Coming Up At The Observatory....

Dean’s Astro Class, Sept 5, 7p
FOTO Monthly Meeting, Sept 6, 7:30p
Future Galileo Awards, Sept 7, 6p
ScopeOut!, Sept 8, noon-11p
History Tours, Sept 9, 1-4p
A2Z Astro Class, Sept 9, 7p
Ultimate Educators Expo, Sept 12, 2-6p
Astro Thursday, Sept 13, 8:00p
FOTO Kids & Teens, Sept 14, 8p
Astro Saturday, Sept 15, 8p
Astro Friday, Sept 21, 8p
Great Outdoor Weekend, Sept 22, 8-10p
International Moon Night, Sept 22, 8-10p
History Tours, Sept 23, 1-4p
Great Outdoor Weekend, Sept 23, 8-10p
Astro Friday, Sept 28, 8p
Late Night @ the COC, Sept 28, 10:30p
Mysteries of the Universe*, Oct 1, 7p
Dean’s Astro Class, Oct 3, 7p
FOTO Monthly Meeting, Oct 4, 7:30p
FOTO Kids & Teens, Oct 5, 7:30p
*UC Communiversity

The Word

By Dale Zoller

They did it! NASA/JPL has successfully landed the Mars Science Laboratory (aka, “Curiosity”) on the surface of Mars. Curiosity’s main goal is to determine if Mars could have supported microbial life at some point in its past. It is armed with ten times the mass of scientific instruments than any previous mission to Mars. In addition to 17 cameras, Curiosity has a laser for zapping rocks and spectroscopic analysis of the resulting gases. It is also equipped with a sample analysis instrument to test for organics in soil samples. So far, it appears that all systems are working as planned.

Curiosity touched down on Mars on August 6, 2012 using what has to be the most complex descent system yet developed for landing a spacecraft on the surface of another planet. The main reason for the novel final descent system is the rover’s size. Curiosity is roughly the size of a Mini Cooper and weighs in at nearly a ton. By comparison, the Spirit and Opportunity rovers only weighed about 400 pounds. Due to its size and weight, the “airbag” landing system used for previous rovers was not an option for Curiosity. The earlier Viking and Phoenix landers used thrusters during their final descent phase to slow themselves down and achieve a soft landing on shock-absorbing legs. Having been designed as a rover with wheels, Curiosity needed something different.

The something different is the new “sky crane” landing system. Once the spacecraft had slowed to about Mach 1.7, a supersonic parachute was deployed from the
aeroshell as in all the previous Mars missions. At about 1 mile above the surface, the rover and descent stage dropped out of the aeroshell. The descent stage is a platform above the rover with eight variable-thrust rocket thrusters used to slow the descent. In order to avoid dust and debris being kicked up from the surface by the thrusters (which might damage the rover), the “sky crane” lowered the rover to a soft landing on the surface of Mars. This system consisted of a bridle lowering the rover on three nylon tethers and an electrical cable carrying information and power between the descent stage and rover. While suspended roughly 25 feet below the descent stage, the sky crane system slowed to a halt and the rover touched down. Within two seconds of touch down, it activated cable cutters on the tethers and umbilical cord to free itself from the descent stage. The descent stage then flew away to a crash landing over 2,000 ft away.

NASA deserves a lot of credit for developing this novel system that has allowed it to land the largest and most scientifically capable mission on the surface of Mars. Even though America’s human spaceflight program is on a (hopefully) temporary hiatus, our robotic program seems to be alive and well.

**FOTO Kids and FOTO Teens**

*By Dean Regas*

Our next meeting will be held on Friday, September 14 at 8pm (note the new date). The graduation of the Future Galileos is taking place on our usual first Friday of the month so we’re moving back a week . The October meeting will return to its normal schedule (October 5’ at 7:30pm). We’re going to be hard-pressed to find planets this month. Saturn and Mars will be really low in the sky but we might catch them right after sunset if the clouds stay away. Since it was too cloudy in August to find the Dolphin constellation, we’ll try again in September and learn more about the stars and deep space objects in the Summer Triangle. If you have any questions about the meeting, please email Dean Regas at dean@cincinnatiobservatory.org

**ScopeOut 2012**

*By Dale Zoller*

The Observatory’s annual astronomy, science and education fair will be held Saturday, September 8, 2012 at the Observatory.

**We need FOTO volunteers**

…to help with registration, parking, raffles, telescopes, dinner, gift shop, etc. Pre-registered volunteers will have their ScopeOut admission fee waived (there is still a charge for the dinner & speaker – contact the Observatory office for reservations). We will have final sign-up sheets available at the September FOTO meeting. There will be two daytime shifts (12-2:30 and 2:30-5pm) and evening viewing (8-10:30pm).

