

# THE EVENT HORIZON

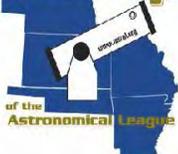


## ST. LOUIS ASTRONOMICAL SOCIETY

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

**VOLUME 22, Issue 8  
August, 2012**

### Mid States Region



## Discovering Comet Bruenjes – From Western Missouri by Astrophotographer Fred Bruenjes

Comets are chunks of ice and rock only a few miles across. Only the very few that travel into the inner solar system develop a fuzzy head and a millions-of-miles-long tail. Even these spend most of their time far away from the sunlight that activates the tail, so they are difficult to see, even through telescopes. But several times each year a new comet is found – often by an amateur astronomer. The comet is then named for the comet hunter who first reported it. Amateur astronomer Fred Bruenjes will present the story behind the discovery of Comet C/2012 C2 – Comet Bruenjes. The discussion will include motivations, search strategy, equipment, the discovery, follow-up, and reporting, along with tips for prospective comet hunters.

Fred Bruenjes is an amateur astronomer and veteran astrophotographer. He left an electrical engineering job in California to settle in Warrensburg, Missouri. There he built his own observatory, as well as Moonglow Technologies, an electronics firm specializing in developing astronomical products. He is still an engineer and software designer during the day, but now also an astronomer and astrophotographer by night. His pictures have appeared in a number of commercial magazines. Some websites for his work, etc are:

<http://www.moonglow.net/ccd/>

<http://apod.nasa.gov/apod/ap110115.html>

<http://apod.nasa.gov/apod/ap050806.html>

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### Upcoming speakers:

**September** Carroll Iorg (Astronomical League President)

**October** Angela Speck - (Astronomy Department, University of MO-Columbia)

### 10th Annual SLAS Star-B-Q

A good time was had by all who came to the 10th Annual SLAS Star-B-Q held at the Walnut Grove shelter in Babler State Park last Saturday. We were blessed by good weather for a change compared to the last few years when it was very hot. Temperatures were in the 80's and there was no rain and few clouds by the time darkness allowed for observing. Young's provided the catering again with both pulled pork and chicken, buns, baked beans, cole slaw, iced tea, lemonade and ice cream! Members brought lots of other sides to match and some great desserts to go with the ice cream! Volleyball and badminton provided some daytime recreation and a few people set up solar telescopes. Mark Jones provided his usual quiz and there were door prizes for those that did well on the quiz. Observing went late into the night as people set up for both telescope work and observing the fabulous meteors from the Perseid Meteor shower (among others). The last of us finally left around 2am. One of the highlights was getting to see Jerry Loethen and family before they departed for Australia! Good luck down under to them!

## President's Corner *by Jim Small*

I really enjoyed this year's Star-b-q. The weather was fantastic for a change and the skies were clear once darkness came and telescopes were set up. Some folks worked on their binocular Messier objects and I gave a run on my new 50mm apo from Stellarvue. What was most impressive though were the Perseid (and other) meteors that lit up the sky during the evening. There were perhaps a dozen or so very bright meteors before midnight and they continued to come faster as the night wore on. Jim and Ann Trull had perhaps the best setup for meteor observing as they gave a first run on a couple of really nice reclining lounge chairs. Nothing like having a Lazy-Boy for the field!! Greg Rigelman's binocular chair was also useful, especially since it is able to rotate!

The meal was terrific as usual. There were lots of desserts, my favorite being the chocolate cake that had 2012 Perseid Meteor Shower on the top. Lots of chocolate icing! Young's did the usual great job of catering the food for us. It sure is nice not having to put all of that together ourselves!

A few games before and after dinner until it was time for the annual quiz for door prizes. There were several that did well, but a couple of them got perfect scores because they discovered that Mark tried to make life easy and have all the correct answers be the first choice! I'm betting that Mark doesn't try that again!

It was great to see everyone at the event, which turned out to be a bon voyage party for the Loethen's before they leave for Brisbane, Australia for an extended period of time. Karen and Jerry have both promised some good "down under" reports for us! I'm guessing that Jerry knocks off his southern skies observing program while he's there!

