Star Trails in Kenton, OK
Michael Gratiot
December Calendar

Social
December 6 - Beginner Meeting @ Weldon Springs Interpretive Center, 7295 HWY 94 South, St. Charles, MO 63304

December 8 – 5-9pm Monthly meeting at Weldon Spring Interpretive Center, 7295 HWY 94 South, St. Charles, MO 63304. Ham will be the main meal by Doug Gilmore. Complimentary dishes and desserts are encouraged and welcome.

December 18, 7pm – 9pm DigitalSIG Astrophoto and DIY-ATM group meetings. The main topic is Tinkercad presented by John Duchek. Weldon Spring Interpretive Center, 7295 Highway 94 South, St. Charles, MO 63304.

December 26 – Normal DIY-ATM group meeting canceled until January.

December 7, 14, 21, 28 - 7 pm start times Broemmelsiek Park Public viewing, 1593 Schwede Road, Defiance, MO 63341, weather permitting.
A newsletter is only as interesting as the material sent in by contributors.

Would you like earn the eternal gratitude of your fellow club members and intergalactic recognition in our newsletter? Send a note to your friendly editor on any astronomy related subject at newsletter@aseonline.org I’ll get it posted in the monthly newsletter.

Your editor at large (not large editor),

Jim Curry
Notes from the Executive Director:

Greetings!

This November has seemed more like a January or a February! Plenty of snow and COLD temps. Probably more of this yet to come this winter, once winter actually 'starts'!

December will have a few things going on to be aware of. For one, we still have ASEM Calendars available! Of the 150 printed, only 38 un-claimed so far (another 14 ordered but not yet picked up/paid). I will bring them to our December 8 ASEM meeting. If you can't be there to pick yours up, please make other arrangements with me to either meet up or I can mail yours.

Comet 46/P Wirtanen may be boom or bust, like any comet, but it is gathering excitement for its' close pass by Earth at its' perihelion around mid-December. You'll need to plan on late PM viewing when the moon is not in sight. It may or may not be visible naked-eye, and I think binos may give the best views. It is still pretty low in the sky at "press time" but is already technically mag 6 and still over 2 weeks from perihelion. Lots of folks born after 1996 (so, 22 yrs old or younger) have NEVER seen a comet so we need to give the public a chance to see it if we can.

We only had one good Friday night in the month of November. Hopefully we'll have one or more good Friday nights at Broemmelsiek Park in December. Even sweeter if it can stay above 32°F in the evening hours.
The Mars INSIGHT lander looks very successful so far. I watched the landing on NASA TV and it was pretty cool. Hopefully it will accomplish some good science in addition to the successful landing. Maybe we will have a report at the Dec 8 Meeting??

I hope everyone gets all of the astro-goodies on their Christmas lists! Happy Holidays!

Clear Skies!

Jim Twellman, Executive Director, Alliance for Astronomy (dba Astronomical Society of Eastern MO)
November Broemmelsiek reports

By Bill Fisher

November 2nd, 2018

The Nov. 2 FNOH was a no go due to inclement weather.

November 9th, 2018

The Nov. 9 FNOH event did not occur due to inclement weather. Hopefully better weather and viewing conditions will manifest for the Nov. 16 FNOH.

November 16th, 2018

Finally, clear skies for a FNOH, though we did need to fight the dew most of the evening.

The ASEM members who participated included:

Jim Stenzel
Steve Boerner was also present and was very active teaching Girl Scouts about various aspects of astronomy and what they were viewing.

About 30 from the public attended including a group of Girl Scouts that included 14 Scouts and 14 adults and friends. They were working towards and astronomy badge and needed to see objects through a telescope, talk to at least one astronomer, and visit an observatory. The Girl Scouts visited all ASEM members. They spent quite a bit of time with Jim Twellman who provided a great deal of information. By the end of their visit they had accomplished all requirements.

