SkyWAAtch

A Night with Ron Garan

On March 14th, NASA astronaut Ron Garan spoke to a sold out audience at an event sponsored by the WAA and the Iona College Department of Physics. Starting his talk with a stunning video of the view from the International Space Station (ISS), Ron went on to share many of his ISS experiences. Among these, the challenge of orienting himself on his first spacewalk; his daily 2-hour exercise regime to combat the effects of zero gravity and his favorite past-time during off hours--imaging the Earth from an observation window. Ron later recounted his thrill-ride return to Earth aboard a Soyuz spacecraft after 164 days in space. He included a video of his landing in the steppes of Kazakhstan. It looked harrowing, but Ron assured the audience that landing rockets cut in several tenths of a second before touchdown to supplement the parachutes. He concluded with a generous question and answer period.

A theme permeating Ron's talk was what he called the "orbital perspective." This speaks to the benefits an orbital research facility like the ISS can provide for life on Earth, and the inspiration it affords for people to make a difference. As an example, Ron noted the NASA engineers who used water recycling technology developed on the ISS to aid in providing water treatment facilities in Rwanda. For more information, see Fragile Oasis.

Photo courtesy of Bob Kelly.

Events for April 2012

WAA Lectures

"New Mexico Southern Skies" - a Development for Amateur Astronomers devoted to Astronomical Imaging"
Friday April 13th, 7:30pm
Miller Lecture Hall, Pace University
Pleasantville, NY

Dr. Josh Knight will speak on imaging at the New Mexico Southern Skies facility. Dr Knight visited NMSS last fall and will describe his visit and why the area is ideal for astrophotography. Dr Knight received his B.S. in Engineering Physics from Cornell University in 1968 and his Ph.D. in Applied Physics from Stanford University in 1978. He has published articles in professionally reviewed journals on solar physics, solar terrestrial interactions and the distribution of quasar red shifts. After 3 years of research and teaching in Solar Physics and Astrophysics at Stanford following his Ph.D., Dr. Knight joined IBM T.J. Watson Research Laboratories where he is still employed. Free and open to the public. Directions and Map.

Upcoming Lectures
Miller Lecture Hall, Pace University
Pleasantville, NY

On May 4th, David High will speak on the Dawn Mission to Asteroid Vesta. Free and open to the public.

Starway to Heaven

Saturday April 14th, 7:00pm
Meadow Picnic Area, Ward Pound Ridge Reservation, Cross River

This is our scheduled Starway to Heaven observing date for April, weather permitting. Free and open to the public. The scheduled rain/cloud date is April 21st. Participants and guests should read and abide by our General Observing Guidelines and Disclaimer. Directions

New Members. . .

Kenn Sapeta - Cold Spring
Amy Saland Nodiff - Scarsdale
Craig and Aaron Ross - Glendale
David Dayya - New Canaan, CT

Renewing Members. . .

Jonathan Gold - Ossining
William Sawicki - Bronx
Lori Wood - Yonkers
Rick Bria - Greenwich, CT

NEAF
NORTHEAST ASTRONOMY FORUM

The Northeast Astronomy Forum will be held on April 28th (8:30am-6:00pm) and April 29th (10:00am-6:00pm) at SUNY Rockland College in Suffern, NY. This is the nation's largest space and astronomy show. It features more than 130 exhibitors as well as workshops and solar observing.

The WAA will have a booth; be sure to stop-by. Members who want to help staff the booth for an hour, please email Larry Faltz at: waa-vicepres@westchesterastronomers.org.

For more information go to the NEAF site.

WAA APPAREL

Charlie Gibson will be bringing WAA apparel for sale to the April meeting. Items include:

- **Caps, $10** (navy and khaki)
- **Short Sleeve Polos, $12** (navy).

Call: 1-877-456-5778 (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the WAA website.

Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is $25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Doug Baum; Senior Vice President: Larry Faltz; Vice President Public Relations: David Parmet; Vice President Educational Programs: Pat Mahon; Treasurer: Rob Baker; Secretary/Vice President Membership: Paul Alimena; Vice President Field Events: Bob Kelly; Newsletter: Tom Boustead.

