PRIMEFOCUS

Tri-Valley Stargazers

February 2014

Meeting Info

What:
Live Video Astronomy Demonstration

Who:
Curtis Macchioni

When:
February 21, 2014
Doors open at 7:00 p.m.
Lecture at 7:30 p.m.

Where:
Unitarian Universalist Church in Livermore
1893 N. Vasco Road

Inside

February Meeting

Live Video Astronomy Demonstration

Curtis Macchioni

Video astronomy seems to be gaining in popularity. Maybe we are just getting old and can't see things in the eyepiece like we used too. Maybe we don't want to spend so much time taking frames, stacking and processing. Or maybe it's just the latest fad. Curtis will give a short talk explaining how to get started in video astronomy and showing what one can expect to see. He will show the minimum equipment and setup needed to view objects on a monitor. He will also show what else is needed if one wants to capture some images. And he will make some suggestions on available video cameras from $99 to $1600. Weather permitting, most of the presentation will consist of live demonstrations of both setups. We will look at some nebula, galaxies, and star clusters so you can get a real feel for what you can see in a light polluted environment with a video camera. If the weather does not cooperate, he will bring the equipment and set it up inside for show and tell.

Caption: A 2-minute unguided exposure of M20 using a Mallincam Xtreme Video Camera. Image Credit: Curtis Macchioni

By day Curtis is a Program Manager for Western Digital Corporation leading a group of scientists and engineers in the development of the next generation of computer hard disk drives. He bought his first telescope as a teen, a 2.4" Unitron refractor, which he used to look at the moon and planets in his light polluted back yard in Pittsburgh, PA. He left astronomy behind in high school but returned in 2008 when he join the TVS. In 2010 he bought a video camera and has never gone back to visual observations. He has viewed and imaged all of the Messier Objects with his video camera along with many other Deep-Sky Objects.

News & Notes

2014 TVS Meeting Dates

The following lists the TVS meeting dates for 2014. The lecture meetings are on the third Friday of the month, with the Board meetings on the Monday following the lecture meeting.

Lecture Meeting	**Board Meeting**	Prime Focus **Deadline**
Feb. 21	Feb. 24	
Mar. 21	Mar. 24	Feb. 28
Apr. 18	Apr. 21	Mar. 28
May 16	May 19	Apr. 25
Jun. 20	Jun. 23	May 30
Jul. 18	Jul. 21	Jun. 27
Aug. 15	Aug. 18	Jul. 25
Sep. 19	Sep. 22	Aug. 29
Oct. 17	Oct. 20	Sep. 26
Nov. 21	Nov. 24	Oct. 31
Dec. 19	Dec. 22	Nov. 28

Money Matters

Treasurer Roland Albers indicates that as of February 3, 2014 the TVS checking account balance is:

Checking $12,004.97

The club is paid up for the year for our rent for the meeting hall and for both observing sites (H2O and Del Valle).

Request for Volunteers: Arroyo Seco Elementary School Stargazing, March 5

We have an upcoming outreach program on March 5th at Arroyo Seco Elementary School in Livermore. Our involvement will consist of setting up some telescopes in the playground and letting the students look through them while answering any questions they might have. Since the event is taking place during twilight, viewing will be limited to bright objects like the moon, Jupiter, and the Pleiades. It would be great to have at least two more TVS members volunteer to be there with their telescopes. As the event nears, I'll keep all TVS volunteers updated with any additional details or sudden changes in plans due to weather. Contact Roland Albers, who will act as coordinator for this event, via the TVS Yahoo users group or via his e-mail address in the Officer Block on p.3

Dues Are Due

TVS' membership year runs from January to December, so now is the time to renew your membership. Our membership rates remain unchanged from last year, as do the subscription rates for Astronomy and Sky & Telescope. We no longer offer the "Regular" membership level since we do not send out printed copies of the newsletter. Rather, at the "Basic" membership level we contact you via e-mail to let you know that a .pdf of the newsletter is available. The renewal form can be found on the back of this newsletter or on our website under the Membership link. Please make our Treasurer's New Year especially wonderful by sending in your renewal today.

Magazine Giveaway: Black Friday

TVS has back issues of *S&T* and *Astronomy* magazines freely available. If you are interested in being a recipient of these valuable resources of astronomical history, please make your interest known at a forthcoming club meeting. First come, first serve!

H2O Maintenance: Paint Needed

The H2O Observatory needs a new coat of paint. Please contact the Observatory Director, Chuck Grant, if you can donate two gallons of a neutral exterior paint to ensure the observatory structure remains weather-resistant.

