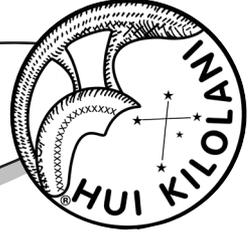


The Astronews



Volume 61, Issue 7

July 2013

www.hawastsoc.org

GUEST SPEAKER
July 2nd Meeting:

Robert Joseph
IfA Astronomer



Robert Joseph has been a Professor of Astronomy at the UH Institute for Astronomy for 24 years. He served as Director of the NASA Infrared Telescope Facility on Mauna Kea from 1989-2000, and was recently awarded the NASA Public Service Medal "for outstanding leadership while serving as Director."

He was IfA Faculty Chair from 2002-2005. Asteroid 7159 has been named "Bobjoseph" by the International Astronomical Union. Joseph has published over 200 scientific papers, and there have been over 3,300 citations of his work by other astronomers in their publications.

His research interests are in extragalactic astronomy. A major research interest over the past 25 years is the astrophysical effects of collisions between galaxies. One result of such collisions is the formation of a new generation of stars. He and his collaborators have shown that such violent bursts of star formation seem not to produce as many low-mass, solar-type stars, or as many very massive stars as are produced in the more quiescent star formation processes occurring in the solar neighborhood.

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Upcoming Events:

- ☆ The next meeting is 7:30PM on **Tues., July 2** at the Bishop Museum.
- ☆ Bishop Museum's next evening planetarium shows are Friday, **July 5 & 19** at 8:00 p.m.
www.bishopmuseum.org/calendar
- ☆ The next Board Meeting is Sun., **June 30** at 3:30 p.m. at the POST building at UH.



SPECIAL GUEST SPEAKER

(cont. from page 1)

Joseph was one of a group of a dozen European astronomers who first proposed the Infrared Space Observatory (ISO) as a space astronomy mission to the European Space Agency in 1979. ISO was launched in 1995 and was very successful. Joseph was a Co-Investigator on the ISOPHOT instrument, and the prototype of the ISOPHOT-S 2.5-12 μm spectrometer was developed in his lab at Imperial College. Joseph was one of the proposers to the European Space Agency for the Far-Infrared and Submillimetre Telescope (FIRST). This mission was re-named Herschel, and was launched in May 2009.

Music is one of Joseph's avocations. He sings baritone in the Honolulu Symphony Chorus and in the choir at Calvary-By-The-Sea Lutheran Church. Performances in recent years have included many of the great Requiems, the Mahler 2nd Symphony, the Mendelssohn Elijah, the Stravinsky Symphony of Psalms, the Mozart Mass in C, Orff's Carmina Burana, the Haydn Creation, the Rutter Gloria and Mass of the Children, Britten's Ceremony of Carols, and the Beethoven 9th Symphony.



The Hawaiian Astronomical Society is now on

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The **Astronews** is a monthly newsletter of the Hawaiian Astronomical Society. Some of the contents may be copyrighted. We request that authors and artists be given credit for their work. Contributions are welcome. Send them to the Editor via email. The deadline is the 16th of each month. We are not responsible for unsolicited artwork.

NASA is doing something a little unusual. It is asking the general public for input on a couple of proposed missions before they are finalized. We all know that asteroids pose a potential threat to Earth. NASA is looking for ideas on how to reduce that threat.

Also, you may have heard about NASA's plan to move a small asteroid into lunar orbit to allow astronauts to practice approach and data collection maneuvers with it. NASA wants ideas on how best to do that as well.

Here are my thoughts. The most difficult potentially threatening asteroids to detect from Earth are the ones that orbit closer to the Sun. They are never high in our night sky. To find these easily, we really need a spacecraft that can look out away from the Sun for them. It might be possible to use the MESSENGER spacecraft that is currently at Mercury to help with this.

