

**EVENTS CALENDAR**

(unless otherwise noted, all events are at the Edwin Ritchie Observatory, Battle Point Park)

**DECEMBER**

DECEMBER 2 ☽

DECEMBER 7

7 p.m. BPAA Board Meeting

DECEMBER 10 ☽

Total Lunar Eclipse

DECEMBER 13

Geminids Meteor Shower Peak

DECEMBER 17 ☽

DECEMBER 21

Winter Solstice (9:30 p.m. PST)

DECEMBER 22

Ursids Meteor Shower Peak

DECEMBER 24 ☿

**JANUARY**

JANUARY 1 ☽

JANUARY 5

Earth at Perihelion (0.983AU from Sun)

JANUARY 9: ☽

JANUARY 11

7 p.m. BPAA Annual Meeting and board election; open to all members

JANUARY 14

7 p.m. Planetarium Show and Star-gazing

JANUARY 16 ☽

JANUARY 23 ☿

JANUARY 31 ☽

**FEBRUARY**

FEBRUARY 1

7 p.m. BPAA Board Meeting

FEBRUARY 10

Deadline for Spring issue of BPAA Newsletter

**Quarterly**

www.bpastro.org Bainbridge Island, WA

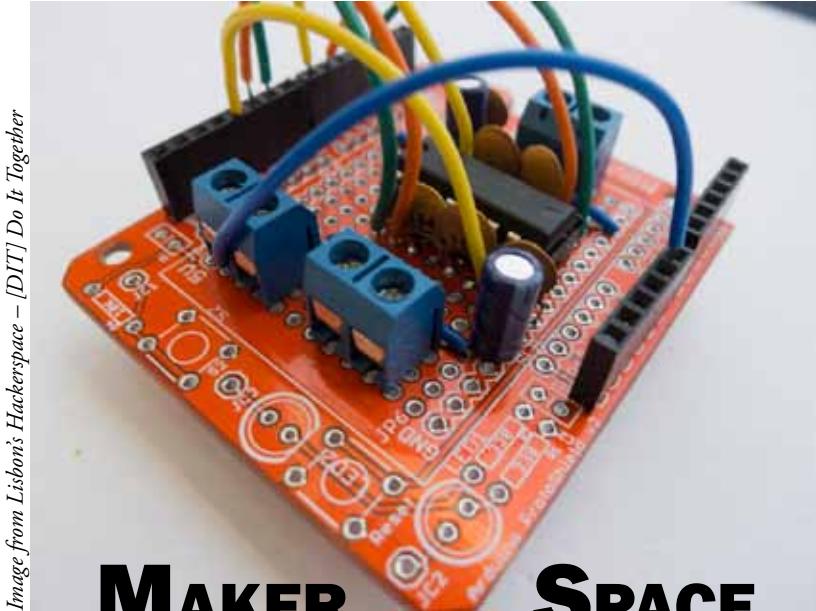


Image from Lisbon's Hackerspace - [DIT] Do It Together

**MAKER SPACE**

**I**magine a shared work area where people mix art, design, technology, food, science, and internet culture. A breeding ground for creative projects. A workshop where you play. A place for tinkering and experiment. A place to make things up, tear things apart, and put them back together. A laboratory, a place to spend time and share ideas with fellow-tinkerers. It doesn't matter if it's woodworking, electronics, metal working, biology, robots or even software. What does matter is DOING things. This is a maker space. There is even a magazine devoted to the idea: *Make Magazine*, <http://makezine.com/>.

This type of space is an ideal learning environment for the technically-inclined. While opportunities for sports, music, and arts enrichment abound, there's remarkably little available for adults or children with a technical bent. And the kids are our future engineers and scientists. Without them, the future is bleak.

Americans learn most of their science and engineering through informal channels such as workshops, museums, and planetarium shows. A maker space is a great way to jump-start this learning. It may be the best way there is. And it's not just for the school-aged or future engineers. It lends itself to all sorts of creative arts and crafts, from hand-cranked luminescent jewelry <http://www.breadboardphilly.org> to vertical window gardens <http://wiki.metrixcreatespace.com/workshops>.