The visitors also included a couple of young men who needed to complete homework for an astronomy class. They needed to view a deep space object and draw what they saw. Jim Stenzel took care of their needs with the 16" JB Dobsonian telescope. Jim reported the 16" JB Dobsonion as well as a 2" telescope was very popular during the evening. Ed White was kept busy operating the C-14 in the observatory. Objects viewed using all ASEM provided telescopes included globular and open star clusters, Mars, and the Moon. I showed the Moon and provided two different views. One was a view of the the whole Moon; a view the children requested. With the other I zeroed in on a small spot on the Moon that included a crater and a lunar dome with a still visible vent. From lunar domes basaltic lava would have flowed roughly two billion years ago. I provided that later view to primarily the adults.

Jim Stenzel and Mike Krawczynski stayed until well after midnight. Friday was close to the prime date for the Leonid meteor shower, but the shower did not show until after midnight. Jim Stenzel reported a good view of that shower.

Other than the fact that the light from the Moon obscured some of the fainter objects, it was a good night. The sky was clear and the temperatures started in the low 40's and dipped into the mid 30's by 9 PM. Ed closed the observatory around that time and I left around that time and most of the public left between 8:30 and 9 PM. I left at 9.

November 23rd, 2018

The Nov 23rd FNOH did not occur because of inclement weather.
November 30th, 2018

I arrived around 7 but only stayed until about 7:20. Nobody showed except for a deer that walked in front of my car on Schwede Rd. The park was dark and desolate with total cloud cover and a developing fog. The FNOH was not held due to inclement weather.

Hopefully December will bring clear skies.
2019 ASEM Calendars
Place your order now with Jim Twellman
There are a few left, order soon.
Front
CATCHING THE STARS
A 12-MONTH CALENDAR FEATURING PHOTOGRAPHY BY MEMBERS OF THE ASTRONOMICAL SOCIETY OF EASTERN MISSOURI

The Astronomical Society of Eastern Missouri (ASEM) is the public outreach activity of the Alliance for Astronomy, Inc., a Missouri Non-Profit Corporation.

The mission of the Alliance for Astronomy is to promote public awareness, appreciation, and education in astronomy and related sciences.

Learn more about ASEM at asemthe.org

PHOTOGRAPHERS
- EDDIE AGHA
- DAN CROWSON
- JOHN DUCHEK
- MICHAEL GRATIOT
- RYAN JONES
- MIKE KRAWCZYNSKI
- GRANT MARTIN
- WILLIAM NEUBERT
- MIKE PUSATERA
- GREGG RUPPEL
- FREDERICK STEILING

Dates and times throughout the calendar are provided in 24-hour CST/CST format.

ASEM-promoted events are based on schedules as known at the time of publishing. Outdoor events are typically “good weather permitting.”

Dates, times, and locations are subject to change. The latest information available can be found at asemthe.org

FRONT COVER: The Heart Nebula
Photograph by Ryan Jones

LEFT: Ecliptic Chromosphere and Prominences
Photograph by Grant Martin

RIGHT: Lunar Mosaic
Photograph by Mike Krawcynski

ALWAYS USE PROPER FILTERING/PROTECTION WHEN VIEWING OR PHOTOGRAPHING THE SUN
Upcoming Comet Chart
Submitted by Jim Twellman

46P/Wirtanen

Look at that comet move! The year ends with a bang as 46P/Wirtanen makes one of its closest approaches to Earth and brightens from magnitude 6 in mid-November to 3 or 4 in mid-December while racing from Fornax to Auriga. Stars shown to magnitude 5 with positions marked every 3 days. SkyMap with additions by the author.
I'm going Christmas shopping. Who knows what I'll find?
I'll be back around 1:30

Is that this great? And it's another telescope? Thanks (Of course)

Astro Funies By Annalise

Created by Annalise Biermann
Upcoming Occultation Predictions
Submitted by Steve Boerner

The “best” event of the month is probably the Dec. 13th (really 12th between 7 PM and 8 PM our time) as the Moon occults/grazes Deneb Algedi. Unfortunately St. Louis is a bit north of the path so an hour drive south would be needed to see it.