At a Lunar and Planetary Science Conference poster session before MESSENGER was launched, I asked if there were plans to look for asteroids on the long cruise phase before it got to Mercury, and I was told that there were indeed such plans. I don't know whether that was done or not, but it sounds like it might be possible.

Best, of course, would be a dedicated spacecraft designed and put into an orbit that would maximize results.

As far as the asteroid capture goes, one big problem is the spin that most asteroids (and other celestial objects) possess. One way to reduce that would be to use harpoonlike anchors attached to tethered weights. Once anchored to the asteroid, the weights could be let out on the tethers to carry away angular momentum. If they could be released in the proper direction to impact the Moon, this would provide excellent data for the study of impact crater dynamics.

If you are interested in submitting your own ideas, you can find all the information at <http://prod.nais.nasa.gov/cgi-bin/eps/synopsis.cgi?acqid=156731>. The deadline is July 18th.

Chris



Wave at Saturn!

One of the most exciting Cassini events in 2013 will be the unusual opportunity on July 19 to image the whole Saturn system as it is backlit by the sun. With Saturn covering the harsh light of the sun, NASA scientists will be gathering unique ring science and also catching a glimpse of our very own home planet. (see image on page 7)

The main science goal for the mosaic scientists are making of the Saturn system is to look at the more diffuse rings that encircle Saturn and check for change over time. A previous mosaic of the Saturn system Cassini made in 2006 revealed that the dusty E ring, which is fed by the water-ice plume of the moon Enceladus, had unexpectedly large variations in brightness and color around its orbit. They'll want to see how that

(Continued on page 7)

High-energy Spy

By Dr. Martin C. Weisskopf

The idea for the Chandra X-Ray Observatory was born only one year after Riccardo Giacconi discovered the first celestial X-ray source other than the Sun. In 1962, he used a sounding rocket to place the experiment above the atmosphere for a few minutes. The sounding rocket was necessary because the atmosphere blocks X-rays. If you want to look at X-ray emissions from objects like stars, galaxies, and clusters of galaxies, your instrument must get above the atmosphere.

Giacconi's idea was to launch a large diameter (about 1 meter) telescope to bring X-rays to a focus. He wanted to investigate the hazy glow of X-rays that could be seen from all directions throughout the sounding rocket flight. He wanted to find out whether this glow was, in fact, made up of many point-like objects. That is, was the glow actually from millions of X-ray sources in the Universe. Except for the brightest sources from nearby neighbors, the rocket instrument could not distinguish objects within the glow.

Giacconi's vision and the promise and importance of X-ray astronomy was borne out by many sounding rocket flights and, later satellite experiments, all of which provided years-, as opposed to minutes-, worth of data.

(Continued on page 9)



Composite image of DEM L50, a so-called superbubble found in the Large Magellanic Cloud. X-ray data from Chandra is pink, while optical data is red, green, and blue. Superbubbles are created by winds from massive stars and the shock waves produced when the stars explode as supernovas. *Credit: NASA*

The smallest of the showers this month may not have much to offer in the sky, but it does have a noteworthy abbreviation. The Piscis Austrinids shower is also identified by the three-letter code “PAU”. It is as if this shower is telling us it’s “done” before it even gets started! Might want to skip this one...

The Delta Aquariids is a strong shower best seen from the below the equator, but at Hawaii’s latitude we can still have a good show. These meteors produce good rates for a week centered on the night of maximum. The meteors are usually faint and lack both persistent trains and fireballs.

The Alpha Capricornids, although not a strong shower, are active from July 11 through August with a “plateau-like” maximum centered on July 29. Despite its weakness, this shower has produced a number of bright fireballs during its activity period. This shower is tied to Comet 169P/NEAT.