Does a maker space fit within the mission of BPAA? I believe the answer is yes. Our charter refers repeatedly to astronomy and doesn't mention science in more general terms. But astronomy encompasses thousands of years of history, as well as the foundations of math, navigation, philosophy and physics. The founders included a workshop in their original plans. There is no reason that the workshop should be limited to telescope building: solar pendulums, trebuchets, even bubblebots (all projects from a recent issue of *Make Magazine*) are all linked to principles of astronomy.

Could the Observatory become a maker space? It requires workshop space

**CALENDAR NOTES:** Yeah, well, it had to end. How many years could it go on? I've been doing calendar duty for almost a decade and I'm 67 years old! Calendar Girl? At my age, forget it. Time to give it up.

The calendar duty goes to Cheth Rowe, who will do a terrific job. He's got a science background and a keen interest in astronomy.

I'm pleased to be going out with the winter sky, my favorite. Last time you'll



Pleiades image by Ed Lunt

have to hear from me about Orion and how fond I am of the fact that it actually bears a resemblance to its namesake. Then there all those bright stars in the winter sky: Rigel, Betelgeuse, Sirius, Aldebaran, Capella, Castor, Pollux, Procyon, and that most wonderful of clusters, the Pleiades. They're all well worth freezing your you-know-what off on a clear, cold winter night.

Winter will bring other highlights. There's a total eclipse on December 10. Folks in Asia and Australia will get the full meal deal, but we in the Pacific Northwest will be able to see the Moon slip into Earth's shadow and start to emerge before the moon sets. And there are meteor showers on December 13 and December 22, well worth bundling up and dragging out that chaise lounge for a night of viewing.

The starting time for the planetarium shows in January, and February is 7:00 p.m. The shows continue to draw large crowds, thanks to the hard work of the volunteers who publicize, present and assist at the showings.

And don't forget BPAA's Annual Meeting on January 11. This meeting is for all members and includes election of officers.—*Diane Colvin, BPAA Events Manager*

#### *Maker Space cont'd from p. 1*

and tools and people to oversee and organize them. Can we do that within the existing BPAA facilities? Perhaps. In the past, we've run robotics workshops and built telescopes. This meant hauling tools and supplies to the Observatory, then taking them home again. The space was cramped, and now is devoted, on a more or less permanent basis, to the planetarium. However, we could

still operate as a workshop. We would need to find someone who has mastered the equipment and is willing to devote hours, on a regular, predictable, basis to opening the building, mentoring, and supervising the shop.

I'm not proposing that BPAA set up a maker space. But there is a need for hands-on science in the community, and a maker space is a great way to address that need.



#### FEBRUARY 11

7 p.m. Planetarium Show and Star-gazing

#### FEBRUARY 14



#### FEBRUARY 21



Any member who is planning to observe can invite others to join in by sending an email to [bpaa@yahoogroups.com](mailto:bpaa@yahoogroups.com). To join our email group, send an email with your name to [bpaa-owner@yahoogroups.com](mailto:bpaa-owner@yahoogroups.com) and we can enroll you. If you want to have web access to the messages and files, you can join the Yahoogroups by clicking the register link for new users on <http://groups.yahoo.com/>. Request to join at <http://groups.yahoo.com/group/bpaa/>. The system will send us a message, and we'll approve your request after we verify your membership.

If BPAA cannot independently sponsor a maker space, then perhaps it can help create one elsewhere. One option, and I think it is a good approach, would be to work with and support the proposal for a community workshop and arts and crafts center at the old 'Hope Center' building on Moran Rd, just off 305 across from the main fire station <http://g.co/maps/e4dwz>.

Current ideas include a community woodworking shop and, quite possibly, other arts and crafts spaces. A maker space, adding technologies like electronics, programming, and 3D printing, would be a tremendous asset to the Center, as well as to Bainbridge Island.—*Malcolm Saunders*

*Noisebridge (San Francisco) Arduinos For Total Newbies workshop, July-2011. Image by Mitch Altman, CC Share Alike*

