The Word

By Dale Zoller

At the November 2011 FOTO meeting, we were treated to Basil Rowe’s presentation “Exoplanets: The Search for Another Earth” where he discussed the methods being used to locate Earth-like planets outside our solar system. During the month of December, there have been several exciting developments in the search for exoplanets. In early December, it was announced that NASA’s Kepler satellite had discovered the most Earth-like planet yet – Kepler-22b. Located about 600 light-years away, it circles a yellow star slightly smaller than our Sun. With an orbital period of about 290 Earth days, it is a little closer to its sun than we are to our Sun. This puts Kepler-22b in what is frequently referred to as the “Goldilocks Zone” – not too hot, not too cold. It is estimated that it has a surface temperature of around 72 degrees, which means liquid water could exist there. Although there is currently no proof that life exists on Kepler-22b, liquid water is one of the key factors for life as we know it. Kepler-22b is estimated to be about 2.4 times the size of the Earth, which makes it among the smallest planets yet found orbiting another star.

Several weeks later, astronomers revealed that two Earth-size planets had been discovered orbiting a star about 950 light-years from Earth. Referred to as Kepler-20e and Kepler-20f, they are part of a 5-planet solar system. Both planets orbit extremely close to their star which makes their surface temperatures way above that considered to be “habitable.” However, they are the first planets confirmed to be the size of our own Earth (Kepler-20e is actually slightly smaller). The discovery of these planets is significant because most of the 700+ exoplanets discovered in the past few years have been Jupiter-size planets (also orbiting very close to their stars). I doubt it will be long before Earth-size planets will be discovered orbiting a star in its “Goldilocks-zone.”
But why let the professional astronomers have all the excitement of discovering new exoplanets? Kepler project scientists have developed a program called Planethunters.org that allows amateur astronomers to assist in locating “candidate planets” that the professionals may have missed. The website has tutorials to show you what to look for (a series of regular dips in a given star's "light curve" – a graph of its brightness over time) and how to mark them. If enough users highlight the same area of a particular star’s light curve, it is forwarded to the science team for further analysis. Try it out – who knows, you may help discover one of the first true Earth-like exoplanets.

**January’s FOTO Meeting**

*By Tom East*

Due to a scheduling conflict, the previously announced program for the January 5, 2012 FOTO Meeting, to be presented by John Kachuba, has been postponed until it can be rescheduled at a later date. Fortunately, our own Terry Flesch has graciously agreed to make the January presentation, “Jupiter”.

**Jupiter Presentation**

As we look up into the clear skies over the holidays, we may or may not catch a glimpse of 8 tiny reindeer and an elf in a sleigh, but one cannot help but notice the brilliant “wandering star” we know as Jupiter. We will discuss what makes Jupiter so unusual in our solar system, both physically and historically. ... and how at one time, merely observing the planet through a telescope proved that the telescope itself was cursed!

Terry Flesch has taught Astronomy and Physics for over 30 years since receiving his Ph.D. in Astronomy from the University of Florida. Born and raised in northern Kentucky, he has served for a number of years as volunteer at the COC and currently teaches Astronomy and Physics at Xavier and Northern Kentucky University.

**Upcoming Programs**

Feb 2, 2012 - **Rick Hunter** will give his new Mars presentation. Rick was a speaker during ScopeOut on the topic of Mars, but many members were not able to attend. This is your opportunity to hear Rick and get the latest information about Mars.

**FOTO’s December Meeting Highlights**

*By Dale Zoller*

In December, the annual FOTO Volunteer Appreciation dinner was held in lieu of the regular meeting. Over 60 FOTO volunteers attended the dinner. A big thank you goes to Rebecca Shundich for organizing the dinner and decorations. Also deserving a round of thanks are the elves that helped set up and decorate on Wednesday evening. Thanks also to Rebecca’s friend Cathie Kocher for providing additional decorations and helping with the setup. Numerous treats and desserts were provided by other volunteers, rounding out an excellent dinner. Dean Regas presented his annual “Deanie” awards. Musical entertainment was provided by cello player Rob Reichhardt. Needless to say, a wonderful time was had by all!

**Introductory Astronomy Classes**

*At the Observatory*

*By Dean Regas*

For 2012 make your resolution to learn more astronomy. This introductory astronomy course is perfect for beginners who want to learn more about observing the night sky, and the Cincinnati Observatory.