Thanks to the membership for the good support for SLAS hosting the 2014 MSRAL convention here in St. Louis. I will chair the committee and Cook Feldman will be the co-chair. We have already had a couple of good discussions about locations and other details for the convention.

Watch for announcements about Tool Kit training sessions once we establish a location for them. Two possibilities are the Science Center and Headquarters for the St. Louis County Library.

**It's budget time again!** If you are in charge of a budget item, please contact Cook Feldman and send him the detailed report of expenditures for the 2013 budget. It is vital to the process that we have your projections as soon as possible.

We have some great speakers coming this fall, starting with Fred Buenjes this Friday. I certainly look forward to seeing you there! There will also be a new members meeting immediately after the regular meeting for those interested!

**Best wishes to the Loethen's as they head for the land down under in Brisbane, Australia!**

## International Dark-Sky Association's Darksky Giveaway

Enter the International Dark-Sky Association's Darksky Giveaway for an astronomically grand prize— **a set of eight Televue Ethos eyepieces valued at \$5,665, generously donated by Televue Optics.** To enter the IDA's Darksky Giveaway, you must be an IDA member before the entry closeout date of August 31, 2012. If you are not a member, joining is easy and the cost of a one-year membership is only \$35.00. To join or renew your membership, visit [www.darksky.org](http://www.darksky.org) and select the "Join" tab at the top of the webpage. You can also join by calling the IDA office at (520) 293-3198. Entering to win is also a breeze. Visit [darksky.org/giveaway](http://darksky.org/giveaway) where you can fill out the entry form online and read the official rules.

Individual memberships help IDA perform its mission in stopping light pollution and helps to support its many programs. Through the International Dark Sky Places program, IDA and its partners certify locations with exceptional nightscapes as International Dark Sky Communities, International Dark Sky Parks, and International Dark Sky Reserves. The Dark Sky Parks and Protected Area Program currently works with national parks to help them utilize quality outdoor lighting. IDA's new Suburban Outreach Sites project partners with astronomy clubs to establish accessible programs for kids and their parents. These programs help IDA to engage communities and to raise awareness and ultimately "to preserve and protect the nighttime environment and our heritage of dark skies through environmentally responsible outdoor lighting." IDA members make a big difference in their communities and around the world, which is why IDA is thrilled to offer its members such a premium giveaway from Televue Optics.

Make sure you enter the DarkSky Giveaway by the deadline and good luck! To learn more, visit [www.darksky.org](http://www.darksky.org). The winner will be announced at the Pacific Astronomy and Telescope Show in September 2012, but does not need to attend PATS.

## **How the Galilean Moons got their Names**

*by*  
**Rick Menendez**

One of the first objects that amateurs observe, after the Moon, is the large multi-hued disk of Jupiter. Surrounding it are the 4 so called Galilean Moons. On the night of January 7, 1610 Galileo pointed the newly invented device called the telescope at the planet and noticed 4 bright stars surrounding it. After several nights of observing he realized that these were not background stars but were in fact satellites like our own Moon orbiting another body. This discovery, that objects orbited bodies other than Earth, would later put him into direct conflict with the teachings of the Church which insisted that everything orbited it; another story. While the moons are collectively named after Galileo, the individual names are a different story: A story of envy and revenge.

Galileo heard about the telescope shortly after Hans Lippershey invented it. He took the Dutchman's description of the device and made his own scope of equal quality. History recognized him as the first person to use the scope for astronomical observations. This, along with being the fact that he is regarded by most as the father of modern science by his use of observation and experiment to verify theory assured Galileo his place as one of the greatest scientists in history, if not the first. His claim to being the first to use the telescope and to observe the moons of Jupiter was challenged by a young upstart college at Padua named Simon Marius who claimed to have seen them a month earlier. This wasn't the first time he had crossed swords with Galileo. 3 years before Marius claimed he had invented a calculating device called the proportional compass. An outraged Galileo quickly rose up to challenge him insisting he had invented the device 9 years earlier and that Marius had stolen the idea. With more influence and power than the young upstart Marius Galileo had him expelled from the university for plagiarism and sent back to Germany.

