

#### **Beyond Earth: strategies for long-term human survival**

The guest speaker for the club meeting on Tuesday February 3 is Roberto Mendez . Dr Mendez describes his talk as follows:

"Our Earth is not a safe place. Geological and paleontological evidence indicates that the history of life on Earth is punctuated by several mass extinction episodes. If we want to optimize our chances of survival in the really long term (millions of years), we must first colonize the Solar System and then spread across the Milky Way galaxy. The purpose of this talk is to describe a plausible strategy that does NOT depend on finding Earth-like planets around other stars "

Roberto Mendez was born in Argentina, where he got his PhD at the University of La Plata. He has worked as an astronomer in Buenos Aires, Argentina, and Munich, Germany. Since 2002 he is research astronomer and professor at the Institute for Astronomy, UH Manoa. His main field of research is planetary nebulae, both in our Galaxy and in other galaxies. He regularly teaches a graduate course on stellar structure and evolution.

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#### **Upcoming Events:**

- The next meeting is on Tuesday, Feb..3<sup>rd</sup> at the Bishop Museum 7:30 PM.
- Bishop Museum's planetarium shows are every Saturday of the month at 8:00 PM www.bishopmuseum.org/calendar
- The next Board meeting is Sun., Feb 1 at 3:30 PM in POST building at UH.

#### President's Message February 2015

Last month I discussed the proposed development at Dillingham Ranch. I submitted the following comment regarding a draft Environmental Assessment for the project.

#### To Whom It May Concern:

I am writing in regard to the Dillingham Ranch Agricultural Subdivision proposal. I am the President of the Hawaiian Astronomical Society (HAS) and I sit as a representative on the state's Starlight Reserve Committee (SRC) which is concerned with limiting and reducing light pollution in Hawaii. These comments are my own and haven't been endorsed by either HAS or SRC.

The proposed project is located in one of the darkest remaining parts of Oahu. HAS holds public telescopic observing events at Dillingham Airfield under a permit granted by the state Department of Transportation. We used to hold such events in the Barbers Point area, but development there has brightened the night sky to the point that it is no longer suitable for such use. Few dark areas remain on Oahu, and we are concerned that the proposed development may adversely affect the dark skies at Dillingham Airfield.

The SRC sponsored legislation that was adopted and requires the state to limit light pollution from street lights that it controls. The City and County of Honolulu is also working to limit light pollution from street lights. However, there are not yet adequate restrictions on lighting associated with homes on private property. The SRC has discussed possible future plans for a Starlight Reserve area near Kaena Point that

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#### Observer's Notebook—February 2015 by Jay Wrathall

#### **Planets Close To the Moon** Times are Hawaii Standard Time

Feb 3, 20h, M 5.0 SSW of Jupiter (176° from sun in midnight sky) Feb 12, 14h, M 2.1° N of Saturn (80° from sun in morning sky) Feb 16, 18h, M 3.6° NNW of Mercury (26° from sun in morning sky) Feb 20, 14h, M 1.9° NNW of Venus (28° from sun in evening sky) Feb 20, 15h, M 1.4° NNW of Mars (29° from sun in evening sky) Feb 21, 12h, M 0.33° N of Uranus (41° from sun in evening sky)

Neptune is closer than 15° from the sun when near the moon in February.

#### **Other Events of Interest** Times are Hawaii Standard Time

Feb 3, 13:09h, Full Moon

Feb 6, 08h, Jupiter at Opposition

Feb 18, 13:47h, New Moon

Feb 21, 20h, Venus 0.41° SSE of Mars (28° from sun in evening sky) Feb 24, 06h, Mercury at greatest elong.

from sun

(26.7° west of the sun in evening sky

Feb 25, 19h Neptune at conjunction with sun

(Passes into morning sky)

