Tri-Valley Stargazers

November 2021

PrimeFocus

Introduction to Modern Narrowband Filters[1]
Coloring with Narrowband Images Using Pixel Math[2]
Dr. Gert Gottschalk[1] and Dr. Kai Yung[2]

[1]Introduction to Modern Narrowband filters: Amateur astronomers in light polluted areas, like our region in northern California, use filters to reduce the effect of light pollution and give better visual and photographic impressions for certain classes of objects. The first part of this presentation will introduce the audience to what types of light pollution we face and the types of filters that have been developed for various visual and photographic applications. We will introduce the relatively new development of narrowband filters with multiple pass bands and how these filters are used mainly in astrophotography.

[2]Coloring with Narrowband Images using Pixel Math: Practitioners of astrophotography usually are rigorous, who try to reproduce images that mimic closely to what humans would have seen if they had perfect vision and no atmospheric distortions. With narrowband images, however, it is often acceptable and encouraged to playfully combine the color channels to arrive at compelling artworks that are still based on the physics of star creation and destruction.

The main challenge with narrowband image processing is how vastly different the magnitude of signal we can detect from the different bands, where the black body emission from stars overwhelms the H-alpha ones, which overwhelms the OIII or SII. To arrive at a color-balanced final image that is relatively noise free, but yet can be acquired with a non-professional setup within a reasonable amount of time, many processing techniques were developed. Today, we will focus on using Pixinsight's powerful and flexible Pixel Math process (along with other supporting modules).

We will first show how to create a color image from a single channel (typically Ha), 2 channels (e.g., HOO) and 3 channels (e.g., SHO or HSO). Followed by how to add narrowband data to RGB images. We will then demonstrate techniques to improve the color and detail using relatively simple Pixel Math expressions. We will finally deep dive into the more exotic pixel math expressions that we sometimes see referenced in others' works, and try to explain the logic and reason behind them.

Biographies

[1]Gert Gottschalk received his masters in physics and Ph.D. in electrical engineering from the university of Berlin, Germany focusing on semiconductors and microelectronics chip design. He is working in the software industry specializing in CAD tools for electronics system design. Gert has been an amateur astronomer and telescope maker since 1978 and has been a TVS member since 1998.

[2]Kai Yung received his B.A. in Physics and C.S. from Williams College, and M.S. and Ph.D. in Applied Science at LLNL. His career touched on Biotech-Genomics, Software Architecture, Social Networking, Machine Learning, Computer Vision, and Robotics.

WHEN:

November 19, 2021
Meeting at 7:30pm
Lecture at 8:00pm

WHERE:

Virtual Meeting using Zoom
See the April 2020 issue of PrimeFocus for info on getting connected using Zoom

TVS QR Code

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News and Notes

2021-2022 Meeting Dates

Lecture Meeting	Board Meeting	PrimeFocus Deadline
Nov. 19	Nov. 22	
Dec. 17	Dec. 20	Dec. 3
Jan.21	Jan. 24	Jan. 7
Feb. 18	Feb. 21	Feb. 4
Mar. 18	Mar. 21	Mar. 4
Apr. 15	Apr. 18	Apr. 1
May 20	May 23	May 6
Jun. 17	Jun. 20	Jun. 3
Jul. 15	Jul. 18	Jul. 1
Aug. 19	Aug. 22	Aug. 5
Sep. 16	Sep.19	Sep. 2
Oct. 21	Oct. 24	Oct. 7
Nov. 18	Nov. 21	Nov. 4
Dec. 16	Dec. 19	Dec. 2

TVS Election Nominations

The annual election of club officers will occur during the November club meeting. The nominations are:
President: Ron Kane
Vice President: Eric Dueltgen
Treasurer: John Forrest
Secretary: Ross Gaunt

Money Matters

As of the last Treasurer's Report on 10/18/21, our club's account balance is $63,326.86. This includes $43.102.14 in the H2O Rebuild fund.

TVS Welcomes New Members

TVS welcomes new members Bill Drelling, Michael Freitas, Prasad Hardas, Suni Mudunuri, Rajanikanth Srinivasagopalan, and Asim, Tahir. Please say hello and chat with them during our Zoom meetings.

Time to Renew Club Membership for 2022

Now is a great time to become part of TVS. Membership is open to anyone with an interest in astronomy. Amateurs and professionals are equally welcome; skilled amateurs comprise the majority of the membership. You do not have to own a telescope in order to be a member.