Articles and Photos

A Potpourri
by Larry Faltz

"Potpourri" is derived from the French phrase literally meaning "rotten pot". It's the collection of dried flowers, herbs and spices that is kept in an open jar in order to overwhelm various impossible-to-overwhelm household odors (Kim-chee 1, Potpourri 0). Metaphorically it means a collection of unrelated items. In trying to write an essay for this month, I've had a bunch of ideas, so how about a little bit about a few things rather than a whole lot on only one?

Pimp Your Flip-Mirror

Those of you who've seen my video set-up at the club's star parties, nicknamed "Locutis" after the cyborg incarnation of Captain Jean-Luc Picard in *Star Trek Next Generation*, know that I'm a dedicated member of the gearhead wing of WAA. We're the folks who perseverate over astro hardware and have subscriptions to the obscure magazine *Astronomy Technology Today*. We're in a constant state of salivation at NEAF. We also like solving usability problems in our set-ups by adapting a variety of devices and small parts, some which were never intended for astronomy.

"Honey, did you see my cutting board?"

For example, the tripod shelf for my netbook is made from a polyethylene cutting board, an assortment of common hardware items including small angle brackets, 3/8" couplers and threaded rods, and inexpensive 2" C-clamps obtained from an on-line theatrical lighting supply company.

I recently modified a flip-mirror using small and somewhat obscure astronomy parts. A flip-mirror is a practical device if you are going to use a telescope for both visual and photographic observation and don't want to keep attaching and removing the parts. It's basically a diagonal, but you can rotate the mirror out of the light path for straight-through viewing. Versions by Orion and Vixen cost a little over $100. They come with 1.25" barrels at a right angle that allow you to place an eyepiece in one and a camera (via an adapter) in the other. The barrels are attached to the body of the mirror with a standard T-thread, which allows you to replace the original barrels with connectors that customize the functionality of the flip mirror.

Vixen Flip Mirror (Vixen)

In my case, I wanted to attach an adapter to mount a Canon DSLR at prime focus (the back of the flip mirror). A T-to-Canon EOS adapter from CNC Parts Supply (they're found on the web at www.telescopeadapters.com) was only $18.95. Three tiny set screws allow the EOS bayonet to be rotated so the mounted camera is in the position of your choice relative to the body of the mirror. I simply unscrewed the original extension tube and screwed on the adapter. I put the device in my 80mm f/6 refractor, attached the camera, popped an eyepiece in the top port, and focused on a distant object, flipping the mirror back and forth to check focus (since the camera's position is fixed, all

focusing is done at the scope). Not surprisingly, when the camera was in focus, the eyepiece was not, and I had to slide it out a little in the barrel and retighten the set screw. I found this an unsatisfying way to manage focus, but once again T-thread came to the rescue. Baader Planetarium, the German manufacturer of many unique and finely crafted telescope accessories, makes an aluminum helical focuser with a T-thread mounting. It's a beautifully crafted, petite piece of equipment, and $52 later I had one. Since the focuser has only 10 mm of travel, I got a set of T-thread extension tubes from CNC (a set has 5, 10, 15 and 20 mm tubes) and with a little screwing and unscrewing I found the right combination of parts to bring my eyepieces into focus.

My Vixen Flip Mirror

A true gearhead never settles for the original if doing so requires an inelegant workaround like sliding the eyepiece up and down for focus. There are all sorts of clever ways to make things more functional. Go for the engineered solution if you can manage it, which in this case means a finely crafted bit of German machining.

Superluminal Neutrinos? Never Mind!

Some of us remember Emily Latella, the confused character played by Gilda Radner on Saturday Night Live in the 1970's. Emily would rant hysterically and humorously about some subject, a malaprop of the actual issue (I recall her complaining "Why are people so upset about Soviet jewelry"), only to be corrected at the end by a disdainful Jane Curtin. She would finish with a smile and a perky "Never mind!"