While the 4 moons are collectively named after Galileo the individual names were a different matter. Galileo like many of us who work in the academic setting had only a tenuous grip on his job. His use of the telescope changed his position from provisional to fully tenured he still realized that to gain and keep that position required influence from powerful academic and above all financial supporters in order to keep his position and continue his work. Thus Galileo named the moons the Medicean Stars after the family of the powerful Florentine and Tuscan industrialist, financier and land owner Cosimo de Medici in order to gain their favor. (Many years later William Herschel would do the same thing when he initially named Uranus after his king calling it George's star).

Marius, still smarting from his previous encounters with Mr. Galileo, saw a chance to extract his revenge. By pandering to a mere industrialist he demeaned the names of the moons and the great discovery. Marius argued that the planet was named in honor of the Greek god Zeus, Jupiter being the Roman version of it, the moons should rightly be named after members of Jupiter's own court.

Thus Io was named after one of Zeus's most beloved maidens, Europa after a Phoenician princess abducted by Zeus and later the mother of 3 of his children, Ganymede after a Trojan boy whom Zeus made a cup bearer to the gods and lastly Callisto a nymph named after loved by Zeus (apparently the gods were very amorous!)

Marius knew instinctively that astronomers would take those names more quickly than they would the names chosen by Galileo whose names were soon discarded. Thus Marius was able to extract a small bit of revenge on a man who had hurt his career. Although, collectively the moons are named for their discoverer Galileo, it was Marius who determined how they would be known. In the end the great scientist Galileo would be known by virtually everyone and Marius is a mere footnote in history he was the one that gave the moons their names.

## End of the Space Shuttle: Good news for Wildlife

by

**Rick Menendez**

Many of us were sad to see the end of NASA's periodic flights into space with the Space Shuttle. There was one group that was very happy to see the end of these flights, the wildlife in and around the the Kennedy Space Center and the Cape Canaveral wildlife area. Seems the exhaust from the Shuttle's solid rocket boosters was deadly for several days to the living creatures in this protected marine estuary and each launch killed thousands of them.

The Shuttle has 2 types of engines. The so-called main engines burn liquid hydrogen and oxygen throughout the powered flight of the craft. the exhaust from them is pure water vapor and this causes no problems. The pair of large solid rocket boosters are a different matter. These 2 rockets which provide the high thrust needed to get the Shuttle off the ground and most of the initial acceleration.. They contain a total of 21/2 million pounds of a mixture consisting of 16% aluminum, 70% ammonium perchlorate and the remainder a rubberized binding compound. The large white clouds that follow the shuttle upward on its arcing flight consists of this residue, the water vapor from the main engines is invisible. This compound which is scattered high into the Florida air is highly acidic and toxic and is irritating to the eyes and can even damage the paint finish on cars. The fallout from this toxic residue causes the shallow lagoons to become so acidic it kills at least a thousand fish in the day or so after launch until it is neutralized by nature. The air force concluded that these dead creatures "should be considered dedicated in the interests of the mission". NASA despite being told of the problems caused by this toxic exhaust, did little to stop it or change the design of future boosters it is considering.

It's not just the Shuttle that's the problem although it did have a large number of flights. American Delta, Titan III and Atlas 5 rockets use them also along with the European Space Agency's 's Ariane rocket also use solid rocket boosters with a similar composition and they cause similar problems to local wildlife. Furthermore the effect of this exhaust on the local stratospheric ozone is poorly understood but the thinking is that this layer that protects Earth from harmful ultraviolet light must surely get hammered.

The real problem is the coming commercialization of space flight. If tourists are going to be regular flying into space far more frequently than shuttle or satellite payloads then the environmental effects will surely be much worse and possibly cumulative if done very frequently.

One option is to use the benign liquid hydrogen/oxygen fuel engine system of the Shuttle. This system is dangerous and very expensive and not suitable for carrying passengers on low cost flights. An alternate system that burns nitrogen and oxygen in the form commonly called laughing gas as an oxidizer with what is essentially used tire rubber compound for fuel. This so-called hybrid booster is cheaper using no super cold liquids and has the safety advantage that, unlike the Shuttles boosters, it can be turned off immediately. This system at a 6 to 1 ratio of nitrogen to oxygen is not as clean as the H<sub>2</sub>O exhaust but much cleaner than current the solid rocket booster residue. The exhaust is mostly superheated harmless nitrogen of which our atmosphere is mainly composed of. The remainder, consisting of carbon mono- and di- oxide is not so benign but this type of engine is surely safer and better for the environment than current designs especially if the commercial market is going to be launching rockets much more frequently than government agencies are now.

Adapted from the SLAS library book "How to Build your own Space Ship" by Piers Bizony

## **Large Hadron Collider Superlatives**

*by*

**Rick Menendez**

A couple months ago Jim Small and a few others discussed the Large Hadron Collider in France/Switzerland. It was recently announced that it had discovered the Higgs Boson, the so-called "God Particle" Operated by CERN (Center for European Research Nuclear) a group of European countries, including the United States, that combine resources to help pay for big science tools like the collider: And this is a big tool, the biggest microscope in the world so to speak. Here are some amazing facts.

The LHC is now the largest 'atom smasher' in the world, replacing the now decommissioned Tevatron located near Chicago. It will achieve a maximum energy of 7 Trillion electron volts (GeV) versus the 2 GeV of the Tevatron, the former record holder. Since the collisions are head on this will be doubled to 14 GeV. It was built inside the tunnel that housed a previous accelerator the Large Electron Positron Collider. To save the cost of building a new tunnel, the LEP was dismantled. Unlike these 2 colliders which collided matter into anti-matter, the LHC will smash protons into protons. The reason is that although it's best to collide oppositely charged particles so the net charge is zero, it's hard to produce and store a lot of anti-matter. By using ordinary protons, the beams can be denser and have what they call higher 'luminosity'

Initial plans were to have the collider operate at 10 GeV but cost considerations scaled this back a bit to 7 GeV. The U.S. was planning on building the Superconducting Super Collider during the Clinton administration in the 90's which would have achieved an energy of 40 GeV. The tunnel was dug under Texas was partially excavated, but Congress, despite pleas from Mr. Clinton and others, was scuttled it due to cost considerations (the cost would have been minuscule compared to our recent wars and Wall Street bailouts I must add). Still this is a big leap in power and in a zone where it was felt they would find the Higgs. This was a major consideration since the Higgs was the last missing piece of the Standard Model of Particle Physics. New discoveries will likely be made in this zone too.

What's special about the LHC, aside from it being the largest at 18 miles, and most powerful collider? At maximum acceleration the protons will, due to Einstein's laws, will be 70 times more massive than at rest. It is the largest, as far as we know, region of cold temperature in the Universe. Cooled by liquid helium to 2 degrees Celsius to keep the magnets superconducting it is even colder than the average 3 degree temperature of outer space. The magnets have a field 100,000 times stronger than Earth's and contain the strongest magnets ever mass produced. The vacuum is a 10 trillionth the of the Earth's air pressure; the largest vacuum ever produced. The energy stored in this field is equal to a couple tons of TNT and the beams have a 10th of that stored on a billionth of a gram of matter, energy which is dumped into tons of graphite and concrete when they are done.

The beams consist of 2,808 bunches each having 115 billion protons. Each bunch is started off at 10 centimeters long and 1 millimeter wide and is separated from the others by 10 meters each accelerated separately. Collisions occur at a slight angle every 25 to 75 nanoseconds. This separation in time and the slight off-center spatial separation of the collisions allow for easier analysis of the debris from the collisions.

The collisions will explore what happened in the first trillionth of a second after the Big Bang and will explore sizes down to a quadrillionth 10<sup>15</sup>th of a millimeter. It draws the power of a medium sized city such as Geneva and thus is not operated only in the cold winter months when power usage (and prices) for electricity are higher. The detection devices are marvels of technology in themselves and produce 50 times the amount of information that the Tevatron did: data that must be sifted through in order to produce new discoveries and confirm other's that we were looking for such as the Higgs. 100 megabytes per second come out or a quadrillion bites per year equal to hundreds of thousands of DVD's. While much is analyzed on site, the majority is farmed out to labs around the world for detailed analysis over the next several years.

The LHC, the biggest and best until they can afford to build a bigger, more advanced collider.

Adapted from Lisa Randall's book 'Knocking on Heaven's Door'

**St. Louis Astronomical Society  
Balance Sheet  
As of July 31, 2012**

	Dec 31, 11	Jul 31, 12
<b>ASSETS</b>		
Current Assets		
Checking/Savings		
Checking - First Bank	604.61	775.38
Deposit, Certificate of	17,855.13	19,913.15
Merchandise Change Fund	20.00	20.00
Savings - First Bank	5,581.25	3,083.78
YMCA Trout Lodge ESCROW	877.87	877.87
Total Checking/Savings	24,938.86	24,670.18
Accounts Receivable		
Accounts Receivable	884.00	
Total Accounts Receivable	884.00	
Other Current Assets		
Inventory Asset	3,669.82	3,669.82
Undeposited Funds	414.90	
Total Other Current Assets	4,084.72	3,669.82
<b>Total Current Assets</b>	<b>29,907.58</b>	<b>28,340.00</b>
<b>TOTAL ASSETS</b>	<b>29,907.58</b>	<b>28,340.00</b>
<b>LIABILITIES &amp; EQUITY</b>		
Liabilities		
Current Liabilities		
Accounts Payable		
Accounts Payable	(461.50)	(461.50)
Total Accounts Payable	(461.50)	(461.50)
Other Current Liabilities		
SLAS Bucks	657.00	530.00
Total Other Current Liabilities	657.00	530.00
<b>Total Current Liabilities</b>	<b>195.50</b>	<b>68.50</b>
<b>Total Liabilities</b>	<b>195.50</b>	<b>68.50</b>
Equity		
Opening Bal Equity	8,599.16	8,599.16
Retained Earnings	25,290.63	21,112.92
Net Income	(4,177.71)	(1,440.58)
<b>Total Equity</b>	<b>29,712.08</b>	<b>28,271.50</b>
<b>TOTAL LIABILITIES &amp; EQUITY</b>	<b>29,907.58</b>	<b>28,340.00</b>

is

	Jan - Jul 12	Budget	\$ Over Budget	% of Budget
<b>St. Louis Astronomical Society Profit &amp; Loss Budget vs. Actual January through July 2012</b>				
Ordinary Income/Expense				
Income				
Magazine Subscription				
Astronomy Magazine Sales	408.00			
Sky & Telescope Sales	757.85			
Magazine Subscription - Other	0.00	1,093.75	(1,093.75)	0.0%
Total Magazine Subscription	1,165.85	1,093.75	72.10	106.6%
Membership Dues	1,730.00	2,046.00	(316.00)	84.6%
Merchandise Sales	(57.00)			
Total Income	2,838.85	3,139.75	(299.90)	90.4%
Cost of Goods Sold				
Magazine Subscriptions				
Astronomy Magazine Cost	408.00			
Sky & Telescope Cost	757.85			
Magazine Subscriptions - Other	0.00	1,093.75	(1,093.75)	0.0%
Total Magazine Subscriptions	1,165.85	1,093.75	72.10	106.6%
Total COGS	1,165.85	1,093.75	72.10	106.6%
Gross Profit	1,673.00	2,046.00	(372.00)	81.5%
Expense				
1-Programs & Events				
Home Made Fest	172.70	200.00	(27.30)	86.4%
Meeting Expenses				
Meeting Refreshments	171.31	262.50	(91.19)	65.3%
Meeting Speaker Fees	175.00	301.00	(126.00)	58.1%
Total Meeting Expenses	346.31	563.50	(217.19)	61.5%
Membership Initiatives	166.68	325.00	(158.32)	60.5%
SLAS Bucks Expense	0.00	131.25	(131.25)	0.0%
Total 1-Programs & Events	715.69	1,219.75	(504.06)	58.7%
2-Newsletter				
Newsletter Postage	141.84	99.12	42.72	143.1%
Newsletter Printing	345.09	338.31	6.78	102.0%
Total 2-Newsletter	486.93	437.43	49.50	111.3%
3-Library expense	208.00	240.00	(30.10)	87.5%
4-Astronomical League Dues	705.00	675.00	30.00	104.4%
5-Loaner Scopes	604.02	600.00	4.02	100.8%
6-Brochures	127.79	0.00	127.79	100.0%
7-Insurance	380.00	380.00	0.00	100.0%
8-Website	107.40	108.00	(0.60)	99.4%
9-Administrative Expenses				
Banking Fees	24.23			
Corporate Filings	20.00	20.00	0.00	100.0%
Office Supplies	80.42	87.50	(7.08)	89.1%
Paypal Fees	10.75	43.75	(33.00)	24.8%
Postage	45.00	51.31	(6.31)	87.7%
Total 9-Administrative Expenses	160.40	202.56	(42.16)	79.2%
<b>Total Expense</b>	<b>3,498.03</b>	<b>3,892.74</b>	<b>(394.71)</b>	<b>90.6%</b>
<b>Net Ordinary Income</b>	<b>(1,625.03)</b>	<b>(1,817.74)</b>	<b>(7.29)</b>	<b>100.4%</b>
Other Income/Expense				
Other Income				
Disputed Bank Charges Expense	22.85			
Donations	275.06	556.00	(309.95)	47.0%
Interest Income	60.55	55.00	5.55	110.1%
RASC Handbooks and Calendars	28.00			
Total Other Income	386.46	647.00	(260.54)	60.1%
<b>Net Other Income</b>	<b>386.45</b>	<b>640.00</b>	<b>(253.55)</b>	<b>60.1%</b>
<b>Net Income</b>	<b>(1,440.58)</b>	<b>(1,177.74)</b>	<b>(262.84)</b>	<b>122.3%</b>

**SAINT LOUIS ASTRONOMICAL SOCIETY  
MINUTES OF BOARD MEETING – July 12, 2012**

**Attendees**

Jim Small, Cook Feldman, Don Ficken, Grant Martin, Mark Jones, Rhonda Whelan

**1. Opening Activities**

Call to Order 7:00pm Read/Approve June Minutes. Cook motion seconded by Rhonda approved

**2. External Business**

Report by John Lakey (SLSC) SLSC offers free volunteer memberships. Go to jobs and volunteering. Regularly comes out to PTV. SLSC is serious about continuing the first Friday Public Telescope Viewing (PTV) events Next PTV at SLSC on August 3. Two shows each evening: 8:00 pm star show, 9:00 pm Seeking New Earths, Business meeting with President of Science Center, next Tuesday (July 7/17) at 6pm. The objective is to familiarize the SLSC President with SLAS' mission and to discuss how SLAS can assist in future SLAS plans. John will wait in lobby at SLSC main building for board members to arrive. SLAS board members will work on bullet points about SLAS prior to the meeting.

**3. Director Reports: If needed**

**President – Jim Small** ALCON was well attended by SLAS. Web report generated by Jim S. with number of hits per month for the past 12 months. Number of hits peaked in May/June coincident with the Annular Eclipse and Transit of Venus.

**Vice President – Bill Biermann** July: Eclipse and Transit recap by SALS members August: Fred Buenges mid-west comet discoverer September: Carrol Iorg, President of the Astronomical League October: Angela Speck, University of MO- Columbia

**Secretary – Mark Jones** No report

**Treasurer/ALCor – Rhonda Whelan** Monthly reports were submitted to board prior to meeting Cook will coordinate with Rhonda on review of reports

**Hospitality – Grant Martin** No report

**Board member at Large reports** Cook Feldman, Linda Follis, Jim Trull – no reports

**4. Committee Reports: If needed**

Membership - see separate report

Dark Site – Next dark sky star party will be July 14. Annual Star-B-Q is August 11, announcement will be included in newsletter