Occultation prediction for St Louis MO
Longitude -90 12 24.0, Latitude 38 37 48.0, Alt. 139m
Occulted stars brighter than magnitude 7.0

All times are in UT.

day Time P Star Sp Mag Mag % Elon

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The December 13th graze will be visible on a line between Okawville, IL and Park Hills, MO.
The December 21st graze will be visible on a line between Louisiana, MO and Mark Twain Lake. Consult Occult 4.2 or other source for the actual path since the towns are near, but not actually the best places to view.
Sad Astronomical League News
Submitted by Steve Boerner

Astronomical League President William Bogardus 1949-2018

Astronomical League President Bill Bogardus passed away on Saturday November 24 after a year-long illness. His wife, Kim, was at his side, and his family comforted him over the Thanksgiving holidays.

Bill had been in active service to the Astronomical League ever since he received his Master Observer plaque at ALCon 2006 in Arlington, TX. He encouraged the club he was a member of, the Amateur Observers’ Society of New York (AOSNY), to host ALCon 2009. After Chairing that convention, he ran for Astronomical League office, becoming secretary in 2009, then vice president in 2014. This past summer, Bill was elected Astronomical League President.

In addition to his leadership roles in the League, he created and administered the AL Radio Astronomy Observing Program, and administered the AL Master Observer Plaque Program. In 2013, Bill received the G.R. Wright Award for Outstanding Service to the Astronomical League and Astronomy.

A few of his non-League, astronomy-related activities included being chosen in 2016 for the Astronomy in Chile Educator Ambassadors Program (ACEAP); and viewing total solar eclipses in China, and the South Pacific. (Of course, he witnessed with his family the August 21, 2017 eclipse from Casper, WY.) He also traveled for southern skies viewing in Bolivia and Chile, and aurora observing in Sweden.

Amateur astronomy was lucky to have had Bill Bogardus play an active role. He will be sorely missed.

I had the pleasure of corresponding with Bill as I worked through the three levels of the AL's Radio Astronomy Observing Program. He truly will be missed.
Alfred Schovanez and Jerry Kelly are mentors for the ASEM Beginner Meetings. These are scheduled for the first Thursday evening of every month in the meeting room of the Weldon Spring Center.

You don’t have to be a beginner to come to the meetings. Many an old pro will admit that there is always more to learn. There is always time to address issues and questions.
November DIY Meeting Notes
These Folks Have Solutions To Problems You Didn’t Know You Had
Reluctantly Submitted This Month By Steve Boerner and
Cheerfully Submitted By Tom Richards

From Steve: (He worked with Holly who brought here dob to the meeting)
Only three at the meeting tonight. Holly, an EMT, who'll use an Orion dob at her sister's place out in the country. She works nights so she's unable to come to meetings or FNOHs.

I don't think I'd recommend the scope to others. It uses two very strong springs to hold the OTA to the base and create friction for the Alt axis. The scope is designed to leave the springs on all the time, but that makes transport a whole lot more difficult that it should be. I don't think Holly would be able to carry the scope in one piece. The springs were a pain (and I only put on one) to stretch into place. I doubt that Amy W could have done it. Without the springs the OTA seemed just a bit front heavy and did a slow nose dive with only a 25mm ep and the RDF. Yes, the springs could be avoided by putting enough balancing magnets back by the mirror.

Additionally the OTA is pretty long and takes a good sized person with long arms if they want to lift it with on hand on each end. Holly was able to do it but it was a struggle. The Orion site says the OTA is just shy of 48” so it should be able to fit across the back seat of a car. Packed in the definitely not but the box was pretty flimsy and isn't going to last very long since it already has a good sized dent in it.

All in all I think I'd recommend the 10” collapsible SkyWatcher dob. They are both made by Synta, are f/4.7, and have 2” focusers with a 2” to 1.25” adapter included. The Orion comes with a 25mm ep and 2x Barlow while the SkyWatcher comes with a 25mm and 10mm. The Orion had a RDF while the SkyWatcher has an 8x50 right angle finder. Currently the SkyWatcher is $15 less in price. The bases are about the same size but the collapsible OTA on the SkyWatcher makes the package much smaller and there are no springs to mess with either.