# Phobos-Grunt:

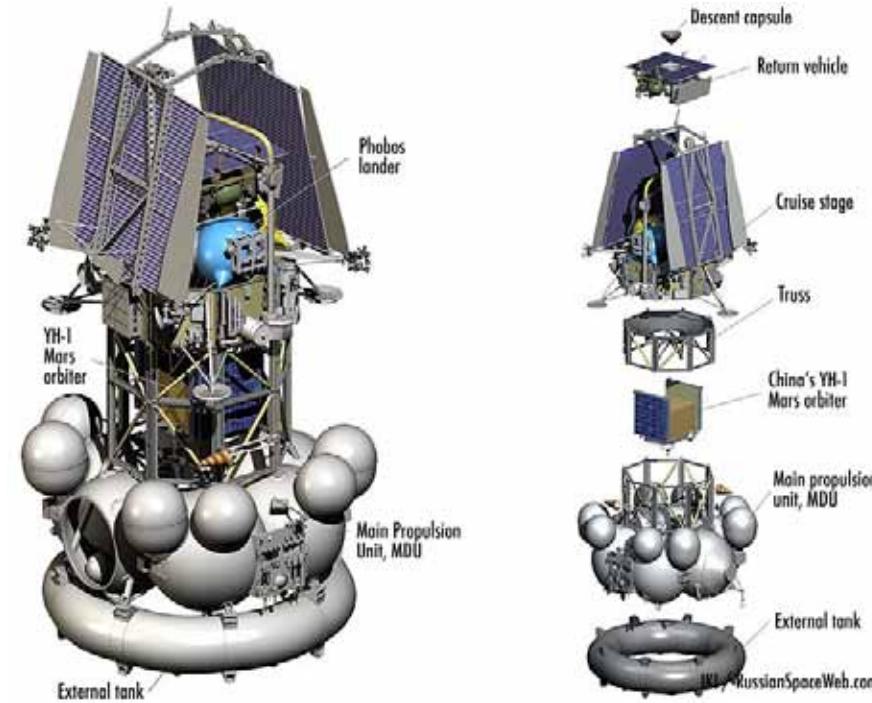
## When funding fails, amateur astronomers fill in

Economic frugality seems to be the way of it these days. Government cost cutting is the norm. Science and NASA face serious funding issues. Everywhere you look times are tough, but austerity would be a step up for the Russian space program since the fall of the Soviet Union. They've had a hard couple of decades. Now, in a major setback, Phobos-Grunt, the rocket headed for the Mars moon Phobos, could not scale the heights. The launch went off as planned, but the unmanned probe failed to follow its intended course.

The Russians have had repeated rocket failures. In December, a rocket and its payload of three communications satellites fell into the Pacific Ocean after failing to reach orbit. A military satellite was lost in February, and in mid-August the Express-AM4, described by officials as Russia's most powerful telecommunications satellite, was lost.

Phobos-Grunt was a daring attempt to reach one of the moons of Mars and to bring soil samples back to Earth. No one has done anything like it.

The Zenit-2 booster rocket launched from the Russian-leased Baikonur cosmodrome in Kazakhstan on November 8th. The probe separated from the booster 11 minutes later. It was then supposed to fire its engines twice to put itself on the path to Mars. Russia's Federal Space Agency chief Vladimir Popovkin said neither of the two ignitions worked, probably due to the failure of the craft's orientation system. As of November 29, Phobos-Grunt remains stalled in Earth orbit, communicating briefly and erratically with ground stations. It's now too late to send the ship on its original mission. Alternatives, such as visiting Earth's moon, or landing on a near-Earth asteroid, have been put forward by various experts.



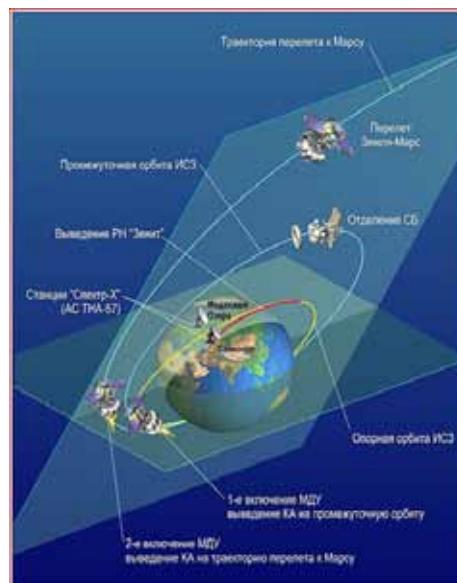
The \$170 million Phobos-Grunt was Russia's first interplanetary mission since Soviet times. (A previous 1996 robotic mission to Mars crashed in the Pacific following an engine failure.)

