

THE EVENT HORIZON



ST. LOUIS ASTRONOMICAL SOCIETY

Devoted to the Interest and Advancement of the Science of Astronomy

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Mid States Region



The Golden Age of Exoplanet Discovery Dr. Peter Plavchan Missouri State University

Dr. Peter Plavchan of Missouri State University will be featured at the January meeting of the St. Louis Astronomical Society. The meeting will begin at 7:30 PM Friday, January 20, in McDonnell Hall, Room 162, on the Washington University campus, Saint Louis, MO 63130. McDonnell Hall is accessible from Forsyth Boulevard via Tolman Way. Yellow zone and street parking are available to the audience.

In 1992, the first two planets orbiting another star were detected. In 1995, another was found around a different star. By January 1, 2017, more than 3,500 "exoplanets" have been detected. Most planets have been found indirectly, but a few have been photographed directly. Some exoplanets are roughly the size of Earth. Some may have surface conditions suitable for alien life to develop. Dr. Plavchan will talk about how exoplanets planets are

detected and why so many planets have been found during the past few years. He will explain why the 21st century has turned into the "golden age" of exoplanet discovery.

Peter Plavchan is an Assistant Professor in the Department of Astronomy, Physics, and Materials Science at Missouri State University in Springfield, Missouri. He earned his Doctoral degree in Physics from UCLA. Prior to joining the faculty at Missouri State, he was an Assistant Research Scientist at the NASA Exoplanet Science Institute at CalTech. His research interests include the study of exoplanets, small cool red stars, planetary formation, and the specialized instruments required for these research areas.

Upcoming Meetings:

February - Pamela Gay, PhD - Super-Secret Squirrel Stuff - SIU-E

March - Christine Floss, PhD - TBA Wash U

April - Kevin Evans, PhD - Weaubleau Impact Structure - MSU

May - Kara Kundert - Cosmic Epoch of Reionization "Skype" - UC Berkeley

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Homemade Fest 2017

Saturday, February 25, 2017
Kirkwood Community Center

Join fellow SLAS members and guests for our annual winter pot-luck dinner meeting. Doors open at 4:30 pm to unload equipment and food and set up the room. We will begin eating at 6 pm.

Formal Opening and presentations begin at 6:45 pm. This is a show-and-tell meeting. Members are encouraged to present anything of astronomical interest they have bought, built, refurbished, improved or just can't do without. You can present your favorite image or explanation of a concept as well. This is your chance to share with your fellow SLAS members. SLAS will provide the soda, coffee and paper goods. So bring a favorite dish or dessert to share and let's enjoy each other's company and love for Astronomy on this long winter's night.

Attendance prizes will be drawn throughout the evening

If you have questions or wish to present, please contact Bradley Waller at vicepresident@slasonline.org for more information. This event is free to all SLAS members and their families. Guests are \$5 each. RSVP on SLAS Night Sky Network is optional but encouraged.



Presidents Corner - Jim Small

Thank you so much for all the members who have volunteered for the more than 150 outreach events we had last year. We reached thousands of people with these events and we expect to reach even more people this year because of the Total Solar Eclipse in August. Without you, we would not be able to reach so many people. The Night Sky Network pins pictured below will be given at the February meeting. Please try to come and be recognized at the meeting.

Homemade Fest will be held Saturday, February 25th at the Kirkwood Community Center from 5-10pm. Doors will be open from 4-11 for us to set up and tear down. Bring your favorite dish! If you wish to present, contact Bradley Waller to let him know. Be sure to RSVP on Night Sky Network so we know how many to expect.

The Eclipse Expo scheduled for Saturday, June 17 will be a spectacular event. We expect thousands of people to attend and we will need your help to run the event. Be sure to contact Don Ficken if you wish to par-

ticipate.

The June SLAS meeting will be held at the expo on Friday, June 16. This represents a great opportunity for us to have a very large crowd and possibly the media at one of our meetings! AND, the parking is FREE!

The International Space Development Conference for 2017 will be located in St. Louis and they have invited SLAS as a cosponsor and would like SLAS members to volunteer to help with the conference in exchange for a reduced rate for attendance. This is a huge conference with around 1000 attendees and hundreds of speakers. It would be fascinating to attend. The conference is 4 days: May 25-29 over Memorial Day weekend. **Link:** <http://isdc.nss.org/2017/>

We tried to negotiate to resolve the parking situation for the Friday night meetings, but Wash U is holding firm on their decision to not allow us to park in the red zones. Please park in yellow zones, on Forsythe, at metered spaces (meters not active after 6 p.m.), and in Car Pool spots (not reserved after 2 p.m.)

**Outreach Awards
for 2016**

Here are the volunteers for 2016. We had 26 members who have 5 or more events and qualified for the Night Sky Network Outreach pin. We have exceeded our 2015 totals of 1396 hours for 150+ events. Any volunteer logging 6 or more hours for a single event is credited for 2 events, such as long events like Astronomy Day, Telescope Building and Sidewalk Solar Observing.

Thank you so much to all our volunteers! We couldn't have done it without you! We look forward to a year of great outreach in this year of the Great American Eclipse!

Pins will be given at the February meeting!



Member Name	# of Hours	# of events
Donald Ficken	234.5 hours;	100 events
Cook Feldman	200.1 hours;	61 events
Larry Campbell	100 hours;	40 events
John Beaury	133.5 hours;	39 events
Rich Heuermann	105.5 hours;	39 events
Mark Jones	100 hours;	34 events
Frank Mack	60.3 hours;	27 events
James Small	71 hours;	26 events
Rick Menendez	49.3 hours;	16 events
Sharon Bertram	44.5 hours;	15 events
Richard Jennings	35 hours;	14 events
Richard Fefferman	29.5 hours;	12 events
Jim Trull	29 hours;	9 events
Bill Biermann	19.6 hours;	9 events
William Neubert	27.3 hours;	8 events
William Winningham	23 hours;	8 events
Bill Breeden	21.5 hours;	7 events
Robert Drzymala	21.5 hours;	7 events
Michelle Birch	24.5 hours;	6 events
Ann Trull	16.5 hours;	6 events
Edward Frey	16 hours;	6 events

Jeffrey Strauss	17 hours;	5 events
Rita Breeden	15.5 hours;	5 events
Josh Zitko	15 hours;	5 events
Doug Blum	13.5 hours;	5 events
Benjamin Winningham	12.5 hours;	5 events

Thomas Schloemann	12.5 hours;	4 events
Gregory Rigelman	11.5 hours;	4 events
Wayne Clark	14 hours;	3 events
Robert Beebe	10.5 hours;	3 events
Gregg Ruppel	9 hours;	3 events
Lynn Fee	9.5 hours;	2 events
Gregory Gaines	9 hours;	2 events
Marlene Bopp	8 hours;	2 events
Dale Engelbrecht	7.5 hours;	2 events
Gaylene Engelbrecht	7.5 hours;	2 events
Alan Sapia	7 hours;	2 events
Bradley Waller	7 hours;	2 events
Gary Holt	7 hours;	2 events
Gerald Hutchins	7 hours;	2 events
Renee Mettle	7 hours;	2 events
Brian Mills	6 hours;	2 events
Cathy Hooper	6 hours;	2 events
Nancy Clark	6 hours;	2 events
Raymond Mueller	6 hours;	2 events
Donald Snyder	4.3 hours;	2 events
Brent Buch	4.5 hours;	1 events
Mark Fedde	4 hours;	1 events
Lee Halbeck	3 hours;	1 events
Gregory Pernoud	2.5 hours;	1 events
James Griffith	2.5 hours;	1 events
JD Henson	2.5 hours;	1 events
Joseph Schober	2.5 hours;	1 events
Michael Malolepszy	2 hours;	1 events
Randy Gibbs	2 hours;	1 events
Anthony Russo	1.5 hours;	1 events
Randy Gettman	1.5 hours;	1 events
Timothy Hulla	1.5 hours;	1 events
Roy Lieberman	0 hours;	1 events



Left: People at one of the many eclipse workshops trying out some of the activities



Right: Frank Mack explaining the use of a Library Telescope at the St. Louis Public Library

**Winter Solstice Attendance Awards Given Despite Cold and Treacherous Conditions!
by Bradley Waller**

Greetings SLAS Collective!

Yes, for those who were brave...some would say stupid ;) and went to the Meeting last Friday, we did hold an Attendance Prize give away!!! We gave away three prizes. Here are the winners!!! There will be more prizes to give away in 2017!!!!

- From Left:** 1. Speaker Dr. Michael Ogilvie of Washington University braving the cold with the rest of us and speaking about Dr. Strange and the Struggle With Dark Energy
2. Winter Solstice 2016 Dale Engelbrecht DVD: Space Balls
3. Winter Solstice 2016 Rick Menendez \$20 Movie to the Hi-Pointe
4. Winter Solstice 2016 Mark Fedde RASC 2017 Handbook

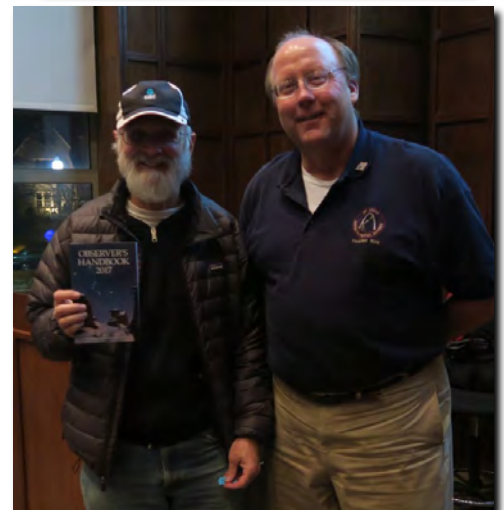


**A RAFFLE FOR
Dr Neil deGrasse Tyson
Peabody Opera House
18 May 2017 @ 7:30pm**



For SLAS members only
The raffle is for TWO tickets to this event. The drawing will be held at the April SLAS monthly meeting. You do not need to be in attendance to win.

Contact person:
Bradley R Waller
SLAS VP
bwaller@stlouisco.com



Free Astrophotography Workshop

The Astronomical Society of Eastern Missouri Digital SIG group will have a free Astrophotography Workshop on Saturday, February 11th in at the Weldon Springs Interpretive Center (<http://www.asemonline.org/map-to-weldon-spring-interpretive-center>) located 7295 Highway 94 South, St. Charles, Missouri 63304. We'll have morning and afternoon sessions.

The morning session will be a presentation by Rick Steiling from 9 AM until around noon focusing on PixInsight (<https://pixinsight.com/>). I would consider this an advanced session. PixInsight is a tool developed for astrophotography. It can be used to stack and process your images from start to end. This will be hands-on – bring your laptop. Data will be provided in advance. Rick's work can be seen here - <http://fuzzy.photos/>. Rick is a regular at the Whiteside Conservation Area when the skies are clear and the moon is out of the way.

After a lunch break (pizza from somewhere local?), our afternoon session will have a couple tracks. The first track will continue on with other PixInsight topics. If there's interest, Rick will work through a DSLR / one-shot-color image. Our other track will be on Sequence Generator Pro and DeepSkyStacker. This is a less-advanced track. Sequence Generator Pro is used to collect your data and a lot more. Once collected, a lot of people use the free DeepSkyStacker to stack the images. There will be time for other questions. Feel free to show up at 1 for the afternoon session.

For those interested in making it a full Astronomy Day, ASEM's general meeting picks up in the same room with a potluck at 6 PM and the normal meeting starting at 7. The 'main dish' is soups and salads so there will be numerous ones to choose from.

Important Notes:

Please RSVP to Dan Crowson – dcrowson@crowson.com This will help us determine the space required.

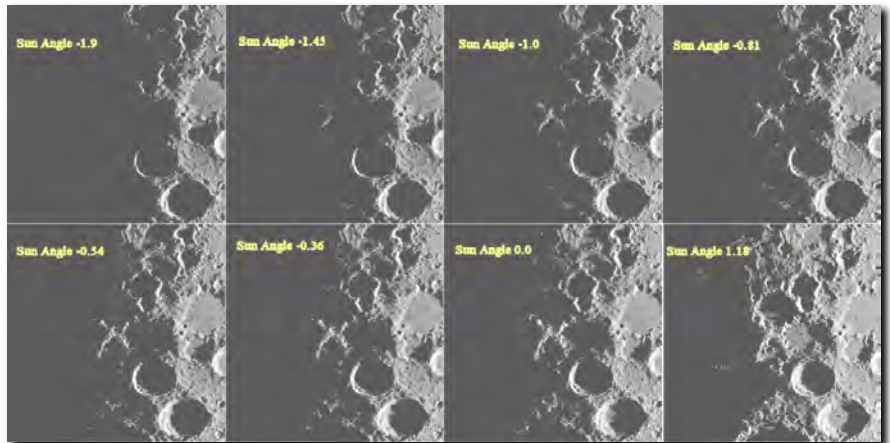
PixInsight and Sequence Generator Pro have fully-functional trial downloads. Both work for 45 days. Please hold off on downloading one or both of these until closer to the date.

For the ambitious, PixInsight is sold in euro's and the dollar is worth more now than it has been in years so it might be a good time to buy.

Lunar X Predictions for 2017

by
Grant Martin

We've had better years that's for sure. After spending some quality time with various experts and software, we've come up with a table of timings for this apparition on the moon. And unfortunately, they all occur in the late afternoon to early evening. Three of the peaks occur in late afternoon. To view any portion of these events during daylight or twilight hours, try using a red filter on your eyepiece to increase contrast.



The image shows various stages of the Lunar X as it unfolds. Use it to refer to the various timings shown below. The table shows the times for select phases on each date. All dates and times are for Central time with DST corrections applied.

Special thanks to the folks at Cloudy nights in this thread:

<http://www.cloudynights.com/topic/559919-lunar-x-predictions-2017/>

Date	Sun angle -1.9 Before start	Sun angle -1.45	Sun angle -1.066	Sun angle -0.54	Sun angle 0 Peak "X"
3-Feb-17	12:39	13:38	14:28	15:36	16:47
3-Apr-17	15:27	16:25	17:15	18:24	19:34
1-Jun-17	14:46	15:45	16:35	17:43	18:53
30-Jul-17	13:38	14:37	15:27	16:35	17:45
27-Sep-17	14:19	15:18	16:08	17:16	18:27
25-Nov-17	16:35	17:34	18:24	19:33	20:43

Relative size and brightness of 200 brightest galaxies (>14.2 mag) by Mark Jones

Note: If you would like a copy of the spreadsheet that was used for these calculations, contact Mark Jones.

Galaxies are typically shown in terms of size and brightness relative to distance from Earth. This of course give a distorted view of true size and brightness of the most interesting galaxies. Since an objects brightness varies by the inverse-square of distance and dimension, a true comparison must place all objects at same distance.

Top Ten Brightest (apparent brightness) as seen from Earth. Five of the galaxies are Messier Objects

Name of	Galaxy		Blue Mag	Size arc-min	Size KLY	Distance MLY	Con	Adjusted Mag	Adjusted Size
LMC	5		0.91	645	30	0.17	Dor	21.65881	0.045688
SMC	0		2.7	315	20	0.21	Tuc	22.98996	0.027563
NGC	224	M31	4.36	190	145	2.6	And	19.18619	0.205833
NGC	598	M33	6.27	71	60	2.8	Tri	20.93527	0.082833
NGC	5128		7.84	26	90	12	Cen	19.34515	0.13
NGC	3031	M81	7.89	27	95	12	UMa	19.39515	0.135
NGC	253		8.04	28	105	13	Sci	19.37134	0.151667
NGC	5236	M83	8.2	13	55	15	Hya	19.2206	0.08125
NGC	5457	M101	8.31	29	200	24	UMa	18.31	0.29
NGC	55		8.42	32	60	6.5	Sci	21.25649	0.086667

Some of the more exotic galaxies are much further away and therefore appear much smaller and dimmer. If we adjust all 200 galaxies to a distance of 2.4 billion light years, what are the top 10 actual brightest? The two far right columns show magnitude and size of each object adjusted to a 2.4GLY distance.

The top 2 are Quasars followed by super-sized or active galaxies. M49 is the only Messier galaxy to make the top 10. Even the mighty M86 and M87 don't make this list. Note the two Quasars topping the list are 4-5 magnitudes (adjusted magnitude) brighter than more normal galaxies.

Name of	Galaxy		Blue Mag	Size arc-min	Size KLY	Distance MLY	Con	Adjusted Mag	Adjusted Size
3C273			12.9	0.3	0.003	2400	Vir	12.9	0.3
OJ287			14.2			3500	Cnc	13.38072	
Mrk421			13.2			400	UMa	17.09076	
Mrk501			13.9			500	Her	17.30621	
NGC	1316		9.42	12	205	59	For	17.4668	0.295
NGC	4472	M49	9.37	10	160	53	Vir	17.64968	0.220833
NGC	4699		10.41	4	95	85	Vir	17.66396	0.141667
NGC	1407		10.7	5	125	94	Eri	17.73542	0.195833
NGC	2336		11.05	7	225	110	Cam	17.74409	0.320833
NGC	772		11.09	7	220	105	Ari	17.88511	0.30625

OK how about size? Which of the 200 brightest are the physically the largest? M101 is the largest Messier galaxy ranks in the top 10. M31 is on 22nd ranked at 145KLY

Name of	Galaxy		Blue Mag	Size arc-min	Size KLY	Distance MLY	Con	Adjusted Mag	Adjusted Size
NGC	2336		11.05	7	225	110	Cam	17.74409	0.320833
NGC	772		11.09	7	220	105	Ari	17.88511	0.30625
NGC	6744		9.14	20	205	35	Pav	18.32072	0.291667
NGC	4565		10.42	16	205	44	Com	19.10379	0.293333
NGC	1316		9.42	12	205	59	For	17.4668	0.295
NGC	5457	M101	8.31	29	200	24	UMa	18.31	0.29
NGC	1365		10.32	11	195	59	For	18.3668	0.270417
NGC	5907		11.12	13	185	50	Dra	19.52621	0.270833
NGC	5033		10.75	11	185	60	CVn	18.7603	0.275
NGC	2768		10.84	8	175	73	UMa	18.42444	0.243333

Now we reduce the list down to just the 38 Messier galaxies. Here is how they rank by apparent brightness. As expected the familiar star party galaxies: M31, 33, 51 and 81 are near the top. Others like M83, 101, 110 and 104 are not as familiar but are top 10 worthy.

Name of	Galaxy		Blue Mag	Size arc-min	Size KLY	Distance MLY	Con	Adjusted Mag	Adjusted Size
NGC	224	M31	4.36	190	145	2.6	And	19.18619	0.205833
NGC	598	M33	6.27	71	60	2.8	Tri	20.93527	0.082833
NGC	3031	M81	7.89	27	95	12	UMa	19.39515	0.135
NGC	5236	M83	8.2	13	55	15	Hya	19.2206	0.08125
NGC	5457	M101	8.31	29	200	24	UMa	18.31	0.29
NGC	205	M110	8.92	22	15	2.7	And	23.66424	0.02475
NGC	5194	M51	8.96	11	85	26	CVn	18.78619	0.119167
NGC	4594	M104	8.98	9	75	30	Vir	18.49545	0.1125
NGC	4736	M94	8.99	11	70	17	CVn	19.73881	0.077917
NGC	221	M32	9.03	9	5	2.6	And	23.85619	0.00975
NGC	4258	M106	9.1	19	130	24	CVn	19.1	0.19
NGC	3034	M82	9.3	11	40	12	UMa	20.80515	0.055
NGC	5055	M63	9.31	13	90	25	CVn	19.22136	0.135417
NGC	4826	M64	9.36	10	45	24	Com	19.36	0.1
NGC	4472	M49	9.37	10	160	53	Vir	17.64968	0.220833
NGC	4486	M87	9.59	8	125	51	Vir	17.95321	0.17
NGC	1068	M77	9.61	7	95	45	Get	18.24499	0.13125
NGC	3627	M66	9.65	9	90	34	Leo	18.89366	0.1275
NGC	4649	M60	9.81	7	115	54	Vir	18.04909	0.1575
NGC	4406	M86	9.83	9	150	57	Vir	17.95168	0.21375
NGC	628	M74	9.95	10	75	24	Psc	19.95	0.1
NGC	4382	M85	10	7	110	53	Com	18.27968	0.154583
NGC	4321	M100	10.05	7	115	53	Com	18.32968	0.154583
NGC	4374	M84	10.09	6	105	57	Vir	18.21168	0.1425
NGC	3368	M96	10.11	8	75	34	Leo	19.35366	0.113333
NGC	4303	M61	10.18	6	95	50	Vir	18.58621	0.125
NGC	3379	M105	10.24	5	55	36	Leo	19.35954	0.075
NGC	3623	M65	10.25	10	70	25	Leo	20.16136	0.104167
NGC	4569	M90	10.26	10	155	55	Vir	18.45924	0.229167
NGC	4501	M88	10.36	7	110	55	Com	18.55924	0.160417
NGC	4254	M99	10.44	5	85	55	Com	18.63924	0.114583
NGC	4579	M58	10.48	6	95	55	Vir	18.67924	0.1375
NGC	3351	M95	10.53	7	70	33	Leo	19.83849	0.09625
NGC	4621	M59	10.57	5	80	52	Vir	18.89104	0.108333
NGC	3992	M109	10.6	8	120	55	UMa	18.79924	0.183333
NGC	3556	M108	10.69	9	115	45	UMa	19.32499	0.16875
NGC	4552	M89	10.73	5	80	52	Vir	19.05104	0.108333
NGC	4192	M98	10.95	10	155	55	Com	19.14924	0.229167
NGC	4548	M91	10.96	5	85	53	Com	19.23968	0.110417

Next let's sort the Messier galaxies by adjusted brightness as seen from 2.4GLY. This ranking knocks our star party favorites off the top 10. Now we see which Messier galaxies are truly large and bright. M49 makes it to top of our list. Sibling elliptical galaxies like M86 and M87 are next. M77 is the first spiral galaxy. The mighty M31 has dropped to 23rd place. M81 drops to 31st place and lowly M33 falls to 35th place.

Name of	Galaxy		Blue Mag	Size arc-min	Size KLY	Distance MLY	Con	Adjusted Mag	Adjusted Size
NGC	4472	M49	9.37	10	160	53	Vir	17.64968	0.220833
NGC	4406	M86	9.83	9	150	57	Vir	17.95168	0.21375
NGC	4486	M87	9.59	8	125	51	Vir	17.95321	0.17
NGC	4649	M60	9.81	7	115	54	Vir	18.04909	0.1575
NGC	4374	M84	10.09	6	105	57	Vir	18.21168	0.1425
NGC	1068	M77	9.61	7	95	45	Get	18.24499	0.13125
NGC	4382	M85	10	7	110	53	Com	18.27968	0.154583
NGC	5457	M101	8.31	29	200	24	UMa	18.31	0.29
NGC	4321	M100	10.05	7	115	53	Com	18.32968	0.154583
NGC	4569	M90	10.26	10	155	55	Vir	18.45924	0.229167
NGC	4594	M104	8.98	9	75	30	Vir	18.49545	0.1125
NGC	4501	M88	10.36	7	110	55	Com	18.55924	0.160417
NGC	4303	M61	10.18	6	95	50	Vir	18.58621	0.125
NGC	4254	M99	10.44	5	85	55	Com	18.63924	0.114583
NGC	4579	M58	10.48	6	95	55	Vir	18.67924	0.1375
NGC	5194	M51	8.96	11	85	26	CVn	18.78619	0.119167
NGC	3992	M109	10.6	8	120	55	UMa	18.79924	0.183333
NGC	4621	M59	10.57	5	80	52	Vir	18.89104	0.108333
NGC	3627	M66	9.65	9	90	34	Leo	18.89366	0.1275
NGC	4552	M89	10.73	5	80	52	Vir	19.05104	0.108333
NGC	4258	M106	9.1	19	130	24	CVn	19.1	0.19
NGC	4192	M98	10.95	10	155	55	Com	19.14924	0.229167
NGC	224	M31	4.36	190	145	2.6	And	19.18619	0.205833
NGC	5236	M83	8.2	13	55	15	Hya	19.2206	0.08125
NGC	5055	M63	9.31	13	90	25	CVn	19.22136	0.135417
NGC	4548	M91	10.96	5	85	53	Com	19.23968	0.110417
NGC	3556	M108	10.69	9	115	45	UMa	19.32499	0.16875
NGC	3368	M96	10.11	8	75	34	Leo	19.35366	0.113333
NGC	3379	M105	10.24	5	55	36	Leo	19.35954	0.075
NGC	4826	M64	9.36	10	45	24	Com	19.36	0.1
NGC	3031	M81	7.89	27	95	12	UMa	19.39515	0.135
NGC	4736	M94	8.99	11	70	17	CVn	19.73881	0.077917
NGC	3351	M95	10.53	7	70	33	Leo	19.83849	0.09625
NGC	628	M74	9.95	10	75	24	Psc	19.95	0.1
NGC	3623	M65	10.25	10	70	25	Leo	20.16136	0.104167
NGC	3034	M82	9.3	11	40	12	UMa	20.80515	0.055
NGC	598	M33	6.27	71	60	2.8	Tri	20.93527	0.082833
NGC	205	M110	8.92	22	15	2.7	And	23.66424	0.02475
NGC	221	M32	9.03	9	5	2.6	And	23.85619	0.00975

Next, we rank the Messier galaxies by size. Which ones are the real giants among us? We see 15 galaxies are above the magic 100,000 LY size reported for the Milky Way. M101 is twice that size. Our big brother M31 ranks 6th.

Name	Galaxy		Blue Mag	Size	Size	Distance	Con	Adjusted Mag	Adjusted Size
NGC	5457	M101	8.31	29	200	24	UMa	18.31	0.29
NGC	4569	M90	10.26	10	155	55	Vir	18.45924	0.229167
NGC	4192	M98	10.95	10	155	55	Com	19.14924	0.229167
NGC	4472	M49	9.37	10	160	53	Vir	17.64968	0.220833
NGC	4406	M86	9.83	9	150	57	Vir	17.95168	0.21375
NGC	224	M31	4.36	190	145	2.6	And	19.18619	0.205833
NGC	4258	M106	9.1	19	130	24	CVn	19.1	0.19
NGC	3992	M109	10.6	8	120	55	UMa	18.79924	0.183333
NGC	4486	M87	9.59	8	125	51	Vir	17.95321	0.17
NGC	3556	M108	10.69	9	115	45	UMa	19.32499	0.16875
NGC	4501	M88	10.36	7	110	55	Com	18.55924	0.160417
NGC	4649	M60	9.81	7	115	54	Vir	18.04909	0.1575
NGC	4382	M85	10	7	110	53	Com	18.27968	0.154583
NGC	4321	M100	10.05	7	115	53	Com	18.32968	0.154583
NGC	4374	M84	10.09	6	105	57	Vir	18.21168	0.1425
NGC	4579	M58	10.48	6	95	55	Vir	18.67924	0.1375
NGC	5055	M63	9.31	13	90	25	CVn	19.22136	0.135417
NGC	3031	M81	7.89	27	95	12	UMa	19.39515	0.135
NGC	1068	M77	9.61	7	95	45	Cet	18.24499	0.13125
NGC	3627	M66	9.65	9	90	34	Leo	18.89366	0.1275
NGC	4303	M61	10.18	6	95	50	Vir	18.58621	0.125
NGC	5194	M51	8.96	11	85	26	CVn	18.78619	0.119167
NGC	4254	M99	10.44	5	85	55	Com	18.63924	0.114583
NGC	3368	M96	10.11	8	75	34	Leo	19.35366	0.113333
NGC	4594	M104	8.98	9	75	30	Vir	18.49545	0.1125
NGC	4548	M91	10.96	5	85	53	Com	19.23968	0.110417
NGC	4621	M59	10.57	5	80	52	Vir	18.89104	0.108333
NGC	4552	M89	10.73	5	80	52	Vir	19.05104	0.108333
NGC	3623	M65	10.25	10	70	25	Leo	20.16136	0.104167
NGC	4826	M64	9.36	10	45	24	Com	19.36	0.1
NGC	628	M74	9.95	10	75	24	Psc	19.95	0.1
NGC	3351	M95	10.53	7	70	33	Leo	19.83849	0.09625
NGC	598	M33	6.27	71	60	2.8	Tri	20.93527	0.082833
NGC	5236	M83	8.2	13	55	15	Hya	19.2206	0.08125
NGC	4736	M94	8.99	11	70	17	CVn	19.73881	0.077917
NGC	3379	M105	10.24	5	55	36	Leo	19.35954	0.075
NGC	3034	M82	9.3	11	40	12	UMa	20.80515	0.055
NGC	205	M110	8.92	22	15	2.7	And	23.66424	0.02475
NGC	221	M32	9.03	9	5	2.6	And	23.85619	0.00975

So, at your next star party try to remember our eyes deceive us as to the actual size of objects we look at. If all Messier galaxies were at the same distance as M31 (2.6MLY), here are the 22 Messiers that would appear brighter than M31 in the sky. At this same adjusted distance of 2.6 MLY, the Quasar 3C273 would be -1.93 magnitude, brighter than Sirius in the night sky.

Name	Galaxy		Blue Mag	Size	Size	Distance	Con	Adjusted Mag	Adjusted Size
NGC	4472	M49	9.37	10	160	53	Vir	2.82	203.85
NGC	4406	M86	9.83	9	150	57	Vir	3.13	197.31
NGC	4486	M87	9.59	8	125	51	Vir	3.13	156.92
NGC	4649	M60	9.81	7	115	54	Vir	3.22	145.38
NGC	4374	M84	10.09	6	105	57	Vir	3.39	131.54
NGC	1068	M77	9.61	7	95	45	Cet	3.42	121.15
NGC	4382	M85	10	7	110	53	Com	3.45	142.69
NGC	5457	M101	8.31	29	200	24	UMa	3.48	267.69
NGC	4321	M100	10.05	7	115	53	Com	3.50	142.69
NGC	4569	M90	10.26	10	155	55	Vir	3.63	211.54
NGC	4594	M104	8.98	9	75	30	Vir	3.67	103.85
NGC	4501	M88	10.36	7	110	55	Com	3.73	148.08
NGC	4303	M61	10.18	6	95	50	Vir	3.76	115.38
NGC	4254	M99	10.44	5	85	55	Com	3.81	105.77
NGC	4579	M58	10.48	6	95	55	Vir	3.85	126.92
NGC	5194	M51	8.96	11	85	26	CVn	3.96	110.00
NGC	3992	M109	10.6	8	120	55	UMa	3.97	169.23
NGC	4621	M59	10.57	5	80	52	Vir	4.06	100.00
NGC	3627	M66	9.65	9	90	34	Leo	4.07	117.69
NGC	4552	M89	10.73	5	80	52	Vir	4.22	100.00
NGC	4258	M106	9.1	19	130	24	CVn	4.27	175.38
NGC	4192	M98	10.95	10	155	55	Com	4.32	211.54
NGC	224	M31	4.36	190	145	2.6	And	4.36	190.00

SLAS Executive Board Meeting Minutes for December 12, 2016

1. Opening Activities: Attending: Jim Small, Bill Winningham, Brent Buch, Larry Campbell, Bradley Waller, Rich Heuermann, Mark Jones. Meeting opened at 705

Review of Nov meeting minutes. Motion to approve minutes as amended Brad second by Jim S. Minutes approved.

2. External Business Next board meeting: Dates confirmed by YMCA, see email

3. Director Reports:

President – Jim Small: Library Report: RASC handbooks are in. Ordered a copy for door prize and one for library. Also **“Explore the Universe Guide” from RASC for the library.**

Website Report: Eclipse website is full steam ahead. A new website specifically for the Eclipse Expo is being created. A different template for Joomla is implemented for this website and the update for the SLAS website will use the new template. Priority to the Expo website is number one at the moment.

Eclipse Expo. Date Saturday, June 17, 2017 at Queeny Park. Unfortunately, Stephen Ramsden cannot make it for the Expo. Mike Reynolds, however, has confirmed. We are currently working on vendors, speakers, programs, etc. for the Expo and could use some SLAS members help for some of the committees. If you are interested in helping out, please contact Don Ficken to volunteer. Mark J to ask Don about dates for expo committee meetings

Regarding the Eclipse, Jim Small spoke to Dave about the Astral Valley event that will take place the weekend of the eclipse. SLAS has a standing invite from Astral Valley to come for the eclipse at no charge. They would love to have up to 200 amateur astronomers at the site if people wish to come. If you don't have plans for the eclipse, this might be a fun weekend to experience it. They will likely have around 4,000 people attending the music events for the weekend prior to the eclipse. Pretty much a great opportunity to be a star for the weekend with scopes if you're game! Jim S to ask Astral about website info for eclipse event

Vice President: Bradley R Waller Speakers for 2017: *January: Peter Plavchan, PhD **“The Golden Age of Exoplanet Discovery”** *February: Pamela Gay, PhD **“Super-Secret Squirrel Stuff”** *March: Christine Floss PhD **“Astronomy with a Microscope: Studying Stardust in the Laboratory”** *April: Kevin Evans, PhD **“Weaubleau Impact Structure”** *May: Kara Kundert **“Skype Event”** **“First Light: Observing the Cosmic Dawn with Paperclips and a Supercomputer”** *June: **Possible Expo Speaker** *July: Ryan Clegg-Watkins, PhD **“Exploring the Moon from Orbit: Paving the Way for Future Astronaut Explorers”** *August: **TBD** *September: **“Results from TSE”** *October: Carl Bender, PhD **“Black Holes and Hawking Radiation”** *November: William McKinnon, PhD **“PLUTO”** *December: Amy E Kimball, **Skype Event “Radio Quasars & the VLA”**

Astro 101 *Dec 2016 “Winter Solstice Attendance Prize” Three prizes will be given away. *Jan 2017 Mark Jones: Astro Events for 2017

Membership Initiatives - Membership Initiative Prizes: Inventory *4 Books: “How I Killed Pluto...” Mike Brown (Signed) *2 Eris photos signed by Mike Brown *1 book: “An Astronauts Guide to Life on Earth” Chris Hadfield (Signed) *1 CD: “Space Sessions” Chris Hadfield (Signed) Jim and Mark may have some books for give away. *Dr Neil deGrasse Tyson here in 18 May 2017. Brad has bought 2 tickets for a raffle event. *Welcome aboard new members meeting are still planned for each month.

Secretary – Mark Jones: Facebook-Started we have 19 members joined Sent cards to Lois Fitter (Sympathy) and Nancy Clark (Get Well). Received donation from friend of Lois and Mara Fitter

Treasurer/ALCor – Bill Winningham: Budget Balance sheet as of Nov 30, 2016 – Total assets thru Nov \$59,219 Profit loss as of Nov 30, 2016 – Total expenses \$1,542 under budgeted amount. Net income \$29,283

Hospitality – Larry Campbell: Full sheet cake planned for Dec meeting for 2nd anniversary of Library Telescope Program

Board member at large reports

Tom Nickelson: (2017) No report

Brent Buch (2018) – Publish of meetings to YouTube The November meeting video was processed and published to **YouTube** on November 20 (a new record for me). This month proved to be a great test to see how quickly I can crank out the video and publish it. As we have agreed previously, it was published as a private video and permission was given to select board and committee members. In addition, I had special requests to add permission for Maggie Duckworth (**Nov 2016 Speaker**), Wayne Clark, Jim Melka, and Rhonda Whelan which is now complete and they have all been notified by email.

Rich Heuermann (2019) Here is what Christine Nobbe told me about St. Louis Space Frontier's wishes for SLAS participation in the May 25-29 ISDC to be held in St. Louis: Primary requests :

- that SLAS publicize and promote the event to its members and visitors

via mention at meetings, in newsletters, in Dialogs, and in other communications - that SLAS support Conference planning and programming in whatever ways it chooses

2. Secondary requests

- that a SLAS member, preferably Don Ficken, present a talk on the Library Telescope Program as an invited lecture during the Conference. Don has agreed to do this. - that SLAS provide telescope viewing on one or more nights during the conference. The site would be at Union Station, Conference venue. - that SLAS/Eclipse St. Louis 2017 Task Force present a display, perhaps with staffed table, about the total solar eclipse of 2017. I think there would be no charge for having the table/display Reg fee non-member is \$200 w/o food Co-sponsor registration is \$185 w/o food Draft proposal: The Board proposes that SLAS participate in the following way: sponsor one exhibitor table (\$100), make monetary donation \$150, conduct one or more of star/solar parties, publicizing on our website and newsletter and our communication, contribute one or more door prizes (need \$ amount), provide volunteers for conference logistics including registration. Rich will discuss our follow-on questions with Christine Nobbe.

3. Additional possibilities- SLAS members serving as volunteers during the event, to provide whatever support is needed (example - registration desk staffing) at times to be scheduled. Those members would receive a discounted registration price for themselves for the conference (not for food or lodgings). Space Frontier is working on details of volunteer participation (how much time must be donated per volunteer, how much the discounted registration cost will be, etc.) Space Frontier would be happy to have several SLAS members serve as volunteers.- Donations. Not required, but would be gratefully accepted, in any amount. Cash, certainly. Perhaps materials suitable for door prizes

Parking: Here is the status of the parking at Washington U. for the monthly members' meetings: The Chancellor's Office replied that they did not wish to overrule the unfortunate decision by Parking Services to enforce the ban on parking in the red zone area in front of McDonnell Hall. We will continue to be restricted to available spots in yellow zones, on Forsythe, at metered spaces (meters not active after 6 p.m.), and in Car Pool spots (not reserved after 2 p.m.) I see no further appeals as possible. I placed the request with the Chancellor's Chief of Staff, who consulted with Community Relations and Parking Services staff. You may recall that it is the University's continuing policy that the first parking violation in each University fiscal year (which begins July 1) is not enforced. (This exemption does not apply to parking in a handicapped spot without a sticker or to parking in a fire lane or posted construction access zone.)

4. Committee Reports: If needed

Library Telescope Program: Only one LTP build planned for 2017.

Notice has gone out to all libraries asking them to reserve telescopes

Membership – Attached is the membership report for November 2016. Our membership count at the end of November 2016 is 155 members compared to 162 members reported for the same month last year. We added five new members in December of last year. Hopefully we can do the same this year. Member renewal notices were sent by Bill Winningham and Don this week. We will also be sending “second notices” for those who have not renewed this year.

Merchandise – Infini-tees shirts for sale - \$20, Mugs \$7

Librarian – purchased RASC handbook and “Exploring the Universe” for library

Newsletter – send articles in ready to go format! Plan to have newsletter out Sunday.

Website – www.slasonline.org/joomla Facebook page created, Eclipse Expo website created

Night Sky Network – In the process of testing new website, contacts will be able to add themselves for contact list!

Observing Programs –Star Parties: December 22 has been moved from the Moonrise Hotel ready room.

5. Old Business None

6. New Business Proposal 1. I move that the Library Telescope “Carl Sagan” part of SLAS loaner scope program be renamed for “Lois Fitter”. This will include a new nameplate cost not to exceed \$15. Cost to be taken from 2016 Loaner scope Budget. Motion by Brad W. and second by Brent B. Motion approved by Board **Proposal 2.** An annual membership recognition award called “The Lois Fitter Lifetime Outreach Award” be created to recognize long-time outreach volunteers who have volunteered for 5 or more years of outreach for the society with a minimum of 5 events per year. A nomination form and selection committee will be created by the membership recognition chair and the award will be presented (if nominations are available) when outreach volunteer recognition pins are presented. Discussion took place with Board. Proposal was tabled until a comprehensive recognition program is developed that goes beyond Outreach.

7. Closing Activities Motion to adjourn Jim S. and second by Bill W. Meeting adjourned at 9:29pm

**St. Louis Astronomical Society
Balance Sheet
As of December 31, 2016**

	<u>Dec 31, 15</u>	<u>Dec 31, 16</u>
ASSETS		
Current Assets		
Checking/Savings		
Astronomy Magazine Award**	465.72	0.00
Checking - First Bank	2,940.49	3,957.37
Deposit, Certificate of	20,108.23	20,148.49
Library Telescope Escrow*	444.55	799.33
Merchandise Change Fund	20.00	0.00
PayPal	82.51	126.42
Savings - First Bank	5,361.90	29,755.97
SLAS Eclipse Conference Escrow***	539.12	6,259.97
YMCA Trout Lodge Escrow	542.87	542.87
Total Checking/Savings	30,505.39	61,590.42
Other Current Assets		
Inventory Asset	1,410.53	1,360.92
Investment in Mid-States 2016	1,000.00	0.00
Undeposited Funds	55.00	0.00
Total Other Current Assets	2,465.53	1,360.92
Total Current Assets	32,970.92	62,951.34
Total Fixed Assets	0.00	0.00
TOTAL ASSETS	32,970.92	62,951.34
LIABILITIES & EQUITY		
Equity		
Opening Bal Equity	8,137.66	8,137.66
Retained Earnings	24,464.84	24,813.26
Net Income	368.42	30,000.42
Total Equity	32,970.92	62,951.34
TOTAL LIABILITIES & EQUITY	32,970.92	62,951.34

* Funds restricted for the Library Telescope Program. \$444.55 was carried over from the end of 2015. Reflects \$1,000 from the 2016 budget.

** Funds from Astronomy Magazine Award, available until 4/10/2016 (funds have been spent).

*** Registration fees and donations for SLAS sponsored eclipse seminars. Also includes \$800 from the 2016 budget.

3:44 PM
01/05/17
Accrual Basis

**St. Louis Astronomical Society
Profit & Loss Budget vs. Actual
January through December 2016**

	<u>Jan - Dec 16</u>	<u>Budget</u>	<u>\$ Over Budget</u>
Ordinary Income/Expense			
Income			
Total Magazine Subscription	1,328.73	1,432.80	(106.07)
Membership Dues	3,350.00	3,600.00	(250.00)
Total Merchandise Sales	166.00	0.00	166.00
Total Income	4,842.73	5,032.80	(190.07)
Cost of Goods Sold			
Total Magazine Subscriptions	1,282.15	1,432.80	(150.65)
Merchandise			
General Merchandise	2.51	0.00	2.51
Inventory Adjustment	(17.91)	0.00	(17.91)
Merchandise - Other	65.01	45.00	20.01
Total Merchandise	49.61	45.00	4.61
Total COGS	1,331.76	1,477.80	(146.04)
Gross Profit	3,510.97	3,555.00	(44.03)
Expense			
1-Programs & Events	1,266.60	1,735.00	(468.40)
2-Newsletter	162.20	200.00	(37.80)
3-Library expense	94.34	100.00	(5.66)
4-Astronomical League Dues	700.00	695.00	5.00
5-Loaner Scopes		50.00	(50.00)
7-Insurance	380.00	380.00	
8-Website	155.40	150.00	5.40
9-Administrative Expenses	781.37	1,430.00	(648.63)
Total Expense	3,539.91	4,740.00	(1,200.09)
Net Ordinary Income	(28.94)	(1,185.00)	1,156.06
Other Income/Expense			
Other Income			
Donations			
SLAS Club Members	20.05	0.00	20.05
Donations - Other	1,459.00	0.00	1,459.00
Total Donations	1,479.05	0.00	1,479.05
Eclipse Escrow Receipts	7,561.00	0.00	7,561.00
Interest Income	47.99	100.00	(52.01)
LTP Receipts	21,473.95	0.00	21,473.95
Non-Operating Income ^{1,2}	458.98	0.00	458.98
Proceeds from Lens Sales	24,388.34	0.00	24,388.34
Total Other Income	55,407.31	100.00	55,307.31
Other Expense			
Astro Mag Award Disbursements	472.76	0.00	472.76
Eclipse Escrow Disbursements	1,853.50	0.00	1,853.50
Eclipse Escrow Funding	980.32	800.00	180.32
LTP Disbursements	21,012.37	0.00	21,012.37
LTP Escrow Funding	1,000.00	1,000.00	0.00
Non-operating Expense ¹	59.00	0.00	59.00
Total Other Expense	25,377.95	1,800.00	23,577.95
Net Other Income	30,029.36	(1,700.00)	31,729.36
Net Income	30,000.42	(2,885.00)	32,885.42

¹ An individual mistakenly signed up for SLAS instead of the Science Center, membership and magazine funds refunded.

² Includes \$399.98 of proceeds from MSRAL 2016.

Wanted: Volunteers!

Be sure to sign up on Night Sky Network for upcoming star parties. Lead volunteers need to know who will be there so they can tell where we are falling short. If you aren't sure how to RSVP, please ask anyone at the meeting and we can show you how on the computer after the meeting. Or contact any board or committee member to find out. See you at the next star party!

Eclipse Expo!

June 17, 2017

www.eclipseexpo.org

Be sure to sign up on the website for your tickets for the expo! They are free as long as you sign up before the day of the expo! Here is the link for tickets!

<http://eclipseexpo.org/index.php/tickets>

Upcoming Star Parties and Other Events

For details on these and other upcoming events, check out the Night Sky Network Calendar linked on the Home Page for SLAS at <http://www.slasonline.org>

SLAS Executive Board Meetings *Location will be at the Edward Jones YMCA* All meetings are on Thursdays unless noted.

2017: Feb 2; Mar 9; Apr 6; May 4; Jun 7 (Wed); Jul 6; Aug 9 (Wed); Sep 7; Oct 5; Nov 9; Dec 7

Dark Sky Observing Dates

See you when it gets warmer!! Use SlasDialogs or Facebook to coordinate winter events!

Francis Park Events: These events are on **Wednesdays the week nearest the first quarter Moon** April 5, May 3, May 31, June 28, July 26, August 30, September 27, October 25

Sky Orienteering Events For members who want to gather and do some relaxed observing at Babler State Park orienteering. Please RSVP if you plan to come!

2017-01-22	5:30 PM	2017-02-19	6:00 PM
2017-03-19	6:30 PM	2017-04-23	7:30 PM
2017-05-21	8:00 PM	2017-06-18	8:30 PM
2017-07-16	8:00 PM	2017-08-13	8:00 PM
2017-09-17	7:00 PM	2017-10-15	6:30 PM
2017-11-12	6:00 PM	2017-12-10	5:30 PM

SLSC Public Telescope Viewing Events: These events are held the first Friday of the month
Planetarium shows start at 7pm
Fri 2/3

YMCA Edward Jones Star Parties (generally third Mondays)

Pattonville Observatory Public Viewing Dates

Broemmelsiek Astronomy Park Public Viewing
Every Friday night with ASEM members

UMSL Observatory
For directions and map
<http://www.umsl.edu/~physics/About%20the%20Department/astro.html>

All sessions include viewing of 1st quarter Moon with additional objects

Skywatch Hotline: 314-516-5706

Saturdays:

LET US KNOW YOU ARE COMING!

To RSVP for any of these events log in to the Night Sky Network and submit your RSVP. If the event is canceled, you will be notified immediately according to the preferences you have selected.

SLAS EVENTS

January

20 Fri SLAS regular meeting
21 Sat Sidewalk Solar Observing - SLSC
26 Thur Maplewood Library
26 Thur River Bend Elementary Science Fair
28 Sat Belleville West Astronomy Club

February

1 Wed Festus Library Star Party
2 Thur SLAS Board Meeting
2 Thur North Glendale Elementary
3 Fri Public Telescope Viewing - SLSC
6 Mon Grant View Library
8 Wed Oak Bend Library
8 Wed SLPL Central Library
9 Thur Indian Trails Library
9 Thur Ferguson Middle School
15 Wed Cross Keys Middle School
17 Fri SLAS Regular Meeting
18 Sat Sidewalk Solar Observing - SLSC
19 Sun SLAS Sky Orienteering Event
24 Fri Parkway STEM Expo
25 Sat SLAS HOMEMADE FEST!

March

3 Fri Public Telescope Viewing SLSC
6 Mon Oak Bend Library
7 Tues St. Louis County HQ
8 Wed PM Sachs Library
9 Thur Berkely Middle
9 Thur Machacek Library
9 Thur SLAS Board Meeting
10 Fri Meramec Valley Library
14 Tue Ferguson Library
16 Thur Premier Charter School
17 Fri SLAS Regular Meeting

SLAS Merchandise Available

SLAS merchandise is now set up for embroidery at
Headz n Threadz at <https://hnt.threadthis.com/>

There are two locations:

Galleria: 2495 St. Louis Galleria, St. Louis, MO 63117 Telephone: 314.862.2695
galleria@headznthreadz.com

Delmar: 6662C Delmar Blvd St. Louis, MO 63130 Telephone: 314.863.2695 delmar@headznthreadz.com
[Delmar Map](#)

Simply take the garment, hat, etc you wish to have embroidered and they will take care of it. They have the SLAS logo on file. You may make modifications to the colors if you wish.

**SLAS Logo is also available at
Infini-tees and Johnny Mac's**



SLAS MEMBERSHIP APPLICATION

Name: Last _____
 First, Middle Initial _____
 Address _____
 City, State, Zip Code _____
 email address _____



Youth @ \$10.00 / 1 year (18 yrs or younger) \$ _____

Individual @ \$25.00 / 1 year \$ _____

Family @ \$40.00/1 year \$ _____

Publications with discount available with your SLAS membership:

Sky and Telescope @ \$32.95 / 1 year \$ _____

(S&T may also be renewed at their website:
<http://www.skyandtelescope.com>)

Astronomy @ \$29.95 / 1 year \$ _____

TOTAL ENCLOSED \$ _____

Please send completed form with check (no cash please) made payable to

St Louis Astronomical Society

Don Ficken, Membership
 13024 Barrett Crossing CT
 St. Louis, MO 63122

Check all that apply:

- Renewal
- Address Change Only
- Please send my newsletter by regular mail
- New Member!**

SLAS OFFICERS

President *Jim Small* 314-307-0692
 president at slasonline.org

Vice President *Brad Waller* 314-481-7250
 vicepresident at slasonline.org

Secretary *Mark Jones* 636-394-2342
 secretary at slasonline.org

Treasurer *Bill Winningham, (Don Ficken - membership)* 636-225-0269
 treasurer at slasonline.org

Hospitality *Larry Campbell* 636-244-2867
 hospitality at slasonline.org

Board Members at Large:
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 Board19 at slasonline.org

Brent Buch 314-239-0329
 Board18 at slasonline.org

Tom Nickelson 314-346-9565
 board17 at slasonline.org

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 (Astronomical League Correspondent)
 treasurer at slasonline.org

MSRAL Rep. *Jim Small* 314-909-7211
 msral_rep at astroleague.org

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 darksite at slasonline.org

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Library Telescope Program *Don Ficken* 636-851-9630
 librarytelescope at slasonline.org

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Merchandise *Vacant*
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Recognition *Larry Campbell* 636-244-2867
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'SLASdialogs' Moderator *Mark Jones, Rhonda Whelan*
 dialogsmoderator at yahoo.com

Star Party Coordinator *Bill Breeden* 314-276-3613
 starparty at slasonline.org

Telescope Making *Bill Davis, Jim Melka* 314-469-3061
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Webmaster *Jim Small* 314-909-7211
 webmaster at slasonline.org

Devoted to the Interest and Advancement of the Science of Astronomy

ST. LOUIS ASTRONOMICAL SOCIETY

We're on the Web!
<http://www.slasonline.org>

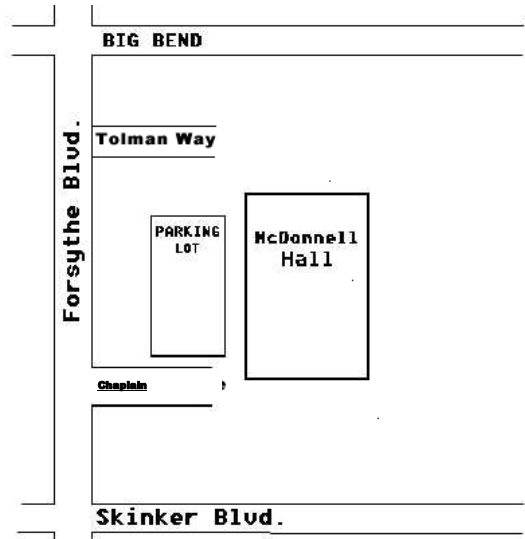


Who We Are and What We Do

St. Louis Astronomical Society is a not-for-profit organization established in 1936. SLAS is devoted to the interest and advancement of the science of astronomy. Our mission is to promote an understanding of the science of astronomy to our members and to the public. Membership is open to anyone with an interest in astronomy.

For more information contact any SLAS officer or visit our website listed above. SLAS is affiliated with the Astronomical League, Night Sky Network and the Mid-States Region of the Astronomical League.

Meetings are held the 3rd Friday of each month at McDonnell Hall at Washington University. See the map to the right for directions.



St. Louis Astronomical Society

Jim Small
13128 Cozyhill Drive
St. Louis, MO 63122