We also need volunteers to help set up early Saturday morning and clean up on Sunday morning. Whether you are a member who has helped out in the past or a new member looking for a way to get involved with the Observatory, please consider volunteering for ScopeOut 2012. If you wish to volunteer but cannot attend the September FOTO meeting, please contact Dale Zoller at dale.zoller@fuse.net as soon as possible. Remember, it is our volunteers that have made ScopeOut a success over the years!

**ScopeOut 2012**

**Telescope Festival at the Cincinnati Observatory**

Saturday, September 8, Noon - 11 pm

*By Dean Regas*

The Cincinnati Observatory celebrates the telescope with an all-day (and all night) open house called ScopeOut.

ScopeOut is an opportunity for people of all ages to look at the latest and greatest astronomical equipment offered by local and national vendors.

Activities include, classes, educational materials for teachers, kid’s space crafts, safe viewing of the Sun, swap table, meteorites, tours of our historic buildings and more astronomical door prizes than you can imagine.

**SCHEDULE OF EVENTS**

**12 pm to 5 pm** main displays, classes, and tours – Admission $7/adults, $5/kids

Activities include, classes, educational materials for teachers, kid’s space crafts, safe viewing of the Sun, swap table, meteorites, tours of our historic buildings and more astronomical door prizes than you can imagine. You may even win a telescope. Great for all ages.

**6 pm to 8:30 pm** Dinner and Keynote Lecture by Pamela Gay, the Star Stryder - $20/person (reservations required)

**9 pm to 11 pm** Viewing through the old telescopes (weather permitting) - $5/person suggested donation.
2012 FOTO Officer/Trustee Elections

By Dale Zoller

The election of FOTO officers and trustees scheduled for October, 2012 FOTO meeting. Nominations for the positions are to be presented to the membership at the September, 2012 meeting. If you would be interested in running for office or wish to nominate someone, please contact John Blasing at blasing@fuse.net.

FOTO Board Members Date the Term Expires

Vice President: Rebecca Schundich / Oct. 2012
Secretary: Michelle Lierl Gainey / Oct. 2012
Treasurer: JoAnne Pedersen / Oct. 2012
FOTO/COC Representative: Scott Gainey / Oct. 2013
Trustee: Dave Bosse / Oct. 2013
Trustee: John Blasing / Oct. 2013

FOTO's September Meeting

By Dave McBride

The September Program will be presented on September 6 by Leo Sack, the Outreach Educator for the Cincinnati Observatory Center. Leo's topic will be “Out There” Outreach: New Programs, Activities, and Antics from the Education Staff. Leo will share with our members an update of the education activities provided by the Observatory.

Thanks to the support of our members and donors, the Observatory’s small staff is able to offer hands-on educational programming for school groups, scout troops, libraries, and other related organizations. Two years ago, the education staff doubled in size – from one full-time educator to two – and our programming has grown dramatically as a result. So, what exactly have Leo and Dean Regis been up to? Leo will provide news from the education trenches, including recent programs and materials that have been developed over the last two years, and exciting new projects for the upcoming school year.


The Program committee is receiving responses from our announcement to host another "member's night" of brief presentations given on special interest topics by our members. This is the occasion where several presentations that are about 10 to 20 minutes in length are combined for the evening’s program. If you would like to share your favorite topic that would be of interest to others during a meeting, please let one of the committee members know about it.

Contact Tom East (animaastra@gmail.com), Dave McBride (SETI@cinci.rr.com) or any FOTO program committee member to participate.

Stargazing at Stonelick State Park

By Craig Niemi

September 8th and 15th Stargazing begins at dusk.

Ah, the clear, cool skies of autumn. Bring your own scope for expert help setting it up. Open to all ages. Stargazes are weather permitting. “Friend” the Stonelick Lake Stargazers Facebook page for weather and schedule updates.

August FOTO Meeting Highlights

By Dale Zoller

The August program “The Permittivity and Permeability of Space” was presented by FOTO member John Blasing. John defined the two terms and reviewed the history of the development of these concepts. Permeability refers to the production of a magnetic field by an electric current, while permittivity refers to the force between two separated electrical charges. John also performed a demonstration of the measurement of permittivity that allowed the calculation of the speed of light.

Business Meeting

Old Business

- The vertical banner is still undergoing revisions of the graphic design. Dale showed the latest proposed designs (by a new graphic designer). There was discussion and objections to these designs. It was agreed that those who had alternate ideas would submit them to Craig and we will try to have paper mockups of some of the ideas for the next meeting.