Phobos-Grunt was originally set to blast off in October 2009; but launch was postponed because the craft wasn't ready.

The latest failure was first noticed by amateur astronomers tracking the launch. The Russians were too frugal to send an observation ship to South America. According to the *Washington Post*, "Early Wednesday, Roscosmos called on amateur satellite trackers to

follow the troubled craft. The first of two crucial rocket burns was scheduled while Phobos-Grunt sped over South America, but observers in Brazil did not see the engine fire, Oberg said." That's right, amateurs in Brazil did the work that most space programs use professionals for. Amateur astronomers have been a primary source of information ever since.

As BPAQ's Chief Astronomer, Malcolm Saunders, has said many times, astronomy is one of the few areas left in science where amateurs can contribute materially to the field.—Charles Higgins



Russian graphic of planned Earth departure trajectory

Image courtesy Russian Space web



## Steve Ruhl President's Message

### Advanced Amateur Astronomy Course

Last spring Dave Fong and I presented an "Introduction to Amateur Astronomy" class through the parks department. Twenty people signed up, had a good time, and learned a few things. One of the things Dave and I learned is that amateur astronomers tend to procrastinate when signing up for a class.

Last fall we decided to offer the class again along with a new "Advanced Amateur Astronomy and Observation." Unfortunately, too few amateur astronomers signed up in time, and we had to cancel the course. However, a good number of our spring "Intro" students and a few newcomers have signed up for the advanced course: it looks like a fun group. (At the moment I am writing this, we have had one class and the tradition has been upheld. We had a flurry of procrastinators sign up at the last minute.)

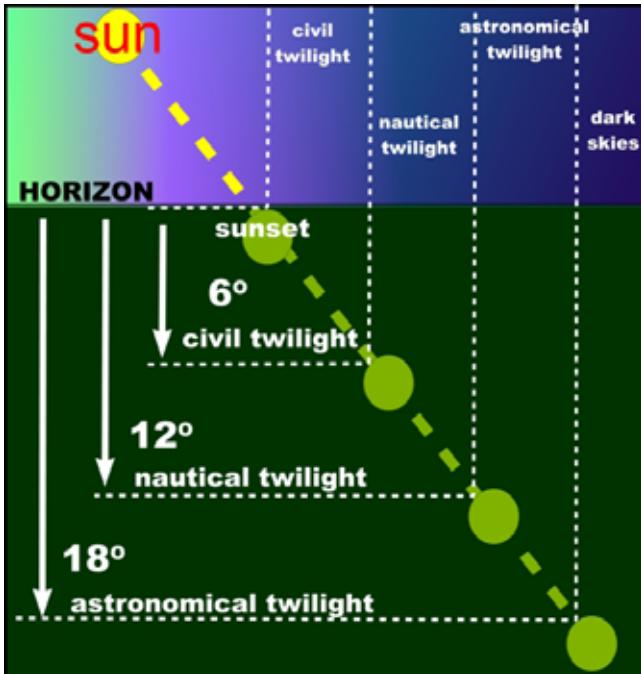
We would like to offer both courses again in the spring. If you are interested, please e-mail me at [president@bpastro.org](mailto:president@bpastro.org). Since these are small courses, we can customize the subjects we cover or alter schedules if we know people's preferences ahead of time. I would love to hear your thoughts.

### Precious Nights

Did you know that there are three versions of twilight: civil, nautical, and astronomical?

The length of the day is considered to be from the moment the top limb of the Sun crosses an ideal horizon in the east until the last bit of the Sun disappears over the horizon in the west. That means the Sun would travel 180° plus the angular width of the Sun (about 1/2°). The other factor is the refraction of the Sun's light through the atmosphere of the Earth. The end result is that a day is about 12 hours and 15 minutes long at the equinox.

"Civil Twilight" lasts from the point of sunset until the center of the Sun reaches 6° below the horizon. From 6° to 12° is "Nautical Twilight," and from



*At the end of Civil Twilight (Sun 6 degrees below the horizon) it is no longer possible to read outdoors without artificial light.*

*At the end of Nautical Twilight, (Sun 12 degrees below the horizon) traditional navigation at sea is no longer possible (horizon is not visible).*

*At the end of Astronomical Twilight (Sun 18 degrees below the horizon) the sky no longer contains scattered sunlight.  
— Canadian Space Agency*



Winter Sky by Astronomy Calgary

12° to 18°, we are in "Astronomical Twilight." Past that, it is night (and really dark).