We will discuss the new and improved Solar System, Moon phases and features as well as identify major stars, constellations and planets. Plus we will show you how to get the most out of your binoculars and telescopes.

There are two sessions. (Select the one session best for you)

**First Session:** Wednesdays, January 4, 11, and 18 - OR - **Second Session:** Mondays, January 9, 16, and 23.

All are 7-9 pm.

Cost: $50 for the series, $40 for Observatory members

To register call Dean Regas at 513-321-5186.

**Stargazing at Stonelick State Park**

Saturdays, January 21st & 28th

Enjoy a winter sky full of stars! Best to arrive just after sunset so you can get the lay of the land before lights-out. And dress warmly. It’s free and open to all ages.
Welcome
New & Renewing
Members!

William Abner
Andrew & Renee Arken
Larry & Mary Back
Renee Bernard
Robert Bertsch
John Blasing
Fred N. Bowman
Tim and Patricia Burke
Thelma Cain
Donald Campbell
Adam Collins
Adam Crosby
Tim Daugherty
Jean Davison
Linda and John Deatrick
Charles and Linda Dehner
Thomas Dibiase
Eugene and Eileen Drust
Mitch Dunn
Donald and Katherine Durack
Bert & Cheryl Durie
Quante Ferguson & Renee Jefferson
Chuck Fields
Jeanette and Greg Fisher
Richard & Kathleen Fisher
Dean Garner
Glenn Goodpaster

Ronald Gough
Lisa Gray
Toni Greer
Robert Hale
Clare Hubbell
Greg and Beth Huber
Frank W. Huss III
Charles Kamine
Jesse & Elaine Lacefield
Kevin Langston
Lisa and Steve Lemen
Greg & Meshawn Lloyd
Ann MacDonald
Tim and Peg Mathile
John McHugh
Matthew & Krystin McKim
James and Mary Nordlund
Janet Owens & Terence Cody
Larry J. Powell
Brian Rhame
Alvin Roehr
Douglass Rouster
Frank Ruggerie
Julie Rutherford
Christine and Charlie Schiff
John Shepherd
Randy Gudvangen & Brett Siereveld
Michael Sitko
Gary and Nancy Strassel
Dwana Strucke
Dave Sturgis
Thomas and Mary Syzek
Mary and Charley Todd
Matt and Annie Wallace
Kent Wellington
Therasa Wesley
Gary and Diane West
Martha Wheeler
Marc & Nadine Whitsett
Fred Widmeyer

Did You Know….
Our solar system has orbited the Milky Way only 18 times since it was formed.

Venus Friday
At the Observatory
Friday, January 27
7:00-8:30pm

By Dean Regas

Is it a plane? Is it a UFO? No, that bright thing in the west is Venus!

Venus Friday includes programs about our closest planetary neighbor and tours of the Observatory. Then, see the clouded, shrouded goddess of beauty for yourself through our historic telescopes along with the Moon and Orion (weather permitting).

Cost: $6 per person
Reservations are recommended. For further information or to make reservations, please call 513-321-5186.

FOTOKids and FOTO Teens

By Dean Regas

FOTO Kids and Teens will next meet on Friday, January 6 at 7pm at the Observatory. If you come a few minutes early we’ll have extra time to see our “Sister Planet” Venus just before she sets over the tree tops in the west.

Then we’ll give you a preview of what to look for in the sky in 2012. We will have a Jupiter and Venus conjunction to talk about, the return of the Red Planet, a partial solar eclipse, and a Transit of Venus. All in all, 2012 looks to be a busy year, astronomically. If you have any questions, please email me, Dean Regas, at dean@cincinnatiosservatory.org
FOTO Planning Meeting
By Dale Zoller

The next FOTO Planning Meeting is scheduled for Thursday, January 19, 2012 at 6pm 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.

A2Z+ Astronomy Class
M is for Mercury
By Dave Bosse

NASA’s probe MESSENGER went into orbit around Mercury this past year and it’s been busy tuning into the smallest planet’s environment ever since. Members of NASA’s MESSENGER team presented the first findings of the spacecraft’s investigation to the American Geophysical Union in early December. With all of these goings-on about Mercury, why not spend the next A2Z+ Astronomy class talking about the (new) runt on the block. Mercury is a somewhat odd planet, holding many mysteries, and now we have this wonderful tool to try to unravel them.