Calendar of Events

February 11, Noon-1:00pm

What: Is Planetary Defense Feasible - DE-STAR: A Planetary Defense and Exploration System
Who: Philip Lubin , UC Santa Barbara
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA
Cost: Free

Dr. Lubin will discuss how his team has proposed an orbital planetary defense system that is capable of beamed power allowing a number of directed energy (DE) possibilities including planetary defense, propulsion allowing relativistic probes and interstellar communications using existing technologies. Recent developments in photonics allow such a system whereas even a decade ago it would have been simply science fiction.

The main objective of DE-STAR would be to use the focused directed energy to raise the surface spot temperature of an asteroid to >3000K, allowing direct evaporation of all known substances. The same system is also capable of propelling spacecraft to relativistic speeds to allow rapid interplanetary travel and relativistic interstellar probes. The baseline system is also capable of propelling a 10^2, 10^3, 10^4 kg spacecraft to 1 AU in 3, 10, 30 days with speeds of about 0.4% the speed of light when used in a "photon rail gun mode".

The same system can also be used for communications out to extremely large distance. For example all the known Kepler planets would see the DE-STAR beacon as the brightest star in the sky (assuming their sky is like ours). The system is also visible at intergalactic distances (Andromeda for example).

Header Image: IC1805, the Heart Nebula. Credit: s58y, CC BY 2.0, via flickr. See: http://creativecommons.org/licenses/by/2.0/deed.en, http://commons.wikimedia.org/wiki/File:IC1805_--_H-alpha_%2B_RGB.jpg#filelinks,http://www.flickr.com/photos/s58y/4144731205/in/photostream/