At this latitude, summer "nights" last little more than an hour and a half. That is hardly time enough to look at more than a few objects.

Winter should be an astronomer's paradise. Around the winter solstice, the days are less than 8 ½ hours long. And the real "night" is slightly less than 12 hours long.

Of course the problem with this paradise is that this is the Pacific Northwest. La Niña is in its second year and while long range forecasts predict that it will weaken by January or so, do not count on it. If you stumble upon a clear night in the next few months, seize it. Take your telescope, binoculars, star chart—whatever you have—dress warmly, and go outside and look at the stars. Oh, and don't forget your dew heaters. The winter sky is just beautiful with Orion, the Double Cluster in Perseus, Taurus, and of course the Winter Necklace: Sirius, Rigel, Betelgeuse, Procyon, Pollux, Castor, Capella, Aldebaran.

Don't waste a precious night.  
Carpe Noctem.



*Model of proposed sundial*

## Sundial Progress

Through the diligent efforts of Charles Higgins, Russ Heglund, and the artist Bill Baran-Mickle, we have made great strides toward installing the sundial on the berm north of the Observatory.

The Parks Board has approved the installation, passing the task of creating a formal agreement onto their staff. We are now in an iterative process of writing an agreement that works. Both sides want to see this succeed: I am optimistic on the outcome.

Also, the Bainbridge Park Foundation has generously awarded us a \$1000 grant toward materials to build the sundial. We will need more funding, but I am hopeful that we can break ground this spring or summer and get the sundial installed.

During the approval process, Bill placed a wooden mock-up of the sundial on the berm for several weeks. I had occasion to observe people interact with it: they seemed fascinated. When the permanent sundial is in place, I believe it will draw people and provide joy from the art, as well as a little education on the movement of celestial bodies.—*Stephen Ruhl*

## What Astronomy has Taught Me, and Why I Do It

In 1998 my wife bought me an equatorially mounted 60 mm refractor, (you know, the kind with the lens in the front) and a video about astronomy for Christmas, and with these words, “You need a hobby!” began my journey that has no end!

I enrolled in Paul Middents’ class, “Astronomy 101.” The class was fascinating; the planets, the stars, and the astronomical discoveries came alive. In a few weeks, Paul Below introduced me to M13 (the Great Globular Cluster in Hercules) and after a few tries, I was able to find it on my own. I was so excited to have accomplished that feat. Next came the Andromeda Galaxy and then onto and next and then... With that little 60 mm, I learned 60mm wasn’t big enough! And I realized I wanted/needed/had to have a 10” Dob!

In 2000 I bought one, a marvelous telescope. I really like it, now that I have changed the focuser and the finder scope, made a stiffer mount, added dew heaters, aligned the mirrors properly, and got better eyepieces; I had good times working on it though!



*Nel's star-gazing setup on one of BPAQ's telescope pads.*

I had no idea I would learn about all the mechanics of telescope building and repair. Next I'll be needing a larger mirror!

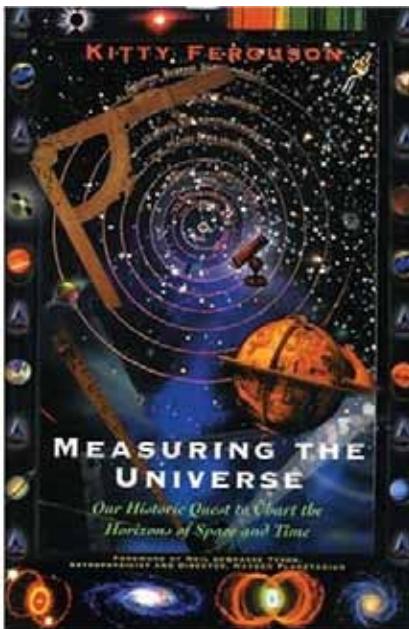
At our monthly star-gazing sessions, hearing someone say, “WOW! Look at those rings. I can see the rings!” is a thrill for me. I enjoy showing the moon, planets, open clusters, globular star clusters, and some galaxies, to all who would come when it is clear. Don't know many faces but I recognize the voices.