Tom Richards wrote:
Well, I got there around 6:45PM and Steve was in the room waiting. We chatted till shortly after 7PM and no one else showed up. Just when I thought of calling it for the night a young lady, Holly ? (I missed the last name), showed up with a brand new Orion 10 inch Classic Dob (for someone she knows who lives in the country?) and wanted help putting it together. So, after unboxing and laying the parts out, I left Steve in charge who was busy on the base with screwdriver in hand. I had to bug-out on errand runs before getting home. Holly was referred to the DIY meeting by Jerry and had visited a club meeting a year ago.

So, thank you Steve for helping her out with the assembly and I trust a bit of orientation on the use. If there was any more interesting details on the scope or assembly, please let us know. I have been recommending that brand/model to others interested in getting a starter scope and I am very curious as to quality of build. Everyone looked great in the box. I will send Jerry a thank you note on the referral. Made me wonder if something like this might happen on the Beginners night as well. Tis the season.
November’s Digital SIG meeting consisted of presentation and discussion about color spaces. You can find the slides from Bill Neubert’s presentation on the following pages. He also developed a spreadsheet that can be found here - https://www.crowson.com/ASEM/Colors.xlsm. The presentation and files can also be found in the Files section of the ASEM Digital SIG Groups.io group.

Michael Gratiot and Ryan Jones talked about their recent trip to Kenton, Oklahoma (see images they took in the pictures section later in this newsletter). Michael showed some drone footage along with some 3d maps created.

December’s meeting will be held on Tuesday, December 18th. We’ll combine with the DIY group and have a presentation by John Duchek on Tinkercad. This program is used for 3d printing.

I’m currently looking for topics for the January meeting. If you have something you would like to present or something you would like to know about, please send me an email (dcrowson at crowson dot com). I meet a lot of people when I’m out imaging but I tend to show up after dark, half an hour later than I should and never manage to circle back around.

The latest Digital SIG news can always be found in the ASEM Digital SIG group here - https://groups.io/g/ASEMDigitalSIG. Discussions in the last month have been on images, what science can be done, new equipment and various other things.
Color Spaces and Astrophotography

Bill Neubert
November 19, 2018

My Motivation was to Understand Why Ha seems Naturally Saturated in Some Images, and Washed out in Others

NGC6888 versus NGC504
The Human Visual System Has Evolved to Be Energy Efficient at Fundamental Tasks

**Human Visual System Evolved for Energy Efficiency**
- Tuned to the peak of the solar spectrum
- Brightness changes are more important than color changes
  - The shape of an object is determined by intensity changes rather than color changes
  - The outline of a moving object is more important than how color is changing with motion
- Intensities are highly non-linear
- Missing information is “filled in” by the brain
  - Colors might be assigned from shape memory rather than direct detection
  - Defaults to “white”

**Electronic Display Systems Evolved for Storage Efficiency**
- Colors are tuned to phosphors or dies
- Colors are “given up” to reduce memory usage
- Colors are refreshed less often in video

**International Standards**

- Earliest known understanding of the “tri-stimulus” nature of human vision traces to Thomas Young in 1802
- International Commission on Illumination (Commission Internationale de l’Eclairage, or CIE) formalized color science and “standard observers” in 1931, with a significant update in 1976
  - Corresponds with advances in color photography electronic representation of colors
  - Referred to a “CIE 1931 or “CIE 1976” as shorthand
- CIE standards play an increasingly critical role is the international standardization of illumination and color
  - Automotive and aerospace indicator lighting
  - Printing industry
CIE Defines Standard Observers

The tristimulus values for a color with a spectral radiance $L_{\lambda,\lambda}$ are given in terms of the standard observer by:

$$X = \int L_{\lambda,\lambda}(\lambda) \bar{x}(\lambda) \, d\lambda$$
$$Y = \int L_{\lambda,\lambda}(\lambda) \bar{y}(\lambda) \, d\lambda$$
$$Z = \int L_{\lambda,\lambda}(\lambda) \bar{z}(\lambda) \, d\lambda$$

$$x = \frac{X}{X + Y + Z}$$
$$y = \frac{Y}{X + Y + Z}$$
$$z = \frac{Z}{X + Y + Z} = 1 - x - y$$

All color spaces are a variation of the weighting in these equations!