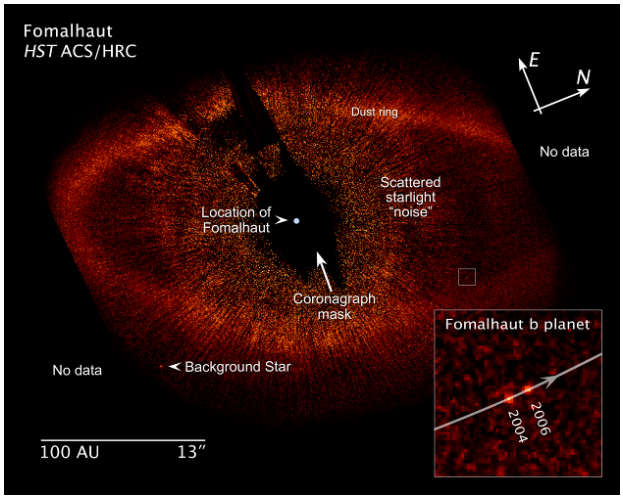
I thought of Emily's response when it was reported in mid-March that those pesky, relativity-eating, faster-than-light neutrinos from CERN's OPERA experiment were indeed spurious, the data corrupted by a bad fiberoptic connector in the timing apparatus. The humbling announcement of this "oops" contrasted with the grandiose discovery announcement last fall, which was followed by more than 80 scientific papers proposing theoretical explanations for the phenomenon, and a detailed Wikipedia entry. It's an interesting article with a lot of detail, and to their credit the authors mention naysayers among the research team and report the latest data refuting the initial claim.

Modern science, especially "big science", has to compete for funding against a myriad of other priorities, and so there's a natural temptation to try to grab the public's attention. The idea of experimenting over and over again until all doubt is removed is a luxury that modern scientists may not be able to afford. No scientist is going to sit on their results to ensure certainty, whatever that may mean in the scientific world. They don't want to be scooped and they don't want to fall out of the funders' field of vision. But the chance they take is humiliation and perhaps even funding exile if they are wrong. Where are Pons and Fleischmann, they of the Cold Fusion debacle in the late 1980's, now?

It's hardly surprising that grand constructions using complex machines run the risk of being confounded by the failure of the smallest mechanical part. The old "chain is as strong as its weakest link" adage is always in play in the world of mega-technology. The most famous example is the O-ring failure that caused the Challenger shuttle explosion, or the pump failure at Three-Mile Island. It always struck me as a form of hubris (even though I was always pulling for their success) that anyone would dare to design and build machines of such profound complexity like the Space Shuttle, the Large Hadron Collider or even a grand piano.

Fomalhaut b? Never Mind!

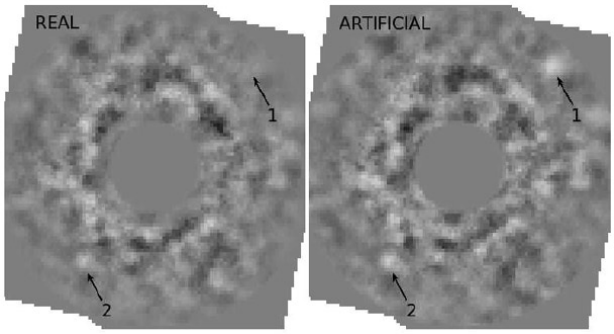
Sometimes scientific findings are wrong even though everything works properly. Take the most publicized finding (to date) of exoplanet research: the imaging of Fomalhaut b.



HST image, annotated by NASA

Most exoplanets have been detected by measuring minute reductions in their host star's brightness as they pass between the star and us, or by the slight wobble of the star's position due to gravitational interactions among the bodies in the system. But in November 2008, an image from the Hubble telescope was released that appeared to show a planetary body around the star Fomalhaut. A small dot of light was seen in different positions on images taken 2 years apart. NASA's press release made it clear that they had no doubt about this finding: "NASA's Hubble Space Telescope has taken the first visible-light snapshot of a planet circling another star." The planet was thought to be the size of Jupiter. The claim was exciting because Fomalhaut is more sun-like than the few other stars around which planets have been imaged.