I've also learned that some people get really excited about astronomy only to burn out in a few months. Others are not so excited, but stay with it, and I enjoy helping them out when I can. Almost all amateur astronomers have been or will be on the same path—to their level of expertise and enjoyment—when they stay with it.

Every star-gazing session I invite friends and acquaintances, who ask me to remind them of the date so that they can attend; but they don't come. Instead people I don't know come and crowd the telescopes wanting to get a look. They hang out and talk about the moon, planets, stars, galaxies, and begin to see the mystery and wonderment of the heavens. They look into space and realize how vast space is and its fullness, and for the first time in their life they understand how small they really are. They are humbled and ask, “What is my place in it all? What does it all mean for me? Why am I? Why is there even space?” Sharing this great awe and mystery keeps me gazing at the sky, learning what I can, and telling what I know.—*Nels Johansen*

**Book Review:****Kitty Ferguson's  
Measuring the  
Universe**

**Our Historic Quest to Chart  
the Horizons of Space and Time.**



Walker & Company, Hardcover, 352pp.  
Publication Date: July 1999.

Other editions: Paperback, August 2000

More than 3000 years ago, Eratosthenes in Alexandria used a hole in the ground, sunlight at summer solstice, and geometry to measure the circumference of the earth with surprising accuracy. (See <http://www.bastro.org/index.php?page=how-big-is-the-earth>) Today astronomers are attempting to measure the entire universe and determine its origins and its possible demise. Efforts to chart the horizons of space and time continue to be one of the great adventures of science.

*Measuring the Universe* is a historical accounting, in chronological order, of how and why measurement progressed, including the effects of culture and politics on progress and who got credit.

The book discusses the efforts of Eratosthenes, Aristarchus of Samos, Hipparchus of Nicaea, Ptolemy, and Timosthenes, Admiral of the Ptolemaic Fleet (ever hear of him?), in the ancient world, and in the modern era, Nicolaus

Copernicus, Galileo Galilei, Johannes Kepler, Tycho Brahe, Christiaan Hugens, Gian Domenico Cassini, John Flamsteed, Issac Newton, Edmond Halley, and William Herschel, and on through contemporary discoveries.

Ferguson discusses the challenges the measurers faced. Their methods of measuring are well explained: anyone who completed the 5th grade will understand the math involved. I found the sections covering parallax, the Cepheid Variables, and radio astronomy very helpful: the easiest to understand of any I have yet read. The book is informative—covering history, culture, personalities, science, and the development of theories—and a delight to read. I have gained a new appreciation of the ancient astronomers and a new understanding of modern astronomy. Whether you have been interested in astronomy for a week or for twenty years you should enjoy *Measuring the Universe*.—Nels Johansen

**Curiosity on Mars**

NASA artist's concept of the car-sized Mars Science Laboratory (MSL) Rover Curiosity on Mars. The MSL launched November 26, 2011, and is scheduled to land on Mars at Gale Crater between

August 6 and 20, 2012. The artist shows Curiosity examining Martian rocks with its 2-meter-long arm, equipped with drill, scoop, and sieve, as well as instruments for studying rocks close up.

The 'head' or mast supports remote sensing instruments: a camera for stereo color viewing and a laser for vaporizing rock material in order to analyse the rocks.

*Image courtesy NASA*



## Journey to OSP

For the past five years, I have made the trek down to the Oregon Star Party. Each year I set aside some time just to marvel at the target-rich region of Sagittarius. Sagittarius is pretty far south, so while you can see it from Bainbridge, the 4° of latitude makes a significant difference. The first photograph is a wide field (60 x 40) view of the area to the right of the top of the ‘teapot’ dome. (The ‘teapot’ is the asterism formed by eight of the brightest stars in Sagittarius.)

The two large nebulosities are the Lagoon Nebula (M8) and the Trifid Nebula (M20). Slightly up and to the left of M20 is the open star cluster M21. To the left and slightly up from M8 is a complex nebula that includes the reflection nebula NGC 6559, IC 1275, IC 1274, and IC 4685. Down and to the left of M8, there is the globular cluster NGC 6544 and further down and slightly left is another globular cluster, NGC 6553. And so forth.