Those renewing their club membership are encouraged to do so by using the online application before the end of December. Normally our memberships are only good for the calendar year, but anyone joining after October 1st will be given a membership for the remainder of 2021 and all of 2022.

The regular club membership remains a bargain at $30. Student membership (full-time High School or College student) is only $10! To become a key holder to H2O, you must be 18 or older. There is a one-time $20 Key deposit and a $10 annual access fee.

You can join TVS or renew your membership online at: http://www.trivalleystargazers.org/membership.shtml After filling out the application form you are connected to the PayPal payment form. You do not need to have a PayPal account to pay online, since PayPal will accept credit cards. Everyone is encouraged to use the online application. Alternatively, you can mail in the Membership Application on the last page of this newsletter along with a check to the Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551-2476. Note that TVS will not share your information with anyone. We only use the e-mail address to notify you when the newsletter becomes available.

All members agree to hold the 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

H2O and Del Valle Observing Sites Reopened

The Del Valle and Hidden Hill Observatory sites have reopened for observing by those who have paid their 2021 TVS Membership dues and are approved key holders.

As of June 15, California state guidance on COVID-19 indicates that use of masks is not required for **outdoor** activities. However, common sense dictates that club members and guests

*Do not use either observing site if you are not feeling well or suspect you were recently exposed to the virus

*You use each observing site at your own risk and agree to hold the club and the landowners free of all liability

*H2O users should wear a mask while at the landowner's home depositing the daily usage fee

*H2O keyholders who wish to use the Quick Dome should first contact Ross Gaunt (secretary"at"trivalleystargazers.org) to reserve it for individual use for the day

Ross Gaunt, our club secretary, emailed the updated lock combinations and usage instructions for each site to all H2O key holders and all Del Valle registered users. If you are a H2O key holder or Del Valle registered user and didn't get Ross's email, please let Ron (president"at"trivalleystargazers.org) or Ross know and we'll straighten it out.

Calendar of Events

November 12-14, Extended Hours

What: Chabot Observatory Reopening Weekend

Calendar of Events (con't)

Celebration
Who: NASA Ames Research Center Scientists, Piedmont Children's Choir
Where: Chabot Space and Science Center, 10000 Skyline Blvd. Oakland, CA 94619
Cost: Adults $24; Youth (2-12), Senior, Student $19

We're kicking off Chabot's reopening with a three-day Center-wide celebration! This exciting weekend features scientists from NASA's Ames Research Center and their captivating work, as well as performances by the Piedmont Children's Choir, drop-in workshops with community partners, space-themed collaborative builds, robotics demonstrations by teen Galaxy Explorers and more.

We ask that all visitors over the age of 2 wear a mask during their visit in all indoor and outdoor spaces, regardless of vaccination status. Additionally, we ask visitors to wash their hands, make space for others when exploring and stay home if sick within 14 days of their visit.

For more information, see:
https://chabotspace.org/events/events-listing/

November 13, 20, 27, Dec. 4, 11, 9:00pm-10:30pm

What: Virtual Telescope Viewing
Who: Chabot Staff
Sponsor: Chabot Space and Science Center
Online: https://www.youtube.com/c/ChabotSpace

Join our resident astronomers on Facebook Live and YouTube every Saturday evening live from Chabot's Observation deck!

Each week, our astronomers will guide us through spectacular night sky viewing through Nellie, Chabot's most powerful telescope. Weather permitting, we will be able to view objects live through the telescopes and our astronomers will be available for an open forum for all of your most pressing astronomy questions.

Nellie is a 36-inch reflector telescope, housed in a rolling roof observatory that allows access to 180 degrees of sky. This modern, research-quality telescope offers breathtaking views of the cosmos.

For more information, see:
https://chabotspace.org/events/events-listing/

November 17, 3:30pm

What: The Hawaii Webb Space Telescope Connection: Developing JWST's Infrared Eyes
Who: Prof. Klaus Hodapp (IfA) and Shane Jacobsen (IfA)
Sponsor: University of Hawaii, IfA
Online: www.youtube.com/user/UHIfA or https://us06web.zoom.us/j/83209497848

A free virtual public talk on how the upcoming James Webb Space Telescope's (JWST) infrared sensosr were developed right here in Hawai'i, at the UH Institute for Astronomy. Hear the story directly from those who helped make these amazing detectors possible!