New Business

- October 2012 elections:
  - All officers, and two of the Trustee positions, are open for nominations.
  - Dale Zoller announced that he will not run for reelection as president as has been president for 4 years.
John Blasing is chairing the nominating committee.

Other Business
- COC is working on its 5-year strategic plan, and as part of this Andy Park (a COC Board member) had met with FOTO officers and trustees at June’s planning meeting to get FOTO input on the relationship between FOTO and COC, what the FOTO membership sees as strengths and weaknesses of COC, what ideas they had for improvement, what vision they had for the future. Mr. Park sent Dale an e-mail shortly before the meeting, attempting to summarize this discussion; Dale found the e-mail confusing and did not think it represented the discussion accurately; he shared it with the membership and there was some discussion about this e-mail.
- Craig Niemi reassured the FOTO members that COC is not contemplating any change in the relationship with FOTO in the immediate future.

A motion was made and passed that Dale would e-mail Mr. Park with his comments and additions to the summary of the discussion, particularly with a counterpoint to the merger of COC and FOTO.

A2Z Astronomy for Members

The A2Z+ class will take its annual September hiatus this month. It’s not that we are frightened of the Equinox. Heck, bring it on, Harvest Moon and all. No, the inspiration for skipping class this time comes from our outreach event of the year. ScopeOut!

The A2Z+ class usually meets the second Sunday of each month and that happens to land on the day after ScopeOut. So, the A2Z+ class will take a back seat and skip a class this month, picking up again in October. There are a couple of excellent classes scheduled for the rest of the year; John Blasing is going to reprise his Permittivity and Permeability of Space presentation and I’ve got a new lecture on Variable Stars that needs to get its sea-legs.

So, skip the A2Z+ class for September, and gather instead, 5 weeks later, on October 14th at 7:00 P.M. in the West Wing of the Herget Building for another astro-adventure.

Did You Know….

A Gamma Ray Burst (GRB) is the result of a cataclysmic explosion of a massive star.

August FOTO Planning Meeting

By Dale Zoller

The next FOTO Planning Meeting is scheduled for Thursday, September 20, 2012 at 6 pm at the Observatory.

The meeting generally lasts a couple hours. The planning meetings are open to all FOTO members. We encourage your participation in the discussion of future FOTO activities.
Weekend with the Stars
Great Outdoor Weekend Events at the Observatory

September 22 and 23 from 8-10 pm

By Dean Regas

The Cincinnati Observatory will show you the stars. Gaze through the beautiful 1843 Mitchel Telescope and see the Moon that Saturday and Sunday night. Both programs include tours of the historic buildings and informal presentations. Amateur astronomers will be on hand with their personal telescopes to help you explore the universe. Bring your own telescope for expert help setting it up and finding celestial treasures or simply bring your eyes and imagination.

-AND-

Sunday, Sept., 23, 1-4 pm

The Observatory will also be open for daytime history tours and safe solar viewing through the old telescope.

No reservations required for any of these programs. They are free and open to the public.

For a list of other events around the city including CAS, go to the website:
www.cincygreatoutdoorweekend.org for a schedule and more information.

For further information please call 513-321-5186.

Weekend with the Stars
Great Outdoor Weekend Events at the Observatory

Late Night at the Observatory

September 28th & October 5th
10:30 pm-12:00 am

Looking for a unique night out? Come see what the Observatory is like after hours. You’ll get to use the oldest big telescope in the U.S. to view astronomical objects that are not visible until late at night (weather permitting). These programs are recommended for adults only.

If the weather does not permit viewing, we’ll have fun with some of the crazy science experiments and “adult” constellation mythology stories that we can’t share with family audiences.

Admission is $10 per person
The late nights sell out early. To make reservations please call 513-321-5186.

Did You Know….

An 80 meter wide asteroid past by Earth in 2002 by a hair’s breadth. It was well inside the orbit of the Moon!
Astronomers didn’t know it was there until three days before its closest approach.

Curiosity Zaps First Martian Rock


Craig’s Corner

By Craig Niemi

Early on the morning of August 6th, NASA’s Curiosity rover was scheduled to reach the Red Planet. After an eight-month journey, the rover, protected in its entry vehicle, was going to attempt what NASA promoted as "Seven Minutes of Terror." Their plan for the heaviest Martian payload ever was for an ambitious soft landing on Mars. The last two rovers, the much smaller Spirit and Opportunity, arrived on the Martian soil cushioned in airbags that protected their delicate instruments.