Planets in October						
Mercury	Venus	Mars				
Makes a rather poor morning appearance in February, reaching greatest elongation on Feb 24	Is in the western sky about 30° from the sun at sunset	Js visible low in the SW evening sky, very close to Venus on Feb 21				
<b>24 Jupiter</b> Reaches opposition on Feb 6 and is in the sky all night. Best observed late in the evening.	<b>5 Saturn</b> Is visible in the southeast- ern sky before sunrise.	<b>W</b> Uranus Is visible in the evening sky after sunset near Mars				
<b>Weptune</b> Is lost in the glare of the sun this month as it reach- es conjunction with the sun on Feb 25	<b>Pluto</b> (Dwarf Planet) Is visible in the east be- fore dawn, Will be better placed for viewing later in the year.	Reached opposition on Jan 30 magnitude +8.1				

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#### **Meeting Minutes**

Due to unforeseen circumstances this issue will not have any meeting minutes.

Gretchen West

H.A.S. Secretary

#### Super Rings around Exoplanet? By John Gallagher and Charles Rykken

An article in the BBC online http://www.bbc.com/news/scienceenvironment-31001936 relates news about a possible exoplanet that has rings 200 times larger than the rings around Saturn. The discovery is related in a technical article http://arxiv.org/pdf/1501.05652v1.pdf.

If Saturn's rings were that large, they would cover a portion of the sky greater than our moon.

The stellar object J1407 is hypothesized to be a giant gaseous planet but so far the researchers have not been able gather enough evidence to show conclusively that it is a planet that is holding the rings together.

It is not possible to include any of the pictures that are included in the above references due to lack of time to track down any inhibiting copyright issues.



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#### Hawaiian Astronomical Society Event Calendar

## FEBRUARY

2015/ February

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01	02	03	04	05	06	07
Sunset 8:18		7:30 PM Club Meeting				6:15 PM Public Star Party (D)
08	09	10	11	12	13	14
Sunset 8:18	8:00 PM Globe at Night	8:00 PM Globe at Night	8:00 PM Globe at Night	8:00 PM Globe at Night	8:00 PM Globe at Night	8:00 PMGlobe at Night 6:15 PMClub Star Party(D) (Private)
15	16	17	18	19	20	21
8:00 PM Globe at Night Sunset 8:18	8:00 PM Globe at Night	8:00 PM Globe at Night	8:00 PM Globe at Night			
22	23	24	25	26	27	28
Sunset 8:18	07	114	7:00 PM Assets School SG (private)	115	6:30 PM Waikiki Elem SP (Private)	6:15 P M Public Star Party(G) 6:15 P M Public Star Party(K)

#### < < Upcoming Star Parties> >

Public Party-Dillingham Feb. 7 Public Party Geiger Feb. 28 Public Party Kahala Feb. 28

Wed	Feb 25, 2015	Assets School (Hickam/Pearl Harbor Area)				
Fri	Feb 27, 2015	Waikiki Elementary School (Waikiki Area)				
Fri	Mar 6, 2015	Iolani Elementary School (McCully Area)				

#### Upcoming School Star Parties

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SUNDAY

#### President's Report (Continued from page 2)

would strictly limit the amount of light that could be introduced into the night sky from any source.

In order to preserve the dark sky in this area for the benefit of astronomy and for wildlife, some simple restrictions could be adopted for those who purchase lots in the proposed development. Outdoor lights with shields that direct light only where it is needed are available. Information is available through the International Dark-Sky Association (http://darksky.org/). Shielding of outside lights would go a long way toward preserving the dwindling resource that is the night sky. Please do whatever you can to reduce the light pollution impact of this project.

Thanks for considering my comments,

#### **Chris Peterson**

#### Mebsuta's Lariat by Barry Peckham

As often happens, January has given us night sky lovers a heaping handful of clear, calm nights. They don't always fall on a Saturday, so weather watchers must do their gazing wherever possible. I live less than a mile from downtown Honolulu and my tiny yard has its share of sky obstructions, but it is better than useless, and I have been planting a scope there on nights when I can make progress with my carbon star hunt.