Chromaticity Diagram shows the Gamut of Human Vision

- Unit distances at any point in the diagram result in receptor stimulation (not necessarily color)
- The boundary represents completely saturated colors
- If you choose any two points, then any color in between is a linear mix of those two colors
- Any three points, properly chosen, can reproduce most of the colors in the diagram
- Blackbody radiators can only occupy colors represented by the central curve
Color Spaces for Devices

- A specific combination of selected standard colors that, when combined, produce a variety of perceived colors
- A color space does not necessarily reproduce each human perceptible color
- A display or printer can have more than three corner colors in order to reproduce a wider range of perceived colors

RGB Color Space

- **Device dependent**
- Covers a **sub-set of the human gamut of colors**
- Minimizes storage space
- Covers 35% to 65% of the gamut, with >99% memory efficiency

By The uploader was DZiklym at English Wikipedia. - Transferred from en.wikipedia to Commons by Acaellies, CC BY-SA 3.0, https://commons.wikimedia.org/w/index.php?curid=34093535
CIE 1976 \( L^*, u^*, v^* \) (CIELUV) Color Space

- Attempted better perceptual uniformity
- Extensively used in computer graphics

CIE 1976 \( L^*, a^*, b^* \) (CIELAB or “LAB”) Color Space

- Developed for digital image processing
- \( L^* \) = Luminance, \( a^* \) = Green-red, \( b^* \) = Blue-yellow
- **Perceptually uniform**: equal amount of numerical change in values corresponds to the same amount of perceived change
- Covers the **entire human gamut** and “impossible colors”
- **Device independent!**
  - Used in Adobe PDF
  - Is the least memory efficient and requires more image storage space than RGB: Great for TIFF, no better for JPEG
Color Contrast is Intensity Dependent

- Very dim and very bright objects appear gray to white
- Color is more difficult to determine for small objects, such as stars. As a result, these objects often appear white or less saturated.

Colors Differentiation Versus Intensity
Color Spaces are 3D

- Colors “wash out” to yellow and white at high intensity
- Colors “fade out” to grey at low intensity

Standard “White” Sources

- “White” in the color sense means that the color coordinates fall on the blackbody radiation line
- CIE Defined “Standard Illuminants”
  - A – Tungsten domestic lighting
  - B, C – Daylight simulation
  - D – Specially derived standardized “daylight”
  - E – “Even” weighting to all wavelengths
  - F – Fluorescents
  - L – LED

- “A32” indicates a 3,200K (tungsten) radiator, “D65” means a 6,500K Daylight radiator
- Reflected Colors are only defined against the standard illuminant
- D65 is the most common definition of “white”
- Blackbody radiators can only be the colors
Stars are, Essentially, Blackbody Radiators

- The human eye is most sensitive to green light at 550 nm because that is the peak wavelength emitted by the sun’s surface
- Blackbody radiators produce green wavelengths, but are never a green color!

Saturation

- Saturation measures the breadth of spectrum distribution that makes up a color
- Saturation is highest when there is the greatest proportional separation between the R, G and B components in a color space
- In CIELAB, the unofficial equation is:
  \[ s = \frac{\sqrt{a^2 + b^2}}{\sqrt{a^2 + b^2 + L^2}} \]
- In general, saturation decreases with increasing luminance
Helmholtz–Kohlrausch effect Makes Saturated Colors Appear Brighter

- Objects of higher saturation will appear brighter, even if their luminance is equal
- Red LED airport landing lights appear twice as bright as the equivalent incandescent lamps
- Hα will naturally appear brighter when saturation is increased, so increase saturation before adjusting brightness

Color appearance phenomena and visual illusions, From Part III - Color phenomena, By Garrett M. Johnson
Edited by Andrew J. Illing, University of Rochester, New York, Mark D. Pantelakis, Rochester Institute of Technology, New York, Anna Prandtli, University of Sussex
Publisher Cambridge University Press, https://doi.org/10.1017/9781316593144.014, pp.679-702