Curiosity was far too large and heavy for such a landing and represented the new technologies and imaginative thinking that would be needed for manned exploration of Mars. NASA engineers devised an ingenious, if not slightly incredulous multi-step descent and landing scenario. Aero-braking, heat shield, retro rockets, a parachute and finally a "sky crane" would slow Curiosity from 18,000 miles an hour, to a soft landing in less than 7 minutes. Every step was programmed into a half-million lines of computer code and required perfect execution. With 14-minutes of one-way communication travel time, all the NASA engineers could do was watch.

For this epic event, the Cincinnati Observatory Center opened its doors from midnight until 2 am. The live feed from NASA-TV played in the 1873 building's classroom. Enthusiastic volunteers were available to answer visitor's astronomy questions, give tours and offer a peek at the Moon through the historic 1845 telescope. With the landing set for 1:31 am Monday morning, we had no idea if we'd be here by ourselves or if a handful of

Did You Know That….

A mere 100 years ago our Universe was just a single galaxy, the Milky Way. Today we know of 100 billion galaxies thanks to the Hubble Space Telescope.
space exploration buffs might appear. We were thrilled when more than 65 visitors arrived to share this historic event. Most of the visitors were first timers to the Observatory, including about a half-dozen kids! The overflow watched the landing from the classroom in the other observatory building. Cheers broke out in both buildings when word came of the successful touchdown and again when Curiosity's first images from the surface of Mars were downloaded.

The kids were especially electrified by what they had just witnessed. Being at the Observatory, with its grand architecture and impressive telescopes; their spectacular telescope views of the Moon; and attentive mentoring from our talented volunteers made it even more memorable for them.

That's when I realized this was our young visitors "Apollo 11 moment." It is the same sense of wonder, awe and pride that was inspired when we heard "the Eagle had landed" in 1969. A moment in their lives when dreams become real, scientific exploration and achievement is celebrated as a society, and future careers in the sciences are launched. We strive for that with each and every visitor, of any age, but on the morning of August 6, 2012, it all came together very powerfully.

See you at ScopeOut on the 8th!

Solar Max in 2013

Forecasters say solar maximum is still a year away. Earlier this month sky watchers got a taste of things to come when a powerful flare sparked Northern Lights over the United States as far south as Arkansas, Colorado and California. http://science.nasa.gov/science-news/science-at-nasa/2012/20jul_tasteofsolarmax/

History of the Observatory

2nd & 4th Sundays
1-4 pm

By Craig Niemi

The Mt. Adams Observatory. 1848 Fontayne & Porter

Our talented volunteer docents from the Museum & History Committee weave the fascinating story of the Cincinnati Observatory’s rich history and the unique cast of characters that made Cincinnati the Birthplace of American Astronomy. An ideal opportunity for our astronomy program volunteers to learn more about the Observatory and incorporate its history into your programming.

No reservations needed, except groups. See the web calendar for updates.

Finally – Evidence of Dark Matter

Energetic light seen radiating from the center of the Milky Way may be the best evidence yet of dark matter, the invisible stuff thought to be hiding throughout the universe.

A new study has found a strong signal of gamma-rays — light of a very short wavelength — coming from the middle of our galaxy, which may be the result of exploding dark matter. http://www.huffingtonpost.com/2012/08/17/dark-matter-detected-gamma-ray-signal_n_1795645.html?ref=topbar

Curiosity Rover Plays First Song Transmitted from Another Planet

ScienceDaily (Aug. 28, 2012) — For the first time in history, a recorded song has been beamed back to Earth from another planet. Students, special guests and news media gathered at NASA's Jet Propulsion Laboratory in Pasadena, Calif., today to hear "Reach for the Stars" by musician will.i.am after it was transmitted from the surface of Mars by the Curiosity rover.

From Curiosity With Love

Mars. Wow — what a view! This image is a high-resolution shot of the Curiosity rover’s ultimate goal: the stratified flanks of Gale Crater’s 3.4-mile (5.5-km) high central peak, Mount Sharp. The image was taken with Curiosity’s 100mm telephoto Mastcam as a calibration test.
Ultimate Educators Expo @ Zoo

Wednesday, September 12, 2-6pm

Greater Cincinnati Environmental Educators
Cincinnati Zoo & Botanical Garden Harold C. Schott Education Center

This is a fun, free afternoon for teachers of all grades and subjects to learn about the resources provided by the Greater Cincinnati Environmental Educators and its partner organizations including the Observatory. Last year over 400 teachers came out and learned about Rocks from Space from John, while Leo revealed the secrets of our sun with solar scopes outside.