Thanks to HAS member Nick Bradley, I have been using the <u>Pocket Sky At-</u> <u>las</u> as a carbon star finder. Map 23 shows part of Auriga and part of Gemini, 2 constellations that are high in the sky on January evenings. The chart identified UU Aurigae as a carbon star so I found it and sketched its starfield, as required by the Astronomical League for their official recognition. It turns out that I had found this target a year ago, and also sketched its field at that time. Not only was the effort redundant, but the 2 sketches hardly matched! I next sought out a carbon star between Pollux's neck and belly button stars. Nothing looked right in 20 minutes of hunting. So it goes with carbon stars.

In frustration, I looked at this same chart for other objects of interest. There is a small globular cluster several degrees north of Castor, so I tried star-hopping to it... over and over and over. It would not show up, but for a faint smudgy suspect around a faint star, and higher power did not help.

Doubly frustrated, I began doing what the go-to folks rarely do... with eye to the eyepiece, I began wandering around the sky. My meander began at Mebsuta, Castor's belly button star. An open cluster, NGC 2266, lurked nearby, but I couldn't detect it. What did stand out, at 45X in an 8 inch scope, was a lariat of faint stars, extending to the north of Mebsuta. The lasso is a wide, thin ellipse made from a dozen stars, including 2 doubles. It is almost half a

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NASA's Space Place

When you think of our sun, the nearest star to our world, you think of an isolated entity, with more than four light years separating it from its next nearest neighbor. But it wasn't always so: billions of years ago, when our sun was first created, it very likely formed in concert with thousands of other stars, when a giant molecular cloud containing perhaps a million times the mass of our solar system collapsed. While the vast majority of stars that the universe forms—some ninety-five percent—are the mass of our sun or smaller, a rare but significant fraction are ultra-massive, containing tens or even hundreds of times the mass our star contains. When these stars run out of fuel in their cores, they explode in a fantastic Type II supernova, where the star's core collapses. In the most massive cases, this forms a black hole.

Over time, many generations of stars—and hence, many black holes—form, with the majority eventually migrating towards the centers of their host galaxies and merging together. Our own galaxy, the Milky Way, houses a supermassive black hole that weighs in at about four million solar masses, while our big sister, Andromeda, has one nearly twenty times as massive. But even relatively isolated galaxies didn't simply form from the monolithic collapse of an isolated clump of matter, but by hierarchical mergers of smaller galaxies over tremendous timescales. If galaxies with large amounts of stars all have black holes at their centers, then we should be able to see some fraction of Milky Way-sized galaxies with not just one, but *multiple* supermassive black holes at their center!

It was only in the early 2000s that NASA's Chandra X-ray Observatory was able to find the first binary supermassive black hole in a galaxy, and that was in an ultra-luminous galaxy with a double core. Many other examples were discovered since, but for a decade they were all in ultra-massive, active galaxies. That all changed in 2011, with the discovery of two active, massive black holes at the center of the regular spiral galaxy NGC 3393, a galaxy that must have undergone only minor mergers no less than a billion years ago, where the black hole pair is separated by only 490 light years! It's only in the cores of active, X-ray emitting galaxies that we can detect binary black holes like this. Examples like NGC 3393 and IC 4970 are not only confirming our picture of galaxy growth and formation, but are teaching us that supermassive relics from ancient, minor mergers might persist as standalone entities for longer than we ever thought!

Check out some cool images and artist reconstructions of black holes from Chandra: <u>http://chandra.harvard.edu/photo/category/blackholes.html</u>

*Kids can learn all about Black Holes from this cool animation at NASA's Space Place: <u>http://spaceplace.nasa.gov/black-holes</u>.* 

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#### Meteor Log—February 2015

#### by Tom Giguere

Once we get into February we enter the "dry" season for meteors. The January Quadrantids are behind us and there are still months to go before the Lyrids make their appearance in April. The  $\alpha$ -Centaurids are the featured shower in February and actually the only listed shower! I would like to see more observations of this southern shower. Folks on the mainland are at a huge (Continued on page 9)