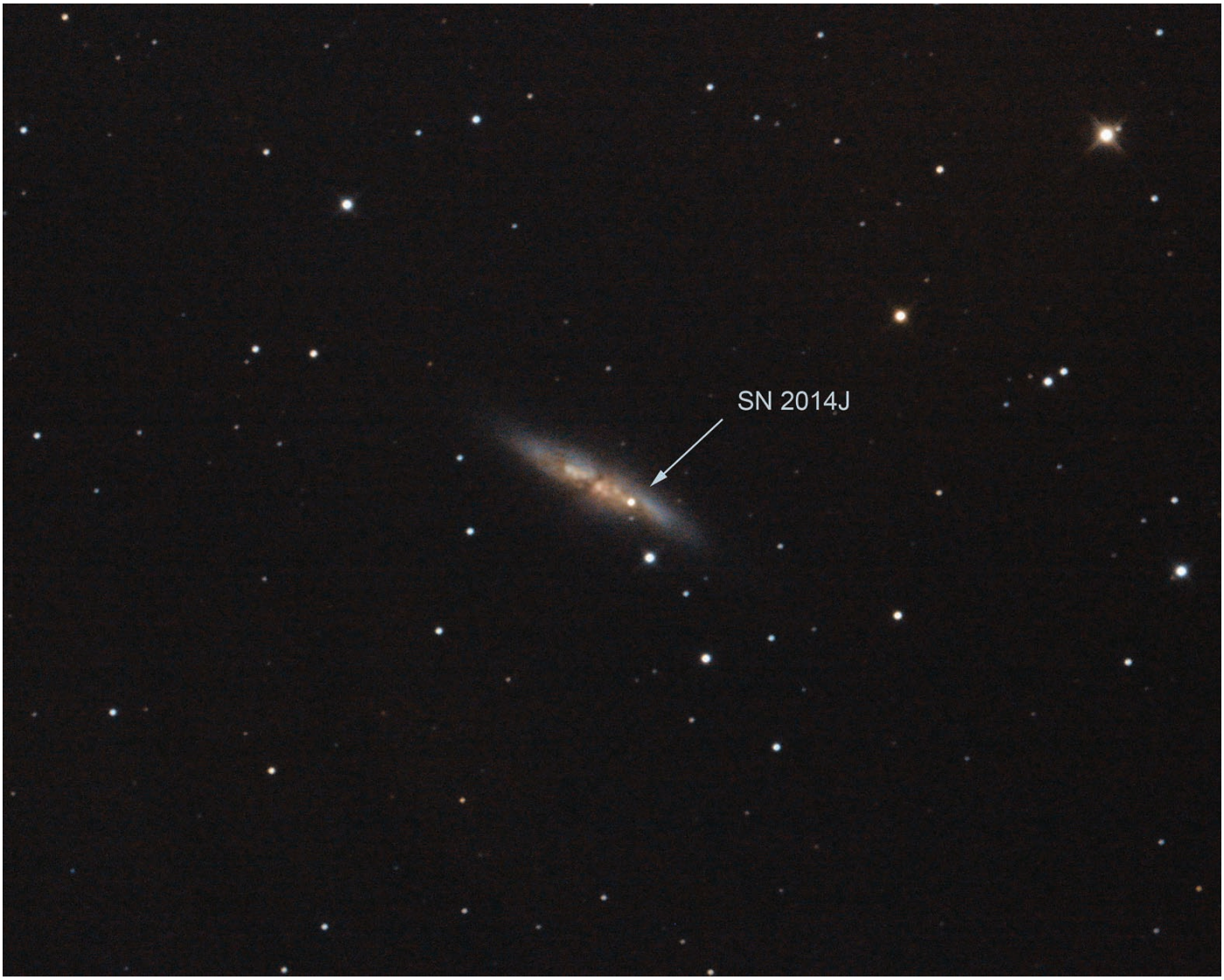

Image Caption: Supernova 2014J, as imaged by Roland Albers on Saturday March 1, 2014 from his backyard in Pleasanton. Roland used an AT6RC astrograph (f/9, 1370mm fl) with AT2FF field flattener and an unmodified Canon T3i DSLR, all sitting atop a Celestron Advanced VX mount and guided with an Orion Mini 50mm guide scope and StarShoot Autoguider. He captured the sub-exposures using BackyardEOS and PHD, and produced the final image from 4 5-minute lights, 10 darks, and 10 flats. He calibrated and stacked the lights using DeepSky Stacker, and processed it using DSS and Photoshop CS5.

Officers

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Laurie Grefsheim

Web & E-mail

www.trivalleystargazers.org

tvs@trivalleystargazers.org

TVS E-Group

So how do you join the TVS e-group, you ask? Just send an e-mail message to the TVS e-mail address (trivalleystargazers@gmail.com) asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

Calendar of Events (continued)

This brings up the question of a visible/ IR SETI search that we will discuss and their implications.

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

February 15, 5:00pm-7:00pm

What: Galileo's 450th Birthday Celebration
Who: You
Where: Chabot Space and Science Center, 10000 Skyline Blvd., Oakland, CA 94619
Cost: Included with General Admission.

Born on February 15, 1564 in Italy, Galileo Galilei was a mathematics professor who is best known for his assertion that the Sun is the center of our solar system, which was quite controversial at the time. He made pioneering observations of nature that have helped to shape our understanding of the universe and developed and improved many astronomical tools. Celebrate his achievements with a fun filled day of making your own discoveries! Use a Gallileoscope and learn how telescopes work. Engineer and pilot your own flying machine marvels, meet Galileo characters and take a glance through our large telescopes.

See http://www.chabotspace.org/events.htm for more information, or call (510) 336-7373.

February 18, Noon-1:00pm

What: Bullet Galaxies and Dark Matter
Who: Marusa Bradac, UC Davis
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA
Cost: Free

One of the greatest accomplishments in recent astrophysics is the creation of a model for the complete inventory of the Universe. All the observational data tells us with extremely high certainty that ordinary matter (every particle ever detected by every person who ever lived) makes up only one fifth of all the matter there is. The rest goes by the popular name of dark matter. Because it is dark, dark matter has been notoriously hard to detect; it doesn't emit or reflect radiation such as light or heat, and it can have only the feeblest of interactions with itself and ordinary matter. So how do we know it is there? In this talk, I will discuss how astronomers observe the invisible matter in one of the true gems on the sky: a giant cluster of galaxies also called the Bullet Cluster..

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

February 22, 7:30pm-8:15pm

What: Jet Propulsion
Who: Saturday Night Space Talks
Where: Chabot Space and Science Center, 10000 Skyline Blvd., Oakland, CA 94619
Cost: Included with General Admission.

With a firm understanding of the basic laws of physics and motion, man has conquered atmospheric flight and space travel. Faride focuses on Sir Isaac Newton's Laws of Motion as it relates to vehicle propulsion systems for aerospace application. There's so much more to what we learned in high school science!

See http://www.chabotspace.org/events.htm for more information, or call (510) 336-7373.

February 25, Noon-1:00pm

What: Studying our Atmosphere at 500 kph: The AJAX Project at NASA Ames
Who: Laura Iraci, NASA Ames Research Center
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA
Cost: Free

Details unavailable.

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

March 3, 7:30pm

What: Going Rogue: Planets Without Parent Stars in the Galaxy
Who: Jacqueline Faherty, Hubble Fellow, Carnegie Institution DTM
Where: California Academy of Science, 55 Music Concourse Dr., Golden Gate Park, San Francisco, CA
Cost: Advanced ticketing required. Academy members $8 , Seniors $10, General $12. Reserve a space online or call 1-877-227-1831.