We will begin the new A2Z+ year on the 8th of January, taking a closer look at Mercury, at least the closer look that MESSENGER is getting and see what new ideas about this mysterious planet can be gleaned.

The A2Z+ class meets the second Sunday of each month at 7:00 P.M. in the West Wing of the Herget Building. It lasts about an hour or so and is free to any member of the Observatory.

"A Long Time Ago In Galaxies Far, Far, Away..."

Presented by
Dr. Amanda Bauer

Saturday, January 21st
7:00-8:30 pm
At the Observatory

Galaxies found in the distant, early universe look and behave differently from those in our local universe. In this presentation, Dr. Bauer describe triumphs and tribulations towards our understanding of these changes over time, by highlighting some fundamental insights into the current mysteries of galaxy formation and evolution, derived from telescopic observations and theoretical simulations.

Astronomy always fascinated Amanda Bauer as a child, but she never thought that it could be a feasible career. As a student at the University of Cincinnati, she studied French for a year hoping she could travel the world, before recognizing her true fascination with the Universe.

She recently moved to Sydney, Australia to begin a Super Science Fellowship with the Australian Astronomical Observatory.

It’s free! Seating is limited. Reservations are required. Call 513-321-5186.

Luminaria Open House Report

The warm weather brought out over 300 visitors to the Observatory and to our friends on Mt. Lookout Square. Everyone enjoyed refreshments, tours, telescopes viewing and holiday carols from Forte Barbershop Quartet. Our thanks to Richard Industries, Mt. Lookout Joe and all our other generous donors and community partners who make this popular annual event possible!
Late Night at the Observatory

January 13th & Feb 10th
10:30 pm - 12:00 am

Can’t sleep? Looking for a unique Friday night out? Come see what the Observatory is like after hours - long after the “early crowd” has gone home. 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).

Get a sneak preview of the next season’s planets and stars – including Jupiter, the Andromeda Galaxy, and more – a month or two ahead of everyone else. Plus, zoom in on a late-rising Moon, or watch the whole sky for a meteor shower or satellite passes. Each night is different and special!

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 $6 per person. To make reservations please call 513-321-5186

Craig’s Corner

By Craig Niemi

First of all I want to take this opportunity to thank again all our members, volunteers, contributors and staff for all you do to make the Observatory Center such an amazing place. 2011 was a great year and I have no doubt that 2012 will bring its own remarkable successes.

Of course everyone is going to have to squeeze more into their schedules since we lose more than a week thanks to the end of the world on Dec 21st when the Mayan calendar runs out.

It’s easy to scoff at the idea of the world ending but after answering all the phone calls from folks interested in Dean’s recent 2012 Hoax Night it raises important issues.

Our world is shaped by science and technology. Every day brings advances in medicine, computers and engineering. And the pace of those advances is only quickening. A citizenry that is science literate brings self-fulfillment and is vital to our national and global well-being. Major policy decisions are being debated today that require basic science literacy.

It was obvious, but not too surprising, that our callers were concerned over what they were hearing about 2012. There are so many misconceptions about the basic tenets of astronomy that it’s no wonder that they are leaving the “decoding” of the Mayan calendar to supposed experts. The proliferation of pseudo-science programs is staggering. Even sources where you would expect well researched programming, such as the History Channel, are full of what can best be called sensational and exploitive shows. And don’t get me started on the role the internet is playing.

One caller was truly concerned about the upcoming disaster. She rattled off the usual litany of 2012 disasters; devastating planetary alignments, flipping of the magnetic poles, our passing through the plane of the galaxy. In addition was another long list of conspiracies, government plots and recommendations to stockpile food and ammunition. She was nearly paralyzed from everything she was being told or read. Was this caller stupid? No. Was she misinformed? Absolutely. We just hope we were able to talk her down off the ledge.

Certainly our K-12 programs are doing their part to improve the situation by educating the kids who in a few years will be leading the advances in science and technology while debating and making decisions on issues we can hardly imagine today.

It’s also important to note that our public programs, that last year served over 10,000 adults, are doing the same. They are tremendous opportunities to help inform and mentor our neighbors who are being called upon to make vital decisions today that affect everyone’s well-being.

But before I climb too far up on my soapbox I’ll stop and wish everyone a Happy New Year. All 366 days of it. (It’s leap year.)