First Qı	larter	Full M	loon	Last Qı	larter	New I	loon	
February	/ 25	Februa	ary 3	Februar	y 12	Februa	ary 18	
Shower	Activi- ty	Maximum		Radiant		V∞	r	ZHR
		Date	λ□	a	δ	km/s		
α- Centau- rids (ACE)	$\begin{array}{c} 1/28 \rightarrow \\ 2/21 \end{array}$	(Feb 08)	319.2	210°	-59.0°	56	2.0	6

We've got a new year, make it your resolution to get out and see a few meteors! Tom Giguere, 808-782-1408, <u>Thomas.giguere@yahoo.com</u>; Mike Morrow, PO Box 6692, Ocean View, HI 96737.



The Astronews

### Treasurer's Report

by April Lew

	HAS Financial R	eport December 16, 2014 to J	anuary 15, 2015
Beginning Balance			\$2,551.41
Income:			
	Dues Received	\$120.00	
	Calendar and postage	\$15.00	
	Donation	\$20.00	
Total Income			\$155.00
Expenses:	1		
Total Expenses			\$0.00
Ending Balance			\$2,706.41

. Many thanks to those renewing their membership (Gary Bloom, Walter Y. Tokushige, Yoshiyuki Inoue, Kayoko Calef, and G. S.). As a reminder, please check your membership anniversary date listed on the Astronews address label. Clear skies to all!

#### (Continued from page 8) Meteor Log

disadvantage when attempting to observe due to the radiant emanating from - 59 degrees, thus observers in Hawaii fill an important role.

Research conducted by IMO suggests that the  $\alpha$ -Centaurids has produced many very bright, even fireball-class, objects (meteors of at least magnitude -3), often with persistent trains. The average peak hourly rate between 1988– 2007 was 6 meteors, however this varies from year to year. There have been outbursts as in 1974 and 1980, of only a few hours' duration yielding rates (Continued on page 11) (Space Place Continued from page 7) Picture of NGC3393 below



Images credit: NGC 3393 in the optical (L) by M. Malkan (UCLA), HST, NASA (L); NGC 3393 in the X-ray and optical (R), composite by NASA / CXC / SAO / G. Fabbiano et al. (X-ray) and NASA/STScI (optical).



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#### (Continued from page 9) Meteor Log

closer to 20-30. If the shower is of a long orbital period type as some analysts suspect, there is the possibility there could be a fresh outburst this year, on February 8, but an hour or so before the nodal crossing time above, according to the modelling at 11 h 28 m UT. The shower's radiant is nearly circumpolar for much of the sub-equatorial inhabited Earth, and is at a useful elevation from late evening onwards. The bright waning gibbous Moon will rise by 21 h 30 m local time for sites within about ten degrees of 30° S latitude on February 8. Despite this severe problem, observers are urged to be alert just in case a fresh outburst should manifest.

(Continued from page 6) Mebsuta's Lariat by Barry Peckham

degree wide. The rope extending up to Mebsuta (meaning "outstretched paw") is a stream of faint stars, simulating a lariat in motion.

It is known to many that John Dobson travelled constantly and carried little with him, barely a change of clothes, but almost always packed a lariat which he spun in public places to attract an audience. The moment I saw Mebsuta's lariat, my mind's eye saw Dobson twirling his rope in an airport lobby, trying to strike up a conversation about the night sky.

And so it was that golden Mebsuta the supergiant used its lariat to rope me, from 900 light years away. My evening of astronomical frustration was corralled in a pleasant pasture of wonder.

Barry

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Galileo's Europa Remastered

Image Credit: <u>NASA</u>, <u>JPL-Caltech</u>, <u>SETI Institute</u>, <u>Cynthia</u> <u>Phillips</u>, Marty Valenti http://apod.nasa.gov/apod/ap141127.html

> Place cover up this snudge with something. A postage stamp is suggested..