manor Community News: "This Week in Astronomy". You can read the online edition here: <http://manorcommunitynews.com/>

TSP 2018

Last chance to sign up before the housing drawing on January 19th!

The great tradition of dark sky observing continues with the 40th Annual TEXAS STAR PARTY, May 6-13, 2018 near Ft Davis, Texas!

Staying on the Ranch in housing, RV, or camping? Staying off-site in other accommodations? Everyone needs to enter the TSP drawing, held in late January.

You should submit a Registration/Reservation Request Form to ENTER THE TSP DRAWING before January 19, 2018. This will provide you the highest possible chance of being selected as one of the 500 people who will be able to attend TSP this year.

Follow this link to get started! <http://texasstarparty.org/get-started/>

SIGN UP NOW!

You can find out the status of your TSP Registration at any time by visiting <http://texasstarparty.org/account/>

Find the latest news at:
<http://texasstarparty.org/news/>

Find out about our new Mirror-making Workshop, where you can make your own mirror during TSP!
<https://texasstarparty.org/mirror-making-workshop/>

Questions? Visit our web site for the latest and complete details!
<http://www.texasstarparty.org/> or email tsprooms@texasstarparty.org

We look forward to seeing you next May!