MOON PHASES

New Moon *First Quarter* *Full Moon* *Last Quarter*
July 8 **July 16** **July 22** **July 29**

Shower	Activity	Max Date	λ 2000	Radiant α	δ	V_{∞} km/s	r	ZHR
Piscis Austrinids (PAU)	7/15 - 8/10	July 28	125°	341°	-30°	35	3.2	5
So. δ -Aquariids (SDA)	7/12 - 8/23	Jul 27-28	127°	340°	-16°	41	3.2	16
α -Capricornids (CAP)	7/03 - 8/15	Jul 28-29	127°	307°	-10°	23	2.5	5

Have fun viewing sporadics and the showers this month.
 Tom Giguere, 808-782-1408, Thomas.giguere@yahoo.com
 Mike Morrow, PO Box 6692, Ocean View, HI 96737

Planets Close To the Moon

Times are Hawaii Standard Time

- July 6, 02h, M 3.7° S of Mars**
(19° from sun in morning sky)
- July 10, 09h, Moon 6.7° SSW of Venus**
(27° from the sun in evening sky)
- July 16, 14h, M 3.2° SSW of Saturn**
(100° from sun in evening sky)
- July 24, 16h, M 5.4° NNW of Neptune**
(147° from sun in morning sky)
- July 27, 12h, M 3.3° N of Uranus**
(112° from sun in morning sky)

Mercury and Jupiter are closer that 15° from the sun when near the moon in July.

Other Events of Interest

Times are Hawaii Standard Time

- July 1, 14h, Pluto at opposition**
- July 7, 21:15h, Moon new**
- July 9, 09h, Mercury at inferior conj. with sun** (Passes into morning sky)
- July 21, 10h, Moon at perigee**
(Only 22 hours before full moon, high tides expected)
- July 24, 21h, Mars 0.79°N of Jupiter**
(24° from sun in morning sky)
- June 22, 08:15h, Moon full**
- July 29, 23h, Mercury at greatest elongation**
(19.6° W of the sun in morning sky)

<p> Mercury</p> <p>Makes a morning appearance at the end of the month when it is visible below Mars and Jupiter before sunrise.</p>	<p> Venus</p> <p>Venus shines brightly in the west after sunset. Look for it on July 22 when it is close to Regulus.</p>	<p> Mars</p> <p>Mars is visible in the morning sky before sunrise. It has a very close conjunction with Jupiter on July 22.</p>
<p> Jupiter</p> <p>Visible shining brightly in the morning sky late in the month, just above Mars and Mercury.</p>	<p> Saturn</p> <p>Saturn is near the meridian at sunset and can be viewed most of the night.</p>	<p> Uranus</p> <p>Uranus can be viewed in the morning sky before dawn.</p>
<p> Neptune</p> <p>Neptune is also in the morning sky before dawn, but will be better viewed later this year.</p>	<p> Dwarf Planet Pluto</p> <p>Reaches opposition on July 1 - one of the best months to try to view this elusive dwarf planet. Near midnight is the best time.</p>	<p> Asteroid 3 Juno</p> <p>Approaching opposition, which will be in early August. It is in Aquarius and is rather dim, magnitude about +9.</p>

(Wave at Saturn continued from page 3)