When it was looked for again in 2010, it was found in a place that didn't make sense: it would have crossed the protoplanetary disk, an impossible route for a real planet.



Spitzer's image of Fomalhaut

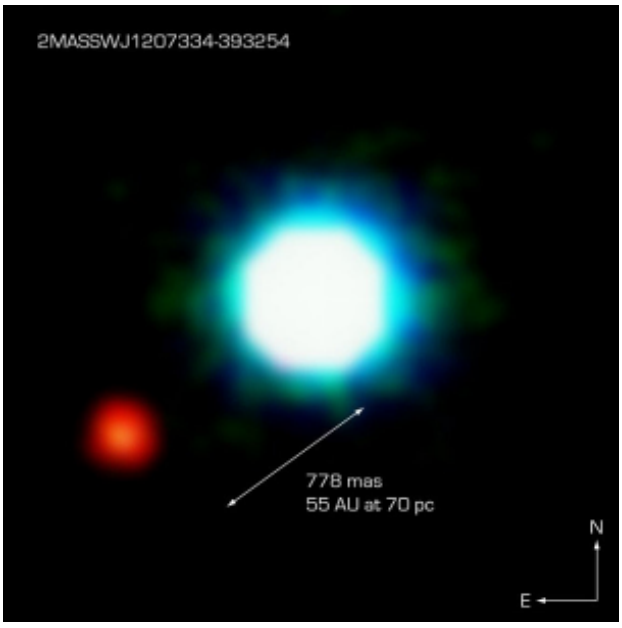
Since the planet should be visible in the infrared, the Spitzer Space Telescope was aimed at Fomalhaut. Where it should have found a bright spot, it found nothing.

The Spitzer image (above) of Fomalhaut was processed to remove the bright star. The actual image, on the left, shows an unrelated bright knot at 2, but nothing at 1, the expected location of the planet. The image on the right is what it would have looked like if the planet existed.

The bright dot picked up by Hubble is now thought to be a light reflection from moving dust clouds surrounding the star.

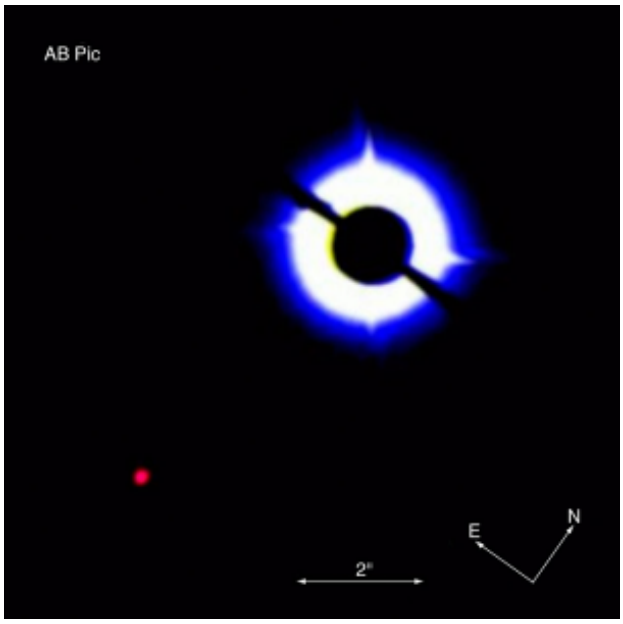
There are just a few systems in which apparent planets have been directly imaged, although none were found at visible wavelengths.

The ESO's Very Large Telescope (four 8.2 meter telescopes at Cerro Paranal in Chile) found a massive Jupiter-like planet around a brown dwarf in 2004. This object is about 5 times Jupiter's mass and orbits at a distance of 55 AU (1 AU=sun-earth distance, 93 million miles) around the brown dwarf 2M1207A. Spectroscopic evidence of water has been detected. The original object was one of 173 brown dwarfs found by the 2MASS project, which used one telescope in each hemisphere to image the entire sky in the near infrared. The northern scope was on Mt. Hopkins, south of Tucson, and the southern was at Cerro Tololo in Chile.