GCEE member organizations (including the Observatory) provide programming to both formal (K-12) and non-formal audiences (youth and adults). Since its inception, GCEE has served dozens of environmental education professionals, hundreds of classroom educators and thousands of Greater Cincinnati school children by providing resource fairs, education workshops, classroom programs and field trips. [https://tickets.cincinatizoo.org/affiliate.asp?ID=CC3168DC-5FBB-447E-998B-CDB0620EE995](https://tickets.cincinatizoo.org/affiliate.asp?ID=CC3168DC-5FBB-447E-998B-CDB0620EE995)

Did You Know….

Did you know that on average the Sun is smaller in size when the number of Sunspots is higher?

International Observe the Moon Night

The 2012 InOMN is Saturday September 22nd and will be held in conjunction with the Great Outdoor Weekend.

By Craig Niemi

The International Observe the Moon Night Team consists of scientists, educators, and Moon enthusiasts from government, non-profit organizations, and businesses throughout the United States and across the globe.

International Observe the Moon Night has created the opportunity for people to take notice of the Moon’s beauty, share that experience with one another and instill in the public a sense of wonderment and curiosity about our Moon. InOMN partnerships include NASA, Google’s Lunar X-Prize and the Lunar and Planetary Institute.

For more information on events, teacher STEM resources and kid’s activities go to [http://observethemoonnight.org/](http://observethemoonnight.org/).

Enceladus: Home of Alien Lifeforms?

Mars dominates the search for extraterrestrial life in our solar system, but a growing number of scientists believe Enceladus, an icy moon of Saturn, is a much better bet.

Enceladus is little bigger than a lump of rock and has appeared, until recently, as a mere pinprick of light in astronomers’ telescopes. Yet Saturn’s tiny moon has suddenly become a major attraction for scientists. Many now believe it offers the best hope we have of discovering life on another world inside our solar system.

The idea that a moon a mere 310 miles in diameter, orbiting in deep, cold space, 1bn miles from the sun, could provide a home for alien lifeforms may seem extraordinary. Nevertheless, a growing number of researchers consider this is a real prospect and argue that Enceladus should be rated a top priority for future space missions.

This point is endorsed by astrobiologist Professor Charles Cockell of Edinburgh University. "If someone gave me several billion dollars to build whatever space probe I wanted, I would have no hesitation," he says. "I would construct one that could fly to
Saturn and collect samples from Enceladus. I would go there rather than Mars or the icy moons of Jupiter, such as Europa, despite encouraging signs that they could support life. Primitive, bacteria-like lifeforms may indeed exist on these worlds but they are probably buried deep below their surfaces and will be difficult to access. On Enceladus, if there are lifeforms, they will be easy to pick up. They will be pouring into space."

The cause of this unexpected interest in Enceladus – first observed by William Herschel in 1789 and named after one of the children of the Earth goddess Gaia – stems from a discovery made by the robot spacecraft Cassini, which has been in orbit of Saturn for the past eight years. The $3bn probe has shown that the little moon not only has an atmosphere, but that geysers of water are erupting from its surface into space. Even more astonishing has been its most recent discovery, which has shown that these geysers contain complex organic compounds, including propane, ethane, and acetylene.

"It just about ticks every box you have when it comes to looking for life on another world," says Nasa astrobiologist Chris McKay. "It has got liquid water, organic material and a source of heat. It is hard to think of anything more enticing short of receiving a radio signal from aliens on Enceladus telling us to come and get them."

Cassini's observations suggest Enceladus possesses a subterranean ocean that is kept liquid by the moon's internal heat. "We are not sure where that energy is coming from," McKay admits. "The source is producing around 16 gigawatts of power and looks very like the geothermal energy sources we have on Earth – like the deep vents we see in our ocean beds and which bubble up hot gases."

At the moon's south pole, Enceladus's underground ocean appears to rise close to the surface. At a few sites, cracks have developed and water is bubbling to the surface before being vented into space, along with complex organic chemicals that also appear to have built up in its sea.

NASA's Kepler Discovers Multiple Planets Orbiting a Pair of Stars

ScienceDaily (Aug. 28, 2012) — Coming less than a year after the announcement of the first circumbinary planet, Kepler-16b, NASA's Kepler mission has discovered multiple transiting planets orbiting two stars for the first time. This system, known as a circumbinary planetary system, is 4,900 light-years from Earth in the constellation Cygnus.

This discovery proves that more than one planet can form and persist in the stressful realm of a binary star and demonstrates the diversity of planetary systems in our galaxy.

http://www.sciencedaily.com/releases/2012/08/120828190127.htm

A new ScienceCast video explores the places Curiosity might go.

"The alluvial fan indicates that water flowed across the surface, so we'll head downhill to where water might have collected. We'll be looking for minerals like salts that might tell us where water has been. It's kind of like a scavenger hunt with minerals as clues."