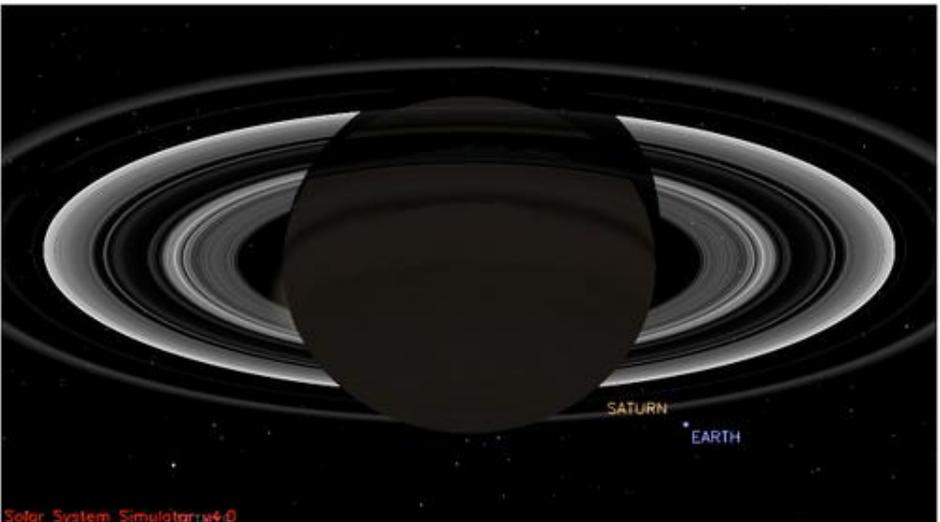
looks seven Earth years and a Saturnian season later, giving clues to the forces at work in the Saturn system. This will be achieved by analyzing collected data from visual and infrared mapping spectrometer, composite infrared mapping spectrometer and ultraviolet imaging spectrograph in addition to the imaging cameras.

But one of the best parts of the mosaic on July 19 is that Cassini be able to take a picture of Earth – and all of us -- from about 898 million miles (1.44 billion kilometers) away.

Opportunities to image Earth from the outer solar system are few and far between and special care must be taken so Cassini does not blind its cameras by looking in the direction of the sun, where Earth is. There have been only two images of Earth from the outer solar system in all the time humankind has been venturing out into space. The first and most distant was one was taken 23 years ago by NASA's Voyager 1 spacecraft from 4 billion miles (6 billion kilometers away), showing Earth as a pale blue dot . The other opportunity was Cassini's image in 2006 from 926 million miles (1.49 billion kilometers).

NASA scientists think Cassini's July image is a special opportunity for Earthlings to wave at our photographer in the Saturn system and learn more about that popular planet, its rings and moons. So go outside, look in the direction of Saturn and send NASA your pictures of yourselves waving. You can share your pictures by joining the Flickr group **Wave at Saturn**, adding them to the Wave at Saturn Facebook event page or tagging pictures on Twitter #waveatsaturn. NASA hopes to make a special collage of all these images if enough images are submitted.

The Cassini portrait session of Earth will last about 15 minutes from 2:27 to 2:42 p.m. PDT (21:27 to 21:42 UTC). ☆



This simulated view from NASA's Cassini spacecraft shows the expected positions of Saturn and Earth on July 19, 2013, around the time Cassini will take Earth's picture. Cassini will be about 898 million miles (1.44 billion kilometers) away from Earth at the time. That distance is nearly 10 times the distance from the sun to Earth.

Image credit: NASA/JPL-Caltech

Night Sky Network Astronomy Events Calendar

List View		Past Events		< July 2013 >		Upcoming Events	
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
	30 4 events: Click here to view	1 8 events: Click here to view	2 8 events: Click here to view	3 8 events: Click here to view	4 Independence Day 9 events: Click here to view	5 24 events: Click here to view	6 30 events: Click here to view
7 12 events: Click here to view	8 11 events: Click here to view 	9 18 events: Click here to view	10 19 events: Click here to view	11 16 events: Click here to view	12 29 events: Click here to view	13 60 events: Click here to view	
14 16 events: Click here to view	15 8 events: Click here to view	16 14 events: Click here to view 	17 15 events: Click here to view	18 12 events: Click here to view	19 24 events: Click here to view	20 26 events: Click here to view	
21 8 events: Click here to view	22 4 events: Click here to view 	23 9 events: Click here to view	24 9 events: Click here to view	25 9 events: Click here to view	26 16 events: Click here to view	27 22 events: Click here to view	
28 5 events: Click here to view	29 5 events: Click here to view 	30 9 events: Click here to view	31 6 events: Click here to view	1	2	3	



ATLANTA, GA
July 24-27, 2013

ALCon 2013 *Summer Skies, Summer Hospitality*

Traveling soon? Consider checking out this event (Atlanta is a central hub for many airlines).

The *Astronomical League*, *Atlanta Astronomy Club* and the *Association of Lunar and Planetary Observers* are holding a conference at the Cherry Planetarium. There are numerous talks, programs and events scheduled as well as an outside tour to the Bradley Observatory.

See a <http://alcon2013.astroleague.org> for more information.

(Space Place continued from page 4)

By 1980, we knew that X-ray sources exist within all classes of astronomical objects. In many cases, this discovery was completely unexpected. For example, that first source turned out to be a very small star in a binary system with a more normal star. The vast amount of energy needed to produce the X-rays was provided by gravity, which, because of the small star's mass (about equal to the Sun's) and compactness (about 10 km in diameter) would accelerate particles transferred from the normal star to X-ray emitting energies. In 1962, who knew such compact stars (in this case a neutron star) even existed, much less this energy transfer mechanism?

X-ray astronomy grew in importance to the fields of astronomy and astrophysics. The National Academy of Sciences, as part of its "Decadal Survey" released in 1981, recommended as its number one priority for large missions an X-ray observatory along the lines that Giacconi outlined in 1963. This observatory was eventually realized as the Chandra X-Ray Observatory, which launched in 1999.

The Chandra Project is built around a high-resolution X-ray telescope capable of sharply focusing X-rays onto two different X-ray-sensitive cameras. The focusing ability is of the caliber such that one could resolve an X-ray emitting dime at a distance of about 5 kilometers!

The building of this major scientific observatory has many stories.

Learn more about Chandra at www.science.nasa.gov/missions/chandra. Take kids on a "Trip to the Land of the Magic Windows" and see the universe in X-rays and other invisible wavelengths of light at spaceplace.nasa.gov/magic-windows.

Dr. Weisskopf is project scientist for NASA's Chandra X-ray Observatory. This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration. ☆

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From the Editor: This is part of a continuing series contributed by Joseph E. Ciotti, Professor of Physics, Astronomy & Mathematics/ Director of the Center for Aerospace Education, Windward Community College, University of Hawai'i

This article originally appeared in The Hawaiian Journal of History, Vol. 45, 2011

HISTORICAL VIEWS ON MAUNA KEA: FROM THE VANTAGE POINTS OF HAWAIIAN CULTURE AND ASTRONOMICAL RESEARCH

BRIDGING THE GAP: 'IMILOA ASTRONOMY CENTER

The exhibits are divided into two main topics that link Hawaiian and scientific beliefs, theories and practices as they relate to Mauna Kea and the cosmos. The two themes are:

- **Origins**, which focuses on the birth of the cosmos and the beginnings of life on earth. One exhibit is a multi-media amphitheater dedicated to performing portions of the Kumulipo, a 2,000-line chant celebrating the Hawaiian creation story and genealogy. Paralleling this theme from the astronomy side is a second small amphitheater-style room that continually runs a 3D video of the Big Bang theory.
- **Explorations**, which features the tools and methods of discovery. Several exhibits are devoted to the Hawaiian canoe, wayfinding (non-instrument navigation) and the voyages of discovery made by the Polynesians. Complementing this are interactive astronomy displays where visitors engage in hands-on activities with astronomical instruments (such as telescopes and infrared cameras) and become acquainted with the

Treasurer's Report

by Jim MacDonald

HAS Financial Report for the month ending as of June 15, 2013

Initial Balance:	\$4,088.69
<i>Receipts:</i>	
Donations	230.05
Dues Received	236.00
Magazine Payment	95.90
Total Income:	\$531.95
<i>Expenses:</i>	
Magazine Subscriptions	74.18
Total Expenses:	\$74.18
Final Balance	\$4,546.46

The club gained six new members this month. They are *Hiroko and Andy Stroble; David Tiller, and rejoining the club are Gary, John, and Donna King.*

Thank you to *Kevin Suehiro, Alex Dzierba, Gary King, Daniel Fischberg, and Alyce Ikeoka* for their generous donations. Come join us for some wonderful summertime viewing.