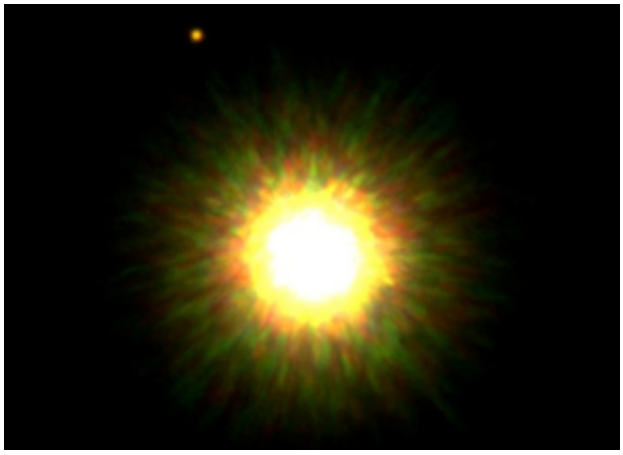
2M1207A and its planet (ESO)

In 2003 and 4, a large object was imaged in orbit around AB Pictoris. This object is either a very large Jupiter or a small brown dwarf. The latter is not formally classified as a planet, but it isn't a star either. The jury's still out.



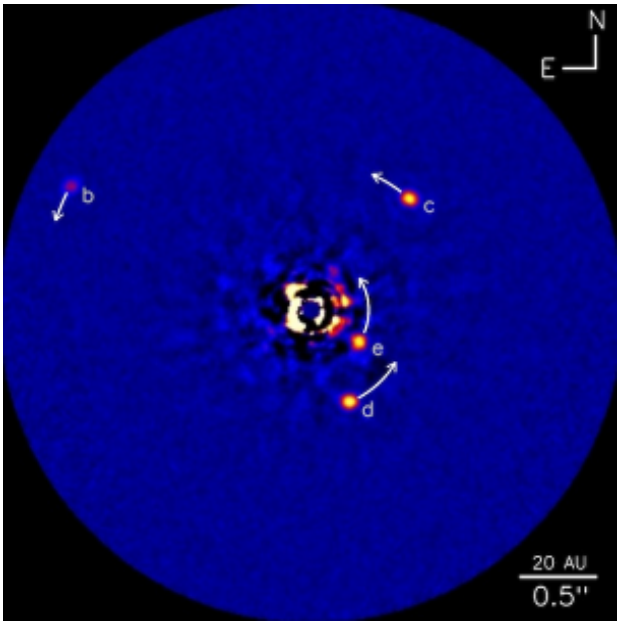
AB Pictoris, Very Large Telescope (ESO)

A planet with about 8 Jupiter masses was found by the Gemini telescope around a young star in Scorpius. Its orbit was calculated to be quite far from the star, about 330 AU. This poses a challenge for theories about its origin.



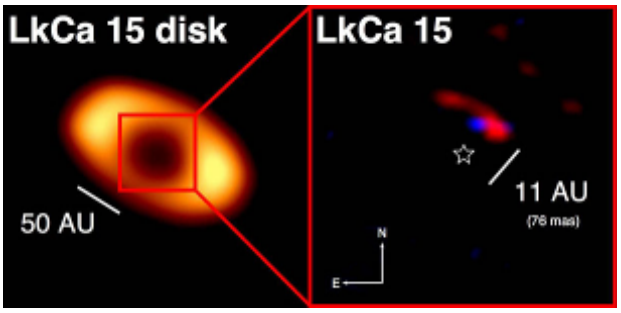
Planet around IRXS J160929 (Gemini)

Astronomers at the Keck and Gemini instruments in Hawaii found 3 large planets orbiting HR 8799, a young star in Boötes. A year later a fourth member of the system was discovered. These planets are estimated to be between 4 and 10 Jupiter masses and are located between 14 and 68 AU from the star.