Wide Field View of Sagittarius  
*Photo Specifics:*  
*Telescope: AstroTech 106LE*  
*Exposure: 6 L 120s & 6 RGB 120 s (all binned 1x1)*  
*September 2, 2011*



The Lagoon Nebula M8  
*Photo Specifics:*  
*Centered about RA 18h 9m 9s Dec -23:26:09*  
*Telescope: Canon 70-200 f4 L Zoom Lens @ 200mm*  
*Exposure: 4 L 120s & 4 RGB 120 s (all binned 1x1)*  
*September 4, 2011*

M8, the Lagoon Nebula, and M20, the Trifid Nebula, are two of the most beautiful objects in the sky. Here they are in their full glory, M8 to the left, and M20 on the following page.



M20, the Trifid Nebula

*Photo Specifics:**Telescope: AstroTech**106LE**Exposure: 10 L 120s**& 10 RGB 120 s (all  
binned 1x1)**September 3, 2011*

Note: I photographed the Trifid last year as well. I was not happy with the graininess of the blue in the image so I increased the exposure to pull out more detail and smooth the blue in the image.

Further north within Sagittarius is M17. M17 is known by various aliases that include the Omega Nebula, the Swan Nebula, the Horseshoe Nebula, and the Lobster Nebula.



M17 the Omega Nebula

*Photo Specifics:**Telescope: AstroTech**106LE**Exposure: 6 L 120s**& 6 RGB 120 s  
(all binned 1x1)**September 1, 2011*

And just to the north of M17 (and just outside of Sagittarius in Serpens Cauda) is the Eagle Nebula (M16). At the core of M16 is the source of the famous Hubble photograph of the "Pillars of Creation." The Hubble photo was taken using narrow band filters instead of normal Red, Green, and Blue. These filters look at a specific frequency of light that is characteristic of a specific element. For the Hubble photo,

the photo was taken with a sulfur III filter assigned to red, a hydrogen alpha filter assigned to green, and an oxygen III assigned to blue. (Normally, the eye would view these emissions as far red

*OSP con't next page*

[invisible], red, and green respectively.) So you can compare my photo with a 10 cm lens to the 240 cm lens of the Hubble.



M16 The Eagle Nebula

*Photo Specifics:*

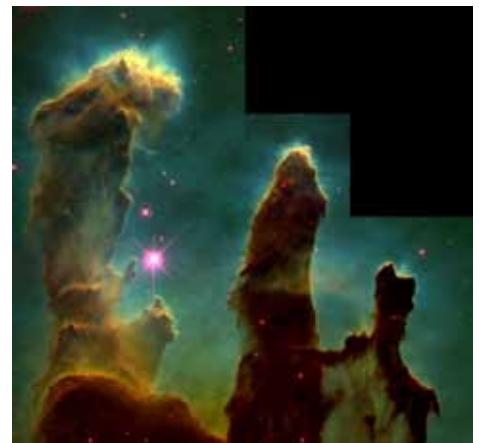
*Telescope: AstroTech 106LE*

*Exposure: 6 L 120s & 6*

*RGB 120 s (all binned*

*1x1)*

*September 2, 2011*



*Hubble photo: The Pillars of Creation, star nursery inside the Eagle Nebula*



Tulip Nebula

*Photo Specifics:*

*Telescope: AstroTech 106LE*

*Exposure: 6 L 300s & 6 RGB*

*300 s (all binned 1x1)*

*October 25, 2011*

For all photographs:

Mount: Losmandy G11 w/ Sidereal Technology controller

Camera: SBIG ST-8300M w/ LRGB color filter wheel

## A Black Hole

One of the most frequent questions I hear is, “What does a black hole look like?” Well, here is your answer. The photo of the Tulip Nebula (Sh2-101) includes the star HDE 226868 (arrow). HDE 226868 is a bright blue O type star about 6000 light years distant with an unseen companion. (The star visually appears yellow only because of the interstellar dust in the area.) The unseen companion is the brightest X-ray source in the sky which is called Cygnus X-1. The two objects orbit each other every 5.6 days and are about 20% of the distance between the Sun and Earth apart. The X-rays come from material shed from HDE 226868 that is falling into the black hole. It is estimated that the black hole is about 20 times the mass of the Sun.

Trust me. If you were close enough to a black hole to visually see the effects of it, you would not want to be there.—  
Stephen Ruhl

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**John H. Rudolph**

Facility Director 1993–2003

*BPAA would like to thank**for their  
generous  
support*