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<<Upcoming Star Parties>>

Public Party-Dillingham July 6 (West)

Kahala/Ewa Party July 13

Public Party-Dillingham July 27 (Galloway)

****note: NO Club Party this month***



SCHOOL STAR PARTIES



SUMMER VACATION!

**NO SCHOOL STAR PARTIES SCHEDULED
UNTIL FURTHER NOTICE**



pioneering discoveries being made at the Mauna Kea observatories.

By setting the cultural and scientific exhibits side-by-side in this fashion, a learning environment is created in which Hawaiian cultural contributions are cherished and validated, and astronomical research endeavors are promoted and humanized.

A major component of the 'Imiloa experience is its state-of-the-art planetarium. Designed with unidirectional seating for 120 visitors, this 16-m dome theater utilizes a full-dome projector with 3D stereoscopic capability. This digital projection system creates an immersive 360-degree viewing environment that allows audiences to vicariously experience voyaging aboard long-distance canoes, observing at the Mauna Kea observatories, and journeying into outer space.

The planetarium's signature show, Maunakea: Between Earth and Sky, uses parallels to compare Hawaiian culture and astronomy research as related to Mauna Kea, while also touching on the controversy over its use. Audiences are aided in visualizing the creation stories of the Kumulipo and the Big Bang. The show also covers the geological formation of the Hawaiian Islands and recounts the legend of volcano goddess Pele's flight across them towards her eventual encounter with the snow goddess Poli'ahu atop Mauna Kea. The projector's immersive, full-dome capability allows audiences to fly through the Gemini Observatory and sail along with Hawai'ioloa on his epic discovery of Hawai'i.

Like other science centers and planetariums, 'Imiloa Astronomy Center takes full advantage of the power of informal learning. Given that individuals generally spend four times as many years out of school as in, it's no wonder that much of what we know comes from experiences outside of formal schooling. Unrestricted by the regulations of formal institutions, informal education can respond more quickly, flexibly and innovatively to the needs of a rapidly changing society.

Even the landscaping surrounding 'Imiloa offers visitors a learning experience into Hawai'i's native ecosystem. The garden consists of over 50 native plants, including the "canoe" plants brought to the islands by the early Polynesian explorers. These species illustrate the variety of flora found at the different elevations on the Big Island.

'Imiloa also collaborates with the observatories on Mauna Kea to spotlight their astronomical discoveries and make them both accessible and interesting to the public.

According to Senator Inouye:

The future of astronomy in Hawai'i—the upgrading of equipment and a skilled local staffing pool—will in large measure depend on good relations with the community, especially those leading the efforts to advance Hawaiian language and culture. The future work opportunities for many young people growing up in Hawai'i will require even greater preparation in astronomy and related fields. 'Imiloa serves to unite efforts to advance knowledge of culture and astronomy, deepen understanding and respect for both, and thereby create opportunities for new generations of young people.

The 'Imiloa Astronomy Center attempts to leverage its mission of inspiring and encouraging Hawaiian and other students to seek careers in science and technology, while remaining grounded in their traditions of family and culture. Its partnerships with the Mauna Kea observatories, the Hawai'i Volcanoes National Park and the National Oceanic and Atmospheric Administration (NOAA) serve to increase opportunities for informal science learning in ways relevant to the local culture—thereby bringing these two groups together as equal partners.

☆ (To Be Continued)

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On July 19, 2013, NASA's Cassini spacecraft will take a picture of Earth from about 898 million (1.44 billion kilometers) away, or nearly 10 times the distance between Earth and the sun. It will be the first time Earthlings have had advance notice that their picture will be taken from interplanetary distances. To learn more about how to participate, visit <http://saturn.jpl.nasa.gov/waveatsaturn>. See page 3 for story *Image courtesy: NASA*

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