4 exoplanets around HR 8799 (Keck)

A protoplanet, a planet still in formation, was detected around a star in Taurus by the Keck telescope. Called LkCa 15b, the object is Jupiter-like and still surrounded by a cloud of dust. In the image below, the planet is the tiny blue dot in the right frame and the dust cloud is red.



Images of a forming planet (blue dot in right frame) (Keck)

All of these new objects have strong infrared signatures, making a good case for their planetary nature. Although a much more data needs to be gathered to understand their true size, orbit, composition and formation, the strong IR emission suggest that their discoverers will not have to say "Never mind!".

Horsehead Nebula at Last

It just looks like a grainy blob, but take my word for it, the picture below is the Horsehead Nebula. It's a

screen shot of a 28-second exposure with a Mallincam color astro video camera on an 8" SCT at f/4, taken at the WAA *Starway to Heaven* star party on March 17th. It's the first time I've seen it from Ward Pound.

Mallincam video screen shot of the Horsehead

It's true that video astronomy is not naked-eye astronomy, but it was video or nothing given our unavoidable light pollution. It's cleverly called "near real-time" viewing.

The nebula is a cloud of dust, known as B33 in Barnard's catalogue of dark nebulae, on the edge IC434, an emission nebula located at the eastern (left) end of Orion's belt just south of the star Alnitak (Zeta [ζ] Orionis). About 5 degrees north of the Orion Nebula (M42), this is a very interesting area of the sky, containing lots of glowing gas. The famous multiple star system Sigma [σ] Orionis is close by.

Stephen O'Meara, in his observer's guide *Hidden Treasures* (Cambridge, 2007), notes that "The Horsehead spans only about 5', and its appearance in small telescopes is one that looks more like a faded thumbprint than a horse's head." That's what it looked like on the LCD video screen when we located it. A notoriously difficult visual object and especially sensitive to light pollution, the Horsehead often benefits visually from a hydrogen beta filter. It's nicely seen in Doug Baum's BiPH through a hydrogen alpha filter.

Everyone knows what the Horsehead looks like because it's a common astrophotography target. First discovered in 1888, when astrophotography was a new technology, it's been imaged countless times by amateurs and professionals, using small, large and even space-based instruments. But visually it's tough, and even with the advantage of video it was difficult to separate from the skyglow. An IDAS P2 broadband light pollution filter helped improve the contrast.

O'Meara notes, "Knowing where to look and using averted vision are the keys to seeing it." The video counterpart of averted vision seems to be to step back from the screen. It was easier to see it from six feet away than from two.

So much of what we are interested in as amateur astronomers is at the limit of our vision, especially when we are looking for galaxies and nebulae. It takes patience and a willingness to find rewards in what are at first glance unimpressive views, and that poses a challenge when we try to impart our enthusiasm for the deep sky to newcomers to our avocation. It's a difficult sell. Sometimes I'm sure they think we're crazy for getting excited over a barely visible fuzzy blob. But who knows what serendipitous and subtle observation might throw the switch and make an enthusiast out of a beginner?

Almanac

For April 2012 by Bob Kelly

After Jupiter's flirtation with Venus, he goes back to playing hard to get, slinking lower in the bright twilight after sunset. But Venus will visit the Seven Sisters, the Pleiades, still getting brighter, just past its furthest extend from the Sun last week.

In the meantime, the glory of digital imaging and software are spying strange structures on Mars and clouds clusters on Venus in ultraviolet light.

Apr 6 Apr 13 Apr 21 Apr 29

Let's start off with Venus, grabbing the attention of all kinds of sky watchers, even after the world noticed the startlingly close pass by Jupiter. Hard to believe, but Venus is still getting brighter, with greatest brilliance calculated for the 30th at magnitude minus 4.7. At this brightness, Venus should be quite visible in daylight. I found that it was easier to find Venus in the day when the Moon

was in the sky, even if the Moon wasn't near Venus. Perhaps having the Moon in the sky helps my eyes focus at infinity, which is needed to pick out Venus in a bright sky.