For more information, see: http://www.ifa.hawaii.edu/

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Officers

President
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info@trivalleystargazers.org

TVS E-Group
To join the TVS e-group just send an email message to TVS at: info@trivalleystargazers.org 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 (con't)

November 17, 7:00pm

What: UAP's: Are They Worth Scientific Attention?
Who: Dr. Jacob Haqq Misra (SETI) and Dr. Ravi Kopparapu (NASA Goddard Space Flight Center)
Sponsor: SETI Institute
Online: REGISTRATION REQUIRED
https://www.eventbrite.com/e/uaps-are-they-worth-scientific-attention-tickets-203255872787

In June of this year, an unclassified version of the U.S. Department of Defense released its preliminary report on unidentified aerial phenomena (UAP). The report cataloged and investigated records of unexplained encounters seen in the sky by U.S. Navy ships and fighter jets. The report's firmest conclusion is that the vast majority of UAPs do represent physical objects, and their surprising maneuvers are not caused by any U.S. advanced technology programs. Nor are they evidence that those objects came from outer space. So, what are they?

Recent UAP sightings have so far failed to generate interest among the scientific community. Part of the reason could be the apparent taboo around UAP phenomena, connecting it to the paranormal or pseudoscience while ignoring its history. Should scientists care about these events? Why should we care? All good questions, and rightly so.

For more information, see: https://www.seti.org/talks

November 17, 7:00pm

What: Postcards from Mars: The Latest From the International Armada of Robot Explorers
Who: Dr. Jim Bell (Arizona State University)
Sponsor: Foothill College
Online: www.youtube.com/user/SVAstronomyLectures

No details available.

For more information, see: https://foothill.edu/astronomy/

November 18, 7:00am-3:00pm (That's Right!!!)

What: Earth at the Crossroads: Can the Study of Other Worlds Help Us Save This One?
Who: Dr. Jill Tarter (SETI), Dr. David Greenspoon (Planetary Science Institute), and 16 others
Sponsor: SETI Institute
Online: REGISTRATION REQUIRED
https://www.eventbrite.com/e/earth-at-the-crossroads-tickets-206084352847

Tantalizing new discoveries suggest that we are probably not alone in the universe. And yet, as Enrico Fermi first put in 1950: *where is everybody?* Are habitable worlds rare, unlikely, and therefore cosmically precious? Or is life easily overwhelmed by changing planetary conditions? Do technological societies in particular face an inevitable "Great Filter" that causes their extinction? These questions link the search for extraterrestrial life to the urgent environmental challenges facing our own civilization, from deadly pandemics to human-caused climate change. On November 18th, Georgetown University and the SETI Institute will unite scholars, journalists, artists and activists in conversations that explore what the search for alien life may reveal about the future of life on Earth. These conversations will be open to Georgetown students and will be broadcast to the public. They will culminate in a roundtable debate intended to draft a proclamation on the state of Earth's environment and its future potential in a cosmic context.

Panel Discussions:

- A Planetary Perspective: Meet the L Variable
- Habitability at Home
- Habitability in the Solar System
- Habitability Beyond
- Habitability at Home Redux

For more information, see: https://www.seti.org/talks

November 26, 9:00am-11:00am

What: Searching for Extraterrestrial Intelligence Across a Century
Who: Prof. Lord Martin Rees OM FRS (UK Astronomer Royal), Dr. Jill Tarter (SETI), Dr. Andrew Siemion (UC Berkeley), and Prof. Tong-Jie Zhang (Beijing Normal University)
Sponsor: SETI Institute
Online: REGISTRATION REQUIRED
https://www.stx.ox.ac.uk/event/happ-discussion-panel-searching-for-extraterrestrial-intelligence-across-a-century

A discussion panel will discuss the history and future of "Searching for Extraterrestrial Intelligence Across a Century".

Programme:
Session Chair: Professor Sara Seager OC (MIT)
Times are GMT

17:00 Welcome and Introductions
17:05 Professor Lord Martin Rees OM FRS
17:25 Dr. Jill Tarter
17:45 Dr. Andrew Siemion
18:05 Professor Tong-Jie Zhang
18:25 Panel Discussion
18:45 Q&A
19:00 Close

The confirmed discussants are:
Professor Paul Davies (Arizona State University)
Professor Donald Brownlee (University of Washington)
Professor G.C. Anupama (Indian Institute of Astrophysics)

For more information, see: https://www.seti.org/talks

TVS Astrophotos

Caption: Gert Gottschalk imaged a massive solar prominence on October 29, 2021. He obtained 76 AVI recordings between 18:36UT to 19:20UT to create a movie of the time evolution of the above prominence:
https://www.skywatcher.space/sun_2021/Sun_20211029_1835_r12.mp4
Each AVI has 2000 frames of 1024 x 1024 pixel resolution using an exposure of 6.531ms. There was a 20sec pause between frames in the automatic recording in FireCapture. Due to slight variations in storage access the duration of a recording might vary slightly, so it is hard to say at what cadence the frames were recorded.

