

PRIMEFOCUS

Tri-Valley Stargazers

November 2002



Meeting Info:

What

Adaptive Optics

Who

Deanna Pennington

When

November 15, 2002
Conversation at 7:00 p.m.
Lecture at 7:30 p.m.

Where

Unitarian Universalist
Church in Livermore
1893 N. Vasco Road

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November Meeting

Adaptive Optics

Deanna Pennington

Earth's atmosphere is a pesky thing for astronomers trying to view the heavens. The Lawrence Livermore Lab decided to do something about it. They developed adaptive optics, a system that measures the distortions from a light in the sky (either a star or a laser guide star), then compensates for the distortions using a deformable mirror that adjusts several hundred times per second.

The laser guide star was also developed at the Lab. Adaptive optics require the use of a bright guide star, but often one does not appear near the target object. An artificial star is created by projecting light from a dye laser on a layer of sodium atoms in the atmosphere 55 to 62 miles above the Earth.

Adaptive optics have allowed astronomers to detect all manner of things. The rings around Uranus became visible to a ground-based scope for the first time. Tiny cloud features on Uranus have also been observed, as well as a methane haze over the south polar cap. Storms on Neptune, with wind speeds reaching more than 1,000 miles per hour, have been observed. Keck photographed a protoplanetary disk envