

THE EVENT HORIZON



ST. LOUIS ASTRONOMICAL SOCIETY

*Devoted to the Interest and Advancement
of the Science of Astronomy*

**VOLUME 24, Issue 2
February, 2014**

Way-Finding and Wobble: Navigating by Starlight *by* **William Biermann and Grant Martin** **SLAS Members**

The February meeting for SLAS will be a double-feature by St. Louis Astronomical Society members William Biermann and Grant Martin. The meeting will begin at 7:30 PM Friday, February 21.

Grant Martin will talk about "Mysteries of Polynesian Navigation". Polynesian sailors were able to navigate their small craft across hundreds, even thousands of miles of seemingly trackless ocean. Without a sextant or a compass, much less a GPS unit, the Polynesian navigator-boatman could locate small islands isolated within the vast sea. In part, they could use the stars as guides. Mr. Martin will describe some of the Polynesian secrets – known and unknown. Bill Biermann will talk about the wobble in the Earth's spin, called "precession". This is a slow wobble – it takes about 26,000 years to complete one cycle.

Mr. Biermann will explain why precession occurs and how it changes the location of the north pole of the sky. He will also discuss how we continue to find evidence that ancient civilizations probably understood some of the effects of precession, and even made corrections for it.

March meeting: Matthias Beilicke - Gamma Ray Astronomy

April meeting: Bob Criss - Rotational Dynamics of Planets, Stars and Galaxies

May meeting: Pamela Gay - Topic TBD

NSN Volunteers to be Recognized at SLAS Meeting

Cook Feldman	26 events	93 hours
John Beury	23 events	72 hours
Donald Ficken	22 events	65 hours
James Small	20 events	57 hours
Mark Jones	16 events	56 hours
Bill Breeden	13 events	37 hours
Jim Trull	13 events	39 hours
Grant Martin	12 events	41 hours
Rick Menendez	11 events	29 hours
Bill Biermann	8 events	26 hours
Larry Campbell	6 events	21 hours
Richard Jennings	6 events	19 hours
Ann Trull	5 events	16 hours
Connie Gleason	5 events	15 hours
Nathan Biermann	5 events	17 hours

Homemade Fest 2014

Saturday, March 22, 2014

Kirkwood Community Center

Join fellow SLAS members for our annual winter pot-luck dinner meeting. Doors open at 5pm to unload equipment and food and set up the room. We will begin eating at 6pm. Formal Opening and presentation begin at 6:45pm. Attendance prizes will be drawn throughout the evening. If you have questions or wish to present, please contact Mark Jones for more information.

MSRAL 2014 REGISTRATION IS OPEN! Register Now!

The registration page for the 2014 Mid-States Region of the Astronomical League Convention is now open! Visit www.slasonline.org/msral2014.html or click the link on the SLAS home page. The deadline for early registration is May 26! We'll see you there!

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President's Corner

by Jim Small

It's Recognition Month for SLAS at the meeting this month. We will be recognizing volunteers for their work. Volunteers for outreach that will be receiving Night Sky Network Pins for attending at least 5 outreach events during 2013 are listed on the front of the newsletter. Again, a hearty THANK YOU for *all* the members who volunteered at outreach events this past year. You are the face of the St. Louis Astronomical Society and we could NOT do what we do without your help!

Homemade Fest will be held on March 22nd at the Kirkwood Community Center this year. Details and maps are available on Night Sky Network and more information is in an ad on this page. If you have photos, memorabilia, stories, etc of John Dobson you would like to share, let Mark Jones know and he will arrange for time or space at the event. Thanks again to Kirkwood Parks for providing us the room to hold the event! Be sure to attend their first star party of the year on March 8 at Kirkwood Park. March 8 is marked as the date to celebrate John Dobson and Sidewalk Astronomy. Bring your dob signed by JD!

Registration for MSRAL 2014 is open! Sign up by clicking the link on the SLAS home page or by clicking here: www.slasonline.org/msral2014.html The deadline for early registration is May 26. After that date, prices will increase.

Costs will be as follows as of this writing Registration: \$30, StarBQ: \$25, Saturday lunch: \$12, Banquet \$40. Coffee and a light continental breakfast will also be provided for both Saturday and Sunday. Rooms will be available at the Knight Center for \$99 plus tax. Not all of the speakers are established at this point, so if you have a paper to present or a speaker to suggest, contact myself or Mark Jones.

The next committee meeting will be a big one and is scheduled for **Sunday, February 23rd at 6:00 pm** at Young's Restaurant in Valley Park at 141 and Marshall just north of the railroad tracks. We need people to take over as committee heads and volunteers for various aspects about the convention such as registration, etc. Please attend if you can.

Grant Martin and Bill Biermann are presenting for the meeting this month. Come on out and support them and learn some ancient astronomy techniques!

You may forward them to president@slasonline.org

We'll see you Friday night!

The Origin of the Earth and the Moon **McDonnell Distinguished Lecture 2014**

by

Professor Alex N. Halliday, University of Oxford

Wednesday, March 5, 2014, 7 p.m.

Washington University, Whitaker Hall, Room 100

Since the days of Kant and Laplace, it has been theorized that our solar system formed from a swirling disk of gas and dust. We can now find evidence of such disks and planets around other stars. Any theory of planet formation has to explain how such a disk gave rise to our own solar system with outer gas giant and icy planets, as well as inner rocky terrestrial or Earth-like planets. Nowadays it is recognized that terrestrial planets had diverse accretion histories. Whereas Mars formed within a few million years, Earth's last major accretion event is thought to have been the Moon-forming collision with another smaller planet, sometimes called "Theia", between 30 million and 200 million years after the formation of the Sun. Despite considerable progress in our understanding, advances in isotope measurement and computer simulations of planet formation are giving diverging views of lunar formation. The net result is that we currently have no satisfactory explanation for the origin of the Moon.



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Join fellow SLAS members for our annual winter pot-luck dinner meeting. Doors open at 5pm to unload equipment and food and set up the room. We will begin eating at 6pm. Formal Opening and presentation begin at 6:45pm.

This is a show-and-tell meeting. Members are encouraged to present anything of astronomical interest they have built, refurbished, improved or just can't do without. 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 Mark Jones for more information. This event is free to all SLAS members and their families. RSVP on SLAS Night Sky Network is optional but encouraged.

Science Night At Selvidge Middle School

by Mark Jones

SLAS participated in the annual Selvidge Science night on Feb 6, 2014. Members Jim Small, Don Ficken, Donna Ficken, Tom Keutzer and Mark Jones attended. Extremely cold weather cancelled the official telescope viewing. However, Tom Keutzer braved the 5F temperatures and set up his refracting telescope in front of the school building to show visitors the Moon and Jupiter.



Don Ficken brought his 8" Celestron and talked to visitors about cell phone apps and gave star-wheel demonstrations.

Science night had a definite space theme. The Science Center had the inflatable star dome set up, the St. Louis Space Society has a display of rocket models. SLAS has an in-door display.



At 6:45 the ISS made a fly-by and a large number of visitors went out to get a brief glimpse. It can be seen here near the top of the photograph below Jupiter.



School administrators estimated that 250 students and family attended the event.

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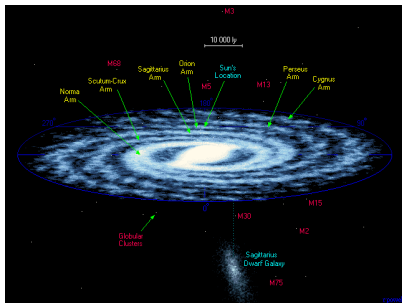
Mark Jones discussed meteorites with students and showed them how to use a video microscope to examine them close-up.

**How Many Stars are in the Milky Way?
A Simple Demonstration.**

by Mark Jones

Astronomers estimate there are approximately 200 billion stars in our Milky Way galaxy. That is a number that is very hard to comprehend. Can we put numbers like this into an easy demonstration that adults and children can better visualize?

What if stars were grains of sand, how much is 200 billion grains of sand?



Demonstration. If 1 sand grain = 1 star and one sand grain is a cube 0.4mm on a side.

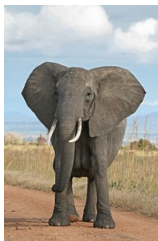
How much would 200 billion grains weigh?

Silica sand grains have an average specific gravity of about 2.6. If a sand grain is a 0.4mm cube, then the total weight can be calculated using mass you would need:

$$200,000,000,000 \times 2.6 \text{ grams/cm}^3 \times 0.000064 \text{cm}^3 = 33,200 \text{ kg!}$$

That is 36.6 tons of sand!

An adult male African elephants can weigh about 7.5 tons, so 36.6 tons would be 5 elephants!!



That's still too big a number to comprehend. Can we better visualize one million grains of sand? How much would a 1 million grains of sand weigh?

$$1,000,000 \times 2.6 \text{ grams/cm}^3 \times 0.000064 \text{cm}^3 = 166 \text{ gm!}$$

That's a much smaller number and can be demonstrated with a small food scale.

At Selvidge Middle School Science night, on Feb 6, we set up this demo and had the students scoop sand from a bag onto the scale and measure 166 grams for one million grains! Now next time they go to the beach they will understand better what a million is. I think the parents also developed an appreciation for these large numbers.

For a final look at scale, what if the Sun were a grain of

sand only 0.4mm in diameter? How far away would the nearest star be? We know that the nearest star is about 4 light-years away. On this scale, the nearest star would be a grain of sand 6.5 km away!!!



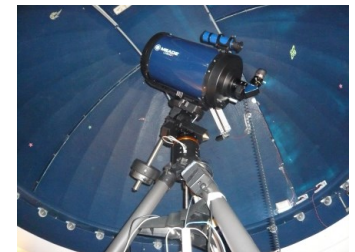
This demonstrates the vastness between stars and the emptiness of space. On this same scale the Milky Way would spread the remaining 36 tons of sand in a disk 90 million miles in diameter. That is the distance from the Earth to the Sun.



Using materials like sand or Playdoh to demonstrate large numbers, size, or mass is a good hands-on activity for both students and adults

For Sale:

Meade 12" (304 mm), Celestron (CGE) Mount



Features:

Meade 12" (304 mm) Dia. LX200 Optical tube, Focal Length (f/10) 3048 mm, Heavy duty Celestron CGE1100 Mount (German Equatorial) on tripod, Electronic automatic tracking powered by car battery adapter & external power supply., Two 25 lb. counter weights, NextStar Electronic hand control, 9 x 50 Finder Scope, Schmidt Cassegrain Optics new in 2007 – (approx. \$2000), CGE Mount new in 2009 from OPT – (\$ 2680.00), Two Lenses included (24.5 mm and 9.7 mm plossl -1.25"), Selling price – \$2,100.00

This is an excellent viewing telescope with very good tracking ability. Has been used with CCD imaging. The Meade optics in this scope are excellent and the Celestron tracking has been good enough for this user to image galaxies M31, M51, M81, M82 as well as nebulas M16, M17, M42 and others. The reason for selling the scope is senior citizen downsizing. The mount is experiencing some alignment inconsistencies.

Contact Ray Mueller hilltopdome@yhti.net or (636) 390-4334

**St. Louis Astronomical Society
Profit & Loss Budget vs. Actual
January 2014**

MISSION UPDATES FOR FEBRUARY 2014

EXTRA SOLAR PLANETS COUNT:		1075					
As of:		14-Feb-2014					
MISSION	COUNTRY	LAUNCHED	DEPARTED EARTH'S ORBIT	ARRIVES MARS	LANDING		
MAVEN	USA	18-Nov-2013	18-Nov-2013	22-Sep-2013	N/A		
Mars Orbiter Mission (MOM)	INDIA	5-Nov-2013	30-Nov-2013	24-Sep-2013	N/A		
Chang'e	CHINA	1-Dec-2013	N/A	N/A	14-Dec-20:		

The Chang'e mission has a rover. It is called, Yutu, Jade Rabbit.
The MOM mission arrives at Mars two days after MAVEN.

**ORBITAL TEST VEHICLE
X-37B**

VEHICLE#	DESIGNATION	DATE		FLIGHT DURATION
		LAUNCHED	LANDED	
OTV 1	USA-212	22-Apr-2010	3-Dec-2010	224D 9H 24M
OTV 2	USA-226	5-Mar-2011	16-Jun-2012	468D 13H 2M
OTV 3	USA-240	11-Dec-2012		

SPACE-X DRAGON

DESIGNATION	LAUNCHED	DATE		
		DOCKED	UN-DOCKED	LANDING
CRS-2	1-Mar-2013	3-Mar-2013	26-Mar-2013	26-Mar-2013
CRS-3	16-Mar-2014			
CRS-4	6-Jun-2014			

CRS: Commercial Resupply Services
COTS: Commercial Orbital Transportation Services

CYGNUS

Cygnus is the Latinized Greek word for swan and a northern constellation

DESIGNATION	NAME	DATE			
		LAUNCHED	DOCKED	UN-DOCKED	RE-ENTR
Orb-D1	G David Low	18-Sep-2013	29-Sep-2013	22-Oct-2013	23-Oct-2013
Orb CRS-1	C Gordon Fullerton	9-Jan-2014	12-Jan-2014		
Orb CRS-2		8-May-2014			

CRS: Commercial Resupply Services
D: Demonstration Flight

CRS-1 is name for Astronaut, C Gordon Fullerton. He died on, 11 Oct 2013. He flew two Shuttle missions: STS-3 and STS-51F. He also flew the Enterprise for Approach and Landing Tests.

PROGRESS & SOYUZ SPACECRAFT

DESIGNATION	NAME	DATE			
		LAUNCHED	DOCKED	UNDOCKING	RE-ENTRY
Progress M-20M	ISS-52-P	27-Jul-2013	28-Jul-2013	3-Feb-2014	11-Feb-2014
Progress M-21M	ISS-53-P	25-Nov-2013	26-Nov-2013		
Progress M-22M	ISS-54-P	5-Feb-2014	5-Feb-2014		

DESIGNATION	NAME	DATE			
		LAUNCHED	DOCKED	UNDOCKING	LANDING
Soyuz: TMA-10M	EXP: 37/38	25-Sep-2013	26-Sep-2013		March 2014
Soyuz: TMA-11M	EXP: 38/39	7-Nov-2013	7-Nov-2013		May 2014
Soyuz: TMA-12M	EXP: 39/40	March 2014			Sept 2014
Soyuz: TMA-13M	EXP: 40/41	May 2014			Nov 2014

ESA AUTOMATED TRANSFER VEHICLE

DESIGNATION	NAME	DATE			
		LAUNCHED	DOCKED	RE-ENTRY	RESULT
ATV-001	Jules Verne	9-Mar-2008	3-Apr-2008	29-Sep-2008	Docked: ISS
ATV-002	Johannes Kepler	16-Feb-2011	24-Feb-2011	21-Jun-2011	Docked: ISS
ATV-003	Edoardo Amaldi	23-Mar-2012	28-Mar-2012	28-Sep-2012	Docked: ISS
ATV-004	Albert Einstein	5-Jun-2013	15-Jun-2013	2-Nov-2013	Docked: ISS
ATV-005	Georges Lemaître	June 2014			

INTERNATIONAL SPACE STATION CREWS

CREW MEMBERS	COUNTRY	UP	DOWN	MISSION	
				STARTED	ENDED
EXPEDITION 38: MISSION STARTED: 10 November 2013					
Oleg Kotov (CDR)	Russia	Soyuz: TMA-10M	Soyuz: TMA-10M	25-Sep-2013	
Sergey Ryazansky	Russia	Soyuz: TMA-10M	Soyuz: TMA-10M	25-Sep-2013	
Michael S Hopkins	USA	Soyuz: TMA-10M	Soyuz: TMA-10M	25-Sep-2013	
Koichi Wakata	JAXA	Soyuz: TMA-11M	Soyuz: TMA-11M	7-Nov-2013	
Mikhail Tyurin	Russia	Soyuz: TMA-11M	Soyuz: TMA-11M	7-Nov-2013	
Richard A Mastracchio	USA	Soyuz: TMA-11M	Soyuz: TMA-11M	7-Nov-2013	

UPCOMING MISSIONS

MISSION	COUNTRY	LAUNCH DATE	DESTINATION
Insight (1)	USA	8-Mar-2016	Mars Landing
OSIRIS-Rex (2)	USA	Sept 2016	Asteriod Bennu Sample Return Mission

1: Interior Exploration using Seismic Investigations, Geodesy and Heat Transport
2: Origins Spectral Interpretation Resource Identification Security Regolith Explorer

ON GOING MISSIONS

MISSION	COUNTRY	ARRIVAL DATE	DESTINATION
Dawn	USA	March-April 2015	Dwarf Planet: Ceres
Pluto Express	USA	14-Jul-2015	Planet: Pluto

COSMOS 09 MARCH 2014

Series airs Sunday: Fox @ 2000
Series airs Mondays: National Geographic Channel @ 2100

Ordinary Income/Expense	Jan 14	Budget	\$ Over Budget
Income			
Magazine Subscription			
Astronomy Magazine Sales	102.00	272.00	(170.00)
Sky & Telescope Sales	66.90	329.50	(263.60)
Total Magazine Subscription	167.90	601.50	(433.60)
Membership Dues	380.00	425.00	(45.00)
Total Income	547.90	1,026.50	(478.60)
Cost of Goods Sold			
Magazine Subscriptions			
Astronomy Magazine Cost	68.00	272.00	(204.00)
Sky & Telescope Cost	99.90	329.50	(230.60)
Total Magazine Subscriptions	167.90	601.50	(433.60)
Total COGS	167.90	601.50	(433.60)
Gross Profit	380.00	425.00	(45.00)
Expense			
1-Programs & Events			
Meeting Expenses			
Meeting Refreshments		37.50	(37.50)
Meeting Speaker Fees		20.83	(20.83)
Total Meeting Expenses		58.33	(58.33)
Membership Initiatives		43.75	(43.75)
Total 1-Programs & Events		102.08	(102.08)
2-Newsletter			
Newsletter Postage		12.50	(12.50)
Newsletter Printing		11.25	(11.25)
Total 2-Newsletter		23.75	(23.75)
6-Brochures		20.83	(20.83)
8-Website	113.88		
9-Administrative Expenses			
Office Supplies		20.00	(20.00)
Paypal Fees		3.00	5.14
Postage	8.14	12.50	(12.50)
Total 9-Administrative Expenses	8.14	35.50	(27.36)
Total Expense	122.02	182.16	(60.14)
Net Ordinary Income	257.98	242.84	15.14

**St. Louis Astronomical Society
Balance Sheet
As of January 31, 2014**

	Dec 31, 13	Jan 31, 14
ASSETS		
Current Assets		
Checking/Savings		
Checking - First Bank	3,263.28	3,463.95
Deposit, Certificate of	20,020.23	20,020.23
Merchandise Change Fund	20.00	20.00
PayPal	24.15	0.00
Savings - First Bank	3,357.60	3,357.74
YMCA Trout Lodge Escrow	877.87	877.87
Total Checking/Savings	27,563.13	27,739.79
Other Current Assets		
Inventory Asset	1,707.15	1,707.15
Investment in Mid-States 2014	2,000.00	2,000.00
Undeposited Funds	0.00	84.00
Total Other Current Assets	3,707.15	3,791.15
Total Current Assets	31,270.28	31,530.94
Fixed Assets		
Accum Depr - Office Equip	(216.65)	(216.65)
Office Equipment	216.65	216.65
Total Fixed Assets	0.00	0.00
TOTAL ASSETS	31,270.28	31,530.94
LIABILITIES & EQUITY		
Liabilities		
Current Liabilities		
Accounts Payable	40.99	40.99
Total Accounts Payable	40.99	40.99
Total Current Liabilities	40.99	40.99
Total Liabilities	40.99	40.99
Equity		
Opening Bal Equity	8,137.66	8,137.66
Retained Earnings	19,214.15	23,091.63
Net Income	3,877.48	280.66
Total Equity	31,229.29	31,489.95
TOTAL LIABILITIES & EQUITY	31,270.28	31,530.94

SAINT LOUIS ASTRONOMICAL SOCIETY
MINUTES OF EXECUTIVE BOARD MEETING:
January 9, 2014

1. Opening Activities

Meeting called to order at 7pm

Attendance: Jim Small, Tom Nickelson, Larry Campbell, Brad Waller, Grant Martin, and Mark Jones

December meeting minutes were distributed before the meeting. Brad made motion to approve minutes, Tom seconded, motion passed

2. External Business

SLSC Feb 7th First Friday Homemade Fest tentative Date is Feb 22nd waiting to hear back from John Lakey about use of the SLSC. Mark Jones will be the MC and send out call for presentations and procure the door prizes. Grant will coordinate the refreshments. Spring-cleaning swap meet could be part of the event.

MSRAL 2014. MSRAL web page active, registration should go live by end of January. PowerPoint created for Jan 11th meeting with ASEM, Star-B-Q contract confirmed deposit will be delivered Monday Jan 13th, meeting with Bon Appetit scheduled for next week, lunch menu determined, next committee meeting January 26, 6:00 pm at Young's. Jim to add to NSN calendar

Discussion held about moving the next board meeting from February 6 to 13th. Selvidge Science night on Feb 6 and several board members are attending, therefore it was decided to move the Board meeting to Feb 13th

2014 Board meeting dates: 3/6, 4/10, 5/8, 6/12, 7/10, 8/7, 9/11, 10/9, 11/6, 12/11 are suggested.

3. Director Reports: If needed

President – Jim S

Reported elsewhere

Vice President – Bill Biermann

Speakers: January Dan Crowson; February Bill Biermann and Grant Martin

Secretary – Mark J

No report

Treasurer/ALCor – Budget approved, membership data sent for ALCor report

Cook submitted separate reports for review, including the 2014 budget spread report

Hospitality – Grant M

No report

Board member at large reports

Larry Campbell

Larry gave us a demonstration of his MOVA Globe.

Tom Nickelson Space Grant for people with disabilities. First round of equipment will be ordered soon through Wash U Space Grant Account

Brad Waller

No report

4. Committee Reports: If needed

Membership – report filed. Membership numbers down from last year.

Librarian – Ottewell Calendar and RASC Handbook were ordered for Library. Ottewell received and now in library

Newsletter - Will go out Monday, Jan 13th

Website – MSRAL page is up, working on form generator that is PayPal compatible

Night Sky Network – Pins for outreach ordered. 18 pins purchased for the 16 awardees plus 2 extra. (Includes Mike M). Pins should arrive by end of Jan, presentation at Feb meeting. Jim Small will create certificates and Brad Waller has offered to color laser print the certificates. Jim to send sample to Brad and Brad will print sample and bring to Jan meeting

Loaner Equipment – 13- inch refurbishment nearing completion. Plan to display at Homemade Fest

Star Parties: Board needs to approve waiving the SLAS appearance fee for the April Kirkwood Snores n Smores event. Also waiving the SLAS appearance fee for the August Movie night at Emmeneger park. Kirkwood is charging a nominal fee to cover the costs for food (\$3) and movie (\$8). Motion to waived appearance fee for the 2 events made by Brad, seconded by Larry. Motion passed.

5. Old Business

6. New Business Any new business to bring before the board.

7. Closing Activities

Brad made motion to adjourn meeting, second by Tom, meeting adjourned at 8:50pm

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

3/6/2014
4/10/2014
5/8/2014
6/12/2014
7/10/2014
8/7/2014
9/11/2014
10/9/2014
11/6/2014
12/11/2014

Dark Sky Observing Dates

3/1/2014
3/29/2014 (Messier Marathon)

Francis Park Events: These events are on Wednesdays the week nearest the first quarter Moon

April 9 (9 day old Moon) (2nd Wed.)
May 7 (7 day old Moon) (1st Wed.)
June 4 (6 day old Moon) (1st Wed.)
July 2 (4 day old Moon) (1st Wed.)
August 6 (9 day old Moon) (1st Wed.)
September 3 (8 day old Moon) (1st Wed.)
October 1 (7 day old Moon) (1st Wed.)
October 29 (6 day old Moon) (5th Wed.)

SLSC Public Telescope Viewing Events: These events are held the first Friday of the month-

*Planetarium shows start at 7pm for the summer months
March 7, 2014
April 4, 2014

YMCA Edward Jones Star Parties

4/7/2014
5/5/2014
6/2/2014
6/30/2014 (two in June is because of Moon timing)
8/14/2014

Pattonville Observatory Open House Dates

February 21, 2014 Friday 7:00-9:00pm. Public Program
Jupiter, M45, M44, Star colors, brighter winter constellations
March 7, 2014 Friday 7:00-9:00 p.m. Public Program
Quarter Moon, Jupiter, celestial hexagon, M42, star birth, star life cycle, star colors
March 21, 2014 Friday 8:00-10:00 p.m. Public Program
Jupiter, celestial hexagon, M45, M44, Mizar (Double Star)
April 4, 2014 Friday 8:30-10:30 p.m. Public Program
Small Crescent Moon, Jupiter, Saturn and Mars (late), M44 (the Beehive Cluster), M45 (the Pleiades), Mizar, stars and star colors
April 25, 2014 Friday 9:00-11:00 p.m. Public Program
Jupiter, Saturn, Mars, M104 (Sombbrero Galaxy), M96, M44, Double Stars and various constellations
May 2, 2014 Friday 9:00-11:00 p.m. Public Program
Jupiter, Saturn, Mars, M104, M96 and globular cluster of M3 and M5, open cluster of M44
May 16, 2014 Friday 9:00-11:00 p.m. Public Program
Jupiter (early), Saturn, Mars, M13 (the Great Hercules cluster), M104, M96, globular clusters, constellations and stars

SLAS EVENTS

February
20 (THUR) Incarnate Word Science Olympiad
21 (FRI) SLAS Regular Meeting

March
1 (SAT) SLAS Dark Sky Observing
6 (THUR) SLAS Board Meeting
7 (FRI) SLSC PTV
8 (SAT) Kirkwood Park
14 (FRI) Creve Coeur Stargazing
21 (FRI) SLAS Regular Meeting
22 (SAT) **HOMEMADE FEST !! (Kirkwood Community Center)**

29 (SAT) Messier Marathon

JUNE 6-8 Mid-States Region of the Astronomical League Convention

Other Volunteers THANKS TO ALL VOLUNTEERS !!

Abby Gordon	4	events	11	hours
Daniel Corso	4	events	12	hours
Rita Breeden	4	events	14	hours
Lois Fitter	3	events	14	hours
Wayne Clark	3	events	10	hours
Joe McHugh	2	events	6	hours
Lee Halbeck	2	events	6	hours
Michael Malolepszy	2	events	10	hours
Paul Baldwin	2	events	9	hours

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. For more information about events, such as Moon phase, clear sky clock, weather report or a map of what's up, see the calendar online.



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 @ \$34.00 / 1 year \$ _____
TOTAL ENCLOSED \$ _____

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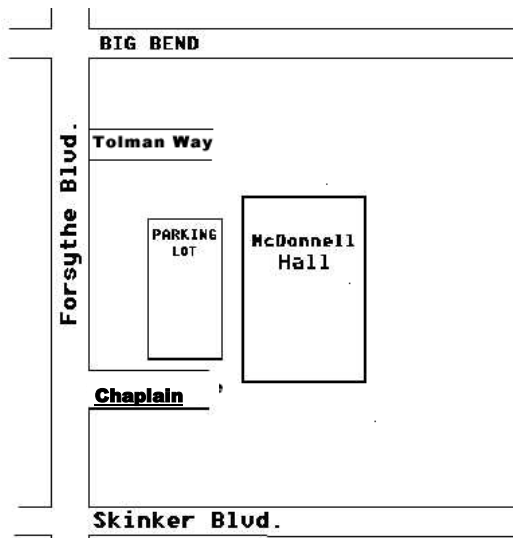


Who We Are and What We Do

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

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