Processing:

1. Autostakkert!2.6 & Registax6
2. Photoshop batch process (action) enlarging frames with black background to account for later cropping. Then frames to a convenient orientation.
3. Photoshop action to roughly manually align frames in batches. The guiding had slipped during the time period and I had to move images around a bit.
4. Photoshop crop to pre-final size
5. Python script with numpy routines to final align frames. This shuffles frames around a bit and another round of crop is needed.
6. Final crop and mp4 creation with ffmpeg.

For more details on Gert's timelapse imaging and processing, see his presentation to the TVS Astrophotography Group:
Gert's TVS AP Presentation

What's Up By Ken Sperber (adapted from S&T)

All times are Pacific Standard Time

November

14	Sun	Algol at minimum brightness for 2 hours centered on 9:36pm
17	Wed	The Leonid Meteor shower is hampered by the nearly Full Moon (Morning)
17	Wed	Algol at minimum brightness for 2 hours centered on 6:25pm
18-19	Thu-	ALMOST Total Lunar Eclipse (97%): Partial umbral phase begins at 11:18pm on the 18th, greatest eclipse Occurs at 1:03am on the 19th, exiting the umbra at 2:47am. Near maximum eclipse, the disk color could be yellow-orange or even ruddy brown. For more details, see November S&T, p.48
19	**Fri**	**Full Moon (0:57am)**
19	Fri	The Moon rises, being located between the Pleiades and the Hyades (Dusk)
23	Tue	The Moon is ~3° from Pollux (Evening)
24	Wed	The Moon is ~3° from M44, the Beehive Cluster (Evening)
27	**Sat**	**Last-Quarter Moon (4:28am)**
27	Sat	The Moon is ~5° from Regulus in Leo (Dawn)

December

1	Wed	All month, Jupiter, Saturn, and Venus form a line above the south-southwestern horizon (Dusk)
3	**Fri**	**New Moon (11:43pm)**
4	Sat	Algol at minimum brightness for 2 hours centered on 11:49pm
6	Mon	The two-day old Moon hangs 2.5° below Venus in the southwest (Dusk)
7	Tue	The crescent Moon hangs 5.5° below Saturn (Dusk)
7	Tue	Algol at minimum brightness for 2 hours centered on 8:38pm
8	Wed	The Moon, Jupiter, and Saturn form a triangle (Dusk)
10	**Fri**	**First-Quarter Moon (5:36pm)**
14	Tue	The Geminid Meteor Shower peaks in the early morning hours. The Moon sets at about 3am.
16	Thu	The nearly Full Moon is situated between the Pleiades and the Hyades (Evening)
18	**Sat**	**Full Moon (8:35pm)**
21	Tue	The Moon is ~3° from Pollux in the west (Dawn)
22	Wed	The Moon is ~3° from M44, the Beehive Cluster in the west-southwest (Dawn)
26	**Sun**	**Last-Quarter Moon (6:24pm)**
27	Mon	Algol at minimum brightness for 2 hours centered on 10:22pm
28	Tue	The Moon is ~4.5° from Spica in the south-southeast (Dawn)
29	Wed	Mercury and Venus adorn the southwest horizon; binoculars suggested (Dusk)
31	Fri	The crescent Moon, Mars, and Antares form an equilateral triangle in the southeast (Dawn)