At the close of 2013, the tally of stars with planets orbiting them toppled more than 1000. The majority of these so-called exoplanets have not been actually "seen" but rather inferred from their effect on the host star. Through painstaking technical methods and tremendous telescope time, a handful can be directly imaged and these giant planets show fascinating diversity in their sizes, temperatures, weather, and relationships to their parent Suns. Over the past several years -- and rather serendipitously -- an entirely new and mysterious breed of "planets" has emerged. Astronomers have discovered a collection of orphans: planets that are moving through the Galaxy seemingly unattached to a star. These so-called free-floating planets are abundant in the Galaxy and vastly easier to study since we do not need to block the light of the exponentially brighter companion in order to get to the precious exoplanet data. In this talk Faherty will highlight how we discovered these seemingly impossible objects and review how these strange, exotic planets may be key players in our understanding of planet formation and evolution.

Calendar of Events (continued)

See http://www.calacademy.org/events/lectures/ for lecture and reservation information

March 4, Noon-1:00pm

What: Refactoring Space Exploration with Soft Ma chines
Who: Vytas SunSprial , NASA Ames Research Center
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA
Cost: Free

To understand how we control motion, we need to understand the physical mechanism being moved. Emerging theories of vertebrate physiology are overturning the traditional bone-centric model of the body in favor of a "tensegrity" model, in which the primary load paths are in the continuous tension network of the soft tissues. In this talk, I will discuss research and development at NASA Ames into dynamic tensegrity robots and how these "soft machines" may be controlled through biologically inspired methods. Along the way, I will talk about how the unique properties of tensegrity robots may enable new methods of planetary landing and exploration.

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

March 8, 7:30pm-8:15pm

What: The Ultimate Camping Trip
Who: Saturday Night Space Talks: Faride Khalaf
Where: Chabot Space and Science Center, 10000 Skyline Blvd., Oakland, CA 94619
Cost: Included with General Admission.

One may compare the characteristics of a great outdoors person to those of an astronaut. Both capable and courageous; Both venturing out into the unknown embarking on a quest for great perspective. What does it take to push the boundaries past Earth and journey into space. Join the conversation with Faride as we talk about what it takes to embark on the Ultimate Camping Trip.

See http://www.chabotspace.org/events.htm for more information, or call (510) 336-7373.

March 11, Noon-1:00pm

What: Pardon our Dust: Infrared Spectroscopy and Interstellar Dust
Who: Jean Chiar
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA
Cost: Free

Interstellar dust grains - small sub-micron-sized particles that pollute the space between the stars - play an important role in the chemistry of the galaxy as well as the star and planet formation process. We glean most information about dust composition in the interstellar medium from infrared spectroscopy. The vibration of molecules making up the dust cause light from a background star to be absorbed at very specific frequencies in the infrared portion of the spectrum. Dust originates in the outflows of old stars and is composed mainly of silicate minerals and carbon particles. In star formation regions, the silicate grains are covered with icy mantles. I will give an overview of the nature of these dust and ice components, with emphasis on our current understanding of the cosmic life cycle of these materials.

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

March 18, Noon-1:00pm

What: Patterns of Sunlight on Extra-Solar Planets
Who: Tony Dobrovolskis, SETI Institute
Where: SETI Headquarters, 189 N. Bernardo Ave., Mountain View, CA
Cost: Free

Exoplanets discovered to date show a wide range of orbital eccentricities; the angles between their spin equators and orbital planes are still quite unknown, but these "obliquities'' may range widely as well. Both eccentricity and obliquity can have profound effects on a planet's seasons, as well as on its cycle of night and day. Remarkable patterns of insolation occur on synchronously-rotating planets, and on those in other spin-orbit states, with implications for their climates, detectability, and habitability.

For more information see: http://www.seti.org/csc/lectures, e-mail info@seti.org, or phone 650-961-6633.

What's Up by Ken Sperber (adapted from S&T and The Year in Space)

All times Pacific Standard Time, until Sunday, March 9, 2am, then Pacific Daylight Time.