When the weather is good, the WAA does a Starway to Heaven observing night at Ward Pound Ridge on one Saturday night each month. Last month, before sunset, we started off by crowd-sourcing our search for Venus. The younger eyes were successful faster, then the half-Venus was readily apparent in our scope. Next, we jumped to Jupiter, noting its differing dark cloud bands in the twilight telescope view and watching as its four bright moons came out one after the other. It was the classic arrangement of two moons on each side that night that our newcomers will long remember. Even tiny Mars had some details more evident with a little twilight in the sky. Then, as darkness came, our scopes when deeper, with visual and image-intensified views of galaxies and clusters. Comet Garradd, despite my expectations (see last month's column), was a plain fuzzy ball, without the separate dust and gas tails seen in photos. After most of the crowd went home, we took at glance at Saturn, low and fuzzy. Come and join us on the 14th !

You'll need binoculars or a wide-angle view telescope to see the Pleiades when Venus visits from the 1st through the 4th. But observers will enjoy finding this 'hidden' star cluster, looking like a tiny 'dipper' despite the glare from Venus. By the end of the month, Venus will have waned to a crescent, even as its apparent diameter increases from 24 to 37 arc seconds, edging out Jupiter for the largest-looking planet this month. Dedicated Venus observers will be looking for faint cloud clusters seen in digital images last month, and perhaps, the infra-red glow of the 900 degree F surface on the 'dark' side.

Mars has surprised observers with its dark and light patterns and a documented cloud or plume that extended far from the planet's surface. Mars, shrinking past 11 arc seconds, at least will be well placed, high in the sky after sunset. Last month, I was disoriented by the multiple white patches on the edges of the planet – the remainder of the white north polar cap (it's summer there) and the occasional fuzzy cloud patches. Occasionally, the gray rock peeks out from the salmon and white planet. To the casual observer, Mars will dim from magnitude minus 0.8 to an even 0.0, but still be a sight under Leo.

Amateur observers also spotted a supernova near Mars (well, near Mars in the sky) in the galaxy M95. It may have peaked at magnitude 13, but still might get brighter in April.

Saturn will get to be its brightest this month, 'only' getting to magnitude plus 0.2 and 19 arc seconds wide. But its lack of sparkly shine belies its treasure of rings, tilted open 13 degrees toward us.

The morning sky stays dark later, with daylight-time enhanced sunrise after 6am. But only Mercury is peeking just above the horizon in a poor morning apparition opposite of setting Saturn. The thin Moon is just above Mercury on the day of its greatest elongation on the 18th. The lack of moonlight on the 22nd will help fans of the Lyrids meteor shower, high up in the morning hours. While usually peaking at about 20 meteors per hour, they did peak at 90 per hour in 1982. Some Lyrids are very bright with long trains (so I'm told).

The sky keeps giving us great photo ops in April. Venus threads its way between Pleiades and Hyades star clusters from the 6th though the 9th. The Moon poses with Saturn and Spica on the 6th. There's a nice triangle of Moon, Mars and Regulus on the 30th. The same threesome practice their pose as they make a straight line on the 2nd and another triangle on the 3rd. Jupiter is joined by a very thin crescent Moon on the 22nd. Can you get a photo of crescent Moon and crescent Venus on the 24th and 25th?

Our own satellites are visible in the morning and evening twilight, as well. The International Space Station, with a crew of six, is visible many mornings through the 8th, evenings from the 9th through the 28th. The ISS can get as bright as magnitude negative 3.5. The Air Force uncrewed spacecraft X37-B has been in orbit more than a year and is visible at magnitude 2 to 4 in the evenings until the 8th and mornings from the 28th. The Chinese Tiangong 1 station, to be visited by a crew, perhaps in June, is visible at magnitude 0 to 3 in the mornings through the 7th and the evenings from the 11th through the 24th.

Bob Kelly at http://bkellysky.wordpress.com