Metamerism is producing the same humanly perceived color using different spectral content

- The eye integrates across a range of wavenhghts. It is not a spectrometer
- Different spectral curves can produce the same “white point”
My Motivation was to Understand Why Ha seems Naturally Saturated in Some Images, and Washed out in Others

Chroma Subsampling in Video Compression

- Takes advantage of the human visual system’s greater attention to luminance contrast changes versus color changes, in order to reduce video file size
- Corresponds to “binning”, but in the time domain
- Defines how often the color information is updated versus the luminance information
  - 4:4:4 means the luminance and chrominance are updated at the same rate
  - 4:1:1 means the chrominance is updated at one-fourth the rate of the luminance
What this means for us imagers

- **Brightness Matters**
  - When stretching or adding luminance, avoid channel saturation
  - Keep the RGB lower in the range
  - For LRGB, keep each channel below ~80% of full scale for regions of interest

- **Size Matters**
  - Stars require stronger saturation than extended nebula because of their small size.
  - For small objects or high frequency color changes, enlarge the image scale for the viewer

- **Compression Matters**
  - RGB covers a sub-set of the human visual gamut; CIELAB covers the full gamut
  - When color taking color video, or producing color video output, check resolution, spatial feature compression AND chroma sub-sampling

- “Green” is not common in astrophotography because blackbody radiators emit green wavelengths, but do not produce green colors
### Equipment Check Out

**as of 11/30/2018**

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 inch scope</td>
<td>Nolan's 12</td>
<td>Jim Twellman (8/5/2016)</td>
</tr>
<tr>
<td>Big Binoculars 25x100 Bresser</td>
<td>25x100 Bressia binoculars</td>
<td>Dave Reed (10/16/2018)</td>
</tr>
<tr>
<td>Canon T3i camera</td>
<td>Canon T3i camera</td>
<td>Jerry Kelly (5/12/2018)</td>
</tr>
<tr>
<td>Coronado PST</td>
<td>Personal Solar Telescope</td>
<td>Dan Crouson (7/14/2018)</td>
</tr>
<tr>
<td>Denkmeier Bino-Viewer</td>
<td>Denkmeier Bino-Viewer</td>
<td>Bill Sheehy (5/12/2018)</td>
</tr>
<tr>
<td>Denkmeier Bino-Viewer 2</td>
<td>1.25&quot; Denkmeier Bino-viewer &quot;STAR SWEEPER&quot; - 2 pcs 2x MULTIPLIER - 2 pcs</td>
<td>Amy White (12/9/2017)</td>
</tr>
<tr>
<td>Equatorial Platform</td>
<td></td>
<td>Grant Martin (9/14/2013)</td>
</tr>
<tr>
<td>Eye-piece/Filter kit</td>
<td>versat 1.25 inch eyepieces &amp; filters (O III; H Beta; UHC)</td>
<td>Fred Schovenez (10/14/2017)</td>
</tr>
<tr>
<td>Lunt - Stack Filter</td>
<td>Stack Filter used on Lunt Solar telescope</td>
<td>Fred Schovenez (9/14/18)</td>
</tr>
<tr>
<td>Lunt Solar Telescope and mount</td>
<td>L550flte filter - 60mm</td>
<td>Fred Schovenez (9/14/18)</td>
</tr>
<tr>
<td>Orion SkyQuest XT6</td>
<td>6&quot; dob with 10mm &amp; 25mm eyepiece.</td>
<td>Mary Anderson (9/5/2018)</td>
</tr>
<tr>
<td>SBIG STL-1001 camera</td>
<td>SBIG STL-1001 Camera</td>
<td>Kirk Steinbruegge (5/12/2018)</td>
</tr>
<tr>
<td>Star Alphas</td>
<td>Herald-Soboff Astrosalas</td>
<td>Chuck Simms (12/9/2017)</td>
</tr>
<tr>
<td>Starmaster 14.5&quot; telescope</td>
<td>Starmaster 14.4 inch telescope</td>
<td>Fred Schovenez (6/9/18)</td>
</tr>
<tr>
<td>WC2 Meade Ultra Wide Angle 4.7mm</td>
<td>WC2-1.25&quot; Meade Ultra Wide Angle 4.7mm Mill-Coated eyepiece</td>
<td>Kirk Steinbruegge (10/14/2017)</td>
</tr>
</tbody>
</table>
Please shoot me a note if your ad is no longer current
jjc@structureguard.com