Comet Survives Dive into the Sun

Sungazing Comet Lovejoy has shocked astronomers by surviving its "death plunge" into the Sun. Must-see movies of the comet's passage through the Sun's atmosphere are featured in Science@NASA.

Scout Programs

Junior Scouts
January 28th, 6pm

By Craig Niemi

The Observatory’s evening Scout Merit Badge Programs provide girl scouts and boy scouts with a unique stargazing experience that fully completes the requirements of the badge or pin.

$6/participant (includes scouts, adults, and all siblings)
Private programs (Monday, Tuesday, or Wednesday evenings) require a $100 minimum group fee.
Contact Leo Sack, Outreach Educator, 513-321-5186 or at leo@cincinnatiobservatory.org
www.cincinnatiobservatory.org/scoutprograms.html

Celestron CGE PRO
Mount for Sale

This is Celestron’s latest heavy duty precision mount well suited to advanced astro imaging: up to 75 lb capacity. The mount is less than a year old & little used. This fine piece of engineering is superb to use & the GOTO electronics perform wonderfully.

Reason for sale; moving into another field in astronomy.

Pricing negotiable. Check Celestron’s web site for details on this mount.
Contact Graham Davis at 513-673-9106.

Did You Know….
Jupiter’s moon Ganameade is larger than the planet Mercury.

Holes Billions of Times Bigger Than Sun Discovered

Scientists have found the biggest black holes known to exist – each one 10 billion times the size of our Sun.

Astronomers discovered the two gigantic black holes in clusters of elliptical galaxies more than 300 million light years away. That’s relatively close on the galactic scale. They are monstrous!
http://www.huffingtonpost.com/2011/12/05/black-hole-scientists-discover-huge_n_1129727.html

For Sale

Celestron CPC 1100. The price has been reduced from $1800 to $1650. It’s been used less than ten times and is in excellent working condition.

I also have a 13mm Televue Ethos that I’m asking $400 for and only used a handful of times. It’s in perfect condition.

Call me with any questions at 859-466-7030, or email me, Toby, at tobdar@mac.com

New Evidence for Complex Molecules on Pluto's Surface

The new and highly sensitive Cosmic Origins Spectrograph aboard the Hubble Space Telescope has discovered a strong ultraviolet-wavelength absorber on Pluto’s surface, providing new evidence that points to the possibility of complex hydrocarbon and/or nitrile molecules lying on the surface.

Kepler Confirms First Planet in Habitable Zone of Sun-like Star

NASA’s Kepler mission has confirmed its first planet in the "habitable zone" of a distant Sun-like star.

This artist's conception illustrates Kepler-22b.

The newly confirmed planet, Kepler-22b, is about 2.4 times the radius of Earth. Scientists don't yet know if it has a predominantly rocky, gaseous or liquid composition, but its discovery is a step closer to finding Earth-like planets.

The "habitable zone" of a planetary system refers to the band of orbits where liquid water could exist on a planet’s surface. Kepler has recently discovered more than 1,000 new planet candidates. Ten of these candidates are near-Earth-size and orbit in the habitable zone of their host star. Candidates require follow-up observations to verify they are actual planets.

Kepler-22b is located 600 light-years away. While the planet is larger than Earth, its orbit of 290 days around a Sun-like star resembles that of our world. The planet’s host star belongs to the same class as our Sun, although it is slightly smaller and cooler.
http://science.nasa.gov/science-at-nasa/2011/05dec_firstplanet/
Kepler Discovers Earth-size Exoplanets

NASA's Kepler mission has discovered the first Earth-size planets orbiting a sun-like star outside our solar system. The planets, called Kepler-20e and Kepler-20f, are too close to their star to be in the so-called habitable zone where liquid water could exist on a planet's surface, but they are the smallest exoplanets ever confirmed around a star like our sun.

The discovery marks the next important milestone in the ultimate search for planets like Earth. The new planets are thought to be rocky. Kepler-20e is slightly smaller than Venus, measuring 0.87 times the radius of Earth. Kepler-20f is a bit larger than Earth, measuring 1.03 times its radius. Both planets reside in a five-planet system called Kepler-20, approximately 1,000 light-years away in the constellation Lyra.


New Horizons Becomes Closest Spacecraft to Approach Pluto

NASA’s New Horizons mission reached a special milestone Dec. 2, 2011, on its way to reconnoiter the Pluto system, coming closer to Pluto than any other spacecraft.