Observing Programs – Several members have Outreach and Transit applications pending

Star Party Coordinator/outreach – see separate report

**Star Parties**

Upcoming events: Francis Park July 25, Gateway July 26, PTV Aug 3

**5. New Business**

MSRAL 2014 –The board will take to the general membership for establishing a MSRAL 2014 committee for SLAS hosting the Mid-States Convention for 2014. Jim Small shall Chair the committee and Cook Feldman shall be Vice-Chair. It is understood that SLAS would be responsible for 50% for any profit or loss from the convention. It is expected that the committee will be responsible to establishing a budget and to solicit SLAS for seed money for long-lead expenditures if needed. Motion Grant second seconded.

Next SLAS board meeting August 9

**6. Closing Activities**

Motion to adjourn by Cook, Rhonda second meeting adjourned at 9:15pm

## Upcoming Star Parties and Other Events

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

### Dark Sky Observing Dates

Saturday, August 18, location TBA  
Saturday, September 15, location TBA  
Saturday, October 13, location TBA

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

Aug. 22, 2012 (5-day old Moon)  
Sep. 19, 2012 (3-day old Moon)  
Oct. 24, 2012 (9-day old Moon)  
Nov. 21, 2012 (8-day old Moon)  
Dec. 19, 2012 (6-day old Moon)

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

Friday, September 6 (note: NO Planetarium show)  
Friday, October 5th  
Friday, November 2nd  
Friday, December 7th

**SLAS Executive Board Meetings** *Location will be at the Edward Jones YMCA.*

Thursday, September, , 2012, 7:00 pm  
Thursday, October 4, 2012, 7:00 pm  
Thursday, November 8, 2012, 7:00 pm  
Thursday, December 6, 2012, 7:00 pm

### Stargazing at the Gateway Arch Dates:

Thursday, August 30  
Thursday, September 27  
Thursday, October 25

## SLAS EVENTS

### August

17 SLAS meeting  
18 SLAS dark sky observing  
22 Francis Park  
28 Nazereth Nursing Home  
30 Star Gazing at the Gateway Arc

### September

6 SLAS board meeting  
7 SLSC PTV  
8 Laumeier Sculpture Park  
10 Edward Jones YMCA  
15 SLAS dark sky observing  
19 Francis Park  
21 SLAS meeting  
22 Stargazing Crestwood Park  
27 Star Gazing at the Gateway Arch  
28 St. Louis Arc at Camp Wyman  
29 WOW 2012 at Riverlands

### October

4 SLAS board meeting  
5 SLSC PTV  
11-15 Illinois Dark Sky Star Party (IDSSP)  
13 SLAS dark sky observing  
18 Manchester Park  
19 SLAS meeting  
20 Larson Park, Webster Groves  
20 Night Sky Over Babler  
23 Bristol Elementary  
24 Francis Park  
25 Stargazing at the Gateway Arch

### November

2 SLSC PTV  
8 SLAS board meeting  
10 Weingarten Vineyard  
16 SLAS regular meeting  
21 Francis Park

### 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:**

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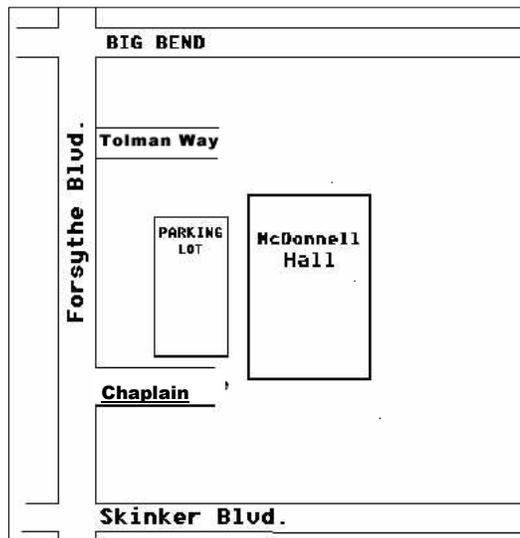


### Who We Are and What We Do

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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