February

14	Fri	Full Moon (3:53pm)
16-02	Sun-	Zodiacal light visible in the west from a dark location (80 minutes after sunset)
19	Wed	Spica and Mars to left and above the Moon (Dawn)
22	Sat	Last-Quarter Moon (9:15am)
22	Sat	Saturn to the right of the Moon (Dawn)
26	Wed	The thin crescent Moon and Venus have a spectacular conjunction (Dawn)

March

1	Sat	New Moon (12:00am)
8	Sat	First-Quarter Moon (5:27am)
9	Sun	Daylight Savings Time begins at 2am
16	Sun	Full Moon (10:08am)
17-18	Mon-	Spica and Mars form a triangle with the Moon
18-31	Tue-	Zodiacal light visible in the west from a dark location (80 minutes after sunset)
20	Thu	Spring begins in the N. Hemisphere (9:57am)
21	Fri	Saturn to the right of the Moon
23	Sun	Last-Quarter Moon (6:46pm)
27	Thu	Venus to the lower-right of the crescent Moon
30	Sun	New Moon (11:45am)

Surprising Young Stars in the Oldest Places in the Universe

By Dr. Ethan Siegel

Littered among the stars in our night sky are the famed deep-sky objects. These range from extended spiral and elliptical galaxies millions or even billions of light years away to the star clusters, nebulae, and stellar remnants strewn throughout our own galaxy. But there's an intermediate class of objects, too: the globular star clusters, self-contained clusters of stars found in spherically-distributed halos around each galaxy.

Image Caption: Globular Cluster NGC 6397. Credit: ESA & Francesco Ferraro (Bologna Astronomical Observatory)/ NASA, Hubble Space Telescope, WFPC2.

Back before there were any stars or galaxies in the universe, it was an expanding, cooling sea of matter and radiation containing regions where the matter was slightly more dense in some places than others. While gravity worked to pull more and more matter into these places, the pressure from radiation pushed back, preventing the gravitational collapse of gas clouds below a certain mass. In the young universe, this meant no clouds smaller than around a few hundred thousand times the mass of our Sun could collapse. This coincides with a globular cluster's typical mass, and their stars are some of the oldest in the universe!

These compact, spherical collections of stars are all less than 100 light-years in radius, but typically have around 100,000 stars inside them, making them nearly 100 times denser than our neighborhood of the Milky Way! The vast majority of globular clusters have extremely few heavy elements (heavier than helium), as little as 1% of what we find in our Sun. There's a good reason for this: our Sun is only 4.5 billion years old and has seen many generations of stars live-and-die, while globular clusters (and the stars inside of them) are often over 13 billion years old, or more than 90% the age of the universe! When you look inside one of these cosmic collections, you're looking at some of the oldest stellar swarms in the known universe.

Yet when you look at a high-resolution image of these relics from the early universe, you'll find a sprinkling of hot, massive, apparently young blue stars! Is there a stellar fountain of youth inside? Kind of! These massive stellar swarms are so dense -- especially towards the center -- that mergers, mass siphoning and collisions between stars are quite common. When two long-lived, low-mass stars interact in these ways, they produce a hotter, bluer star that will be much shorter lived, known as a blue straggler star. First discovered by Allan Sandage in 1953, these young-looking stars arise thanks to stellar cannibalism. So enjoy the brightest and bluest stars in these globular clusters, found right alongside the oldest known stars in the universe!

Learn about a recent globular cluster discovery here: http://www.nasa.gov/press/2013/september/hubble-uncovers-largest-known-group-of-star-clusters-clues-to-dark-matter.

Kids can learn more about how stars work by listening to The Space Place's own Dr. Marc: http://spaceplace.nasa.gov/podcasts/en/#stars

Tri-Valley Stargazers
P.O. Box 2476
Livermore, CA 94551

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Tri-Valley Stargazers Membership Application

Member agrees to hold Tri-Valley Stargazers, and any cooperating organizations or landowners, harmless from all claims of liability for any injury or loss sustained at a TVS function.

Name _____ Phone _____ e-mail _____

Address _____

Do not release my: _____ address, _____ phone, or _____ e-mail information to other TVS members.

Membership category:
_____ $5 Student.
_____ $30 Basic. You will receive e-mail notification when the PDF version of Prime Focus is available for download off the TVS web site.
_____ $10 Hidden Hill Observatory (H2O) yearly access fee. You need to be a key holder to access the site.
_____ $20 H2O key holder fee. (A refundable key deposit—key property of TVS).
_____ $40 Patron Membership. Must be a member for at least a year and a key holder.
_____ $34 One year subscription to Astronomy magazine.
_____ $60 Two year subscription to Astronomy magazine.
_____ $32.95 One year subscription to Sky & Telescope magazine. Note: Subscription to S&T is for new subscribers only. Existing subscribers please renew directly through S&T.
$ _____ Tax deductible contribution to Tri-Valley Stargazers.

$ _____ TOTAL – Return to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551

Membership information: Term is one calendar year, January through December. Student members must be less than 18 years old or still in high school.