It’s taken New Horizons 2,143 days of high-speed flight – covering more than a million kilometers per day for nearly six years—to break the closest-approach mark of 1.58 billion kilometers set by NASA’s Voyager 1 in January 1986.

World's Most Complex Radio Telescope Snaps Stunning 1st Photo of the Cosmos

After years of planning, construction and assembly, a gigantic observatory billed as the world's most complex array of ground-based telescopes has opened its eyes in South America and captured its first image.

The Atacama Large Millimeter/submillimeter Array, or ALMA, is now officially open for business high in the Chilean Andes. The huge $1.3 billion radio telescope, a collaboration of many nations and institutions, should help astronomers explore some of the coldest and most distant objects in the universe, researchers said.

We went to one of the most extreme locations on Earth to build the world's largest array of millimeter/sub-millimeter telescopes having a level of technical sophistication that was merely a dream only a decade ago.

Also see video

Two Deep Fried Planets Discovered

Two Earth-sized planets have been discovered around a dying star that has passed the red giant stage. The discovery marks the first known case of planets surviving being engulfed by their parent star.

"Slam Dunk" Sign of Ancient Water on Mars

NASA's Mars rover Opportunity has found bright veins of a mineral, apparently gypsum, deposited by water near the rim of Endeavour Crater. The discovery was presented at the American Geophysical Union's conference in San Francisco.

"This tells a slam-dunk story that water flowed through underground fractures in the rock," said Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for Opportunity. "This stuff is a fairly pure chemical deposit that formed in place right where we see it. It's the kind of thing that makes geologists jump out of their chairs."
NASA Dawn Spacecraft Beams Back New Images of Vesta Asteroid

NASA's Dawn spacecraft has been a fervent photographer, snapping more than 10,000 pictures of the asteroid Vesta since it slipped into orbit around the giant space rock last summer.

The views were taken from a distance away – until now. The space agency released new images of the hummocky surface as Dawn circled from an average altitude of 130 miles above the surface – the closest it'll get.

From this low orbit, scientists can count numerous small impact craters and see textured grooves and outcrops in sharp detail.

"We're totally thrilled with the data we're getting. It seems to get better," said mission deputy principal investigator Carol Raymond of the NASA Jet Propulsion Laboratory, which manages the $466 million mission.

By inching this close to Vesta, Dawn will use other instruments to measure the gravity field and determine its chemical makeup to better understand its origins.

Dawn will spend the next 2 1/2 months at the current altitude before moving higher to take another round of pictures. By that time, the sun will hit Vesta at a different angle and illuminate sections of the northern hemisphere that had been shrouded earlier.

About the length of Arizona with a huge crater at its south pole, Vesta is the second largest body residing in the asteroid belt between Mars and Jupiter. Asteroids are leftovers from the solar system's birth some 4.5 billion years ago and studying these bodies could offer clues about how rocky planets like Earth formed.

Previous spacecraft have visited smaller asteroids before, but this is the first trip to Vesta.

Powered by ion propulsion, Dawn began orbiting Vesta in July after a 1.7 billion-mile cruise. It will depart Vesta next summer and will fly to an even bigger asteroid, Ceres, where it will arrive in 2015.

Check out the Dawn spacecraft's near-surface images of Vesta Asteroid.: http://www.huffingtonpost.com/2011/12/22/nasa-dawn-spacecraft-vesta-asteroid_n_1165041.html?1324657146&icid=maingrid10%7Clegacy%7Csec1_lnk2%26pLid%3D122675

Astronomers Discover Rare Galaxy at Dawn of Time

Astronomers, have discovered that one of the most distant galaxies known is churning out stars at a shockingly high rate. The blob-shaped galaxy, called GN-108036, is the brightest galaxy found to date at such great distances.

The galaxy, which was discovered and confirmed using ground-based telescopes, is 12.9 billion light-years away. Data from Spitzer and Hubble were used to measure the galaxy's high star production rate, equivalent to about 100 suns per year. For reference, our Milky Way galaxy is about five times larger and 100 times more massive than GN-108036, but makes roughly 30 times fewer stars per year.

The discovery is surprising because previous surveys had not found galaxies this bright so early in the history of the universe. http://www.sciencedaily.com/releases/2011/12/111221211227.htm

The End