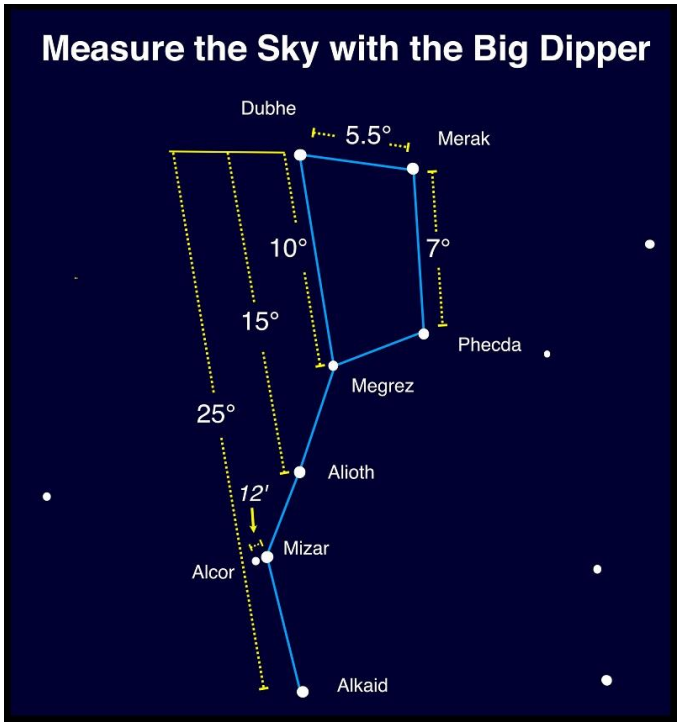
Measure the Night Sky

By David Prosper

Fall and winter months bring longer nights, and with these earlier evenings, even the youngest astronomers can get stargazing. One of the handiest things you can teach a new astronomer is how to measure the sky – and if you haven't yet learned yourself, it's easier than you think!

Astronomers measure the sky using degrees, minutes, and seconds as units. These may sound more like terms for measuring time - and that's a good catch! – but today we are focused on measuring ***angular distance***. **Degrees** are largest, and are each made up of 60 **minutes**, and each minute is made up of 60 **seconds**. To start, go outside and imagine yourself in the center of a massive sphere, with yourself at the center, extending out to the stars: appropriately enough, this is called the **celestial sphere**. A circle contains 360 degrees, so if you have a good view of the horizon all around you, you can slowly spin around exactly once to see what 360 degrees looks like, since you are in effect drawing a circle from inside out, with yourself at the center! Now break up that circle into quarters, starting from due North; each quarter measures 90 degrees, equal to the distance between each cardinal direction! It measures 90 degrees between due North and due East, and a full 180 degrees along the horizon between due North and due South. Now, switch from a horizontal circle to a vertical one, extending above and below your head. Look straight above your head: this point is called the *zenith*, the highest point in the sky. Now look down toward the horizon; it measures 90 degrees from the zenith to the horizon. You now have some basic measurements for your sky.

Use a combination of your fingers held at arm's length, along with notable objects in the night sky, to make smaller measurements. A full Moon measures about half a degree in width - or 1/2 of your pinky finger, since each pinky measures 1 degree. The three stars of Orion's Belt create a line about 3 degrees long. The famed "Dig Dipper" asterism is a great reference for Northern Hemisphere observers, since it's circumpolar and visible all night for many. The Dipper's "Pointer Stars," Dubhe and Merak, have 5.5 degrees between them - roughly three middle fingers wide. The entire asterism stretches 25 degrees from Dubhe to Alkaid - roughly the space between your outstretched thumb and pinky. On the other end of the scale, can you split Mizar and Alcor? They are separated by 12 *arc minutes* - about 1/5 the width of your pinky.



Keep practicing to build advanced star-hopping skills. How far away is Polaris from the pointer stars of the Big Dipper? Between Spica and Arcturus? Missions like Gaia and Hipparcos measure tiny differences in the angular distance between stars, at an extremely fine level. Precise measurement of the heavens is known as ***astrometry***. Discover more about how we measure the universe, and the missions that do so, at nasa.gov.

This article is distributed by the NASA Night Sky Network, a coalition of hundreds of astronomy clubs across the US dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, stargazing info and more.

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

Tri-Valley Stargazers Membership Application

Contact information:

Name: _____ Phone: _____

Street Address: _____

City, State, Zip: _____

Email Address: _____

Status (select one): _____ New member _____ Renewing or returning member

Membership category (select one): Membership term is for one calendar year, January through December.

_____ Student member ($10). Must be a full-time high-school or college student.

_____ Regular member ($30).

Hidden Hill Observatory Access (optional): Must be 18 or older.

_____ One-time key deposit ($20). This is a refundable deposit for a key to H2O. New key holders must first hear an orientation lecture and sign a usage agreement form before using the observing site.

_____ Annual access fee ($10). You must also be a key holder to access the site.

Donation (optional):

_____ Tax-deductible contribution to Tri-Valley Stargazers

Total enclosed: $ _____

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. TVS will not share information with anyone except as detailed in our Privacy Policy (http://www.trivalleystargazers.org/privacy.shtml).

Mail this completed form along with a check to: Tri-Valley Stargazers, P.O. Box 2476, Livermore, CA 94551.