**Free for the taking:**
Fiberglass tube for 8” reflector – x Cave f/5, contact Jim Curry jjc@structureguard.com

For Sale:
Sky View Pro 8 for sale many extras - $500, contact Dennis Montgomery
dennismontgomery8@gmail.com
ASEM Members Photography

A section for ASEM members to distribute their photographs within the Society. Whether you’re shooting digital, film or working in charcoal (hand sketching), this page(s) is for members to show us what you’ve seen and how you recorded it. Sunsets, supernovas, sundials, Stonehenge. Crepuscular rays, planetary alignments, or Markarian’s Chain. If it’s something we have to look up to see it will probably interest this crowd of inquisitive folks.

Sharpless 179 – Dan Crowson – Animas NM

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Comet 46P Wirtanen – Gregg Ruppel – Animas NM
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vdB 30 – Gregg Ruppel – Animas NM
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IC 405 and NGC 1893 – Ryan Jones – Kenton OK
LDN 1235 (the Shark Nebula) – Michael Gratiot – Kenton OK
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NGC 7245 + King 9 – Dan Crowson – Animas NM
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https://www.flickr.com/photos/dcrowson/45817349571
C/2018 V1 Macholz-Fujikawa-Iwa – Gregg Ruppel – Animas NM
vdB 10 – Dan Crowson – Animas NM
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Comet 38/P Stephan-Oterma and NGC 2392 (Eskimo Nebula) – Gregg Ruppel – Animas NM
vdB 29 + 31 – Gregg Ruppel – Animas NM
NGC 7023 – Ryan Jones – Kenton OK
vdB 49 – Dan Crowson – Animas NM

https://www.flickr.com/photos/dcrowson/30798984937
Pegasus Dwarf – Dan Crowson – Animas NM
https://www.flickr.com/photos/dcrowson/45650577582
vdB 11 – Gregg Ruppel – Animas NM
LattePanda Unboxing – Rick Steiling (we miss your astronomy images)
Club Contacts

Membership
Membership issues can be addressed through our executive director Jim Twellman at these addresses:
Email: jtwellman@asemonline.org.
Snail mail:
Alliance for Astronomy (ASEM)
8 Rudder Court
Lake St. Louis, MO 63367

Committees
Comments, questions, suggestions and money (just kidding) may be sent to the following addresses:
program@asemonline.org
Use this address to communicate with the program committee. If you have something to present at a meeting or wish to contribute and let someone else perform, send it here. Questions and/or suggestions about programming etc. Remember, they are here to help you. This is a user friendly society and we like to see members get up and share.
equipment@asemonline.org
This address is used to find out about ASEM loaner equipment. If you find something amiss at BPark by all means report it here. If you are curious about borrowing an item, put in a request via this address.
hospitality@asemonline.org
Got a main dish you’d like to bring to the potluck? We sure could use it AND you will be reimbursed for your expenses.
newsletter@asemonline.org
Primary contact for the newsletter. Got an article or notice you’d like to see published? Send it here and be famous!
Outreach@asemonline.org
Special requests for groups at Broemmelsiek Park including:
• Notice of large party (more than groups of twenty)
• Request for specific requirements needed (school assignment, merit badge requirements, etc.)
• Requests for Star Party / Telescope event at another location
webmaster@asemonline.org
Kirk Steinbruegge is now our webmaster. Shoot him anything you want posted on our Web page

Entertainment
Late breaking news and member adventures (or shenanigans as the case may be) can usually be found at STL Astronomy in yahoo groups. If you aren’t a member, you should join. Go to http://tech.groups.yahoo.com/group/STLAstronomy/ and click “Join”

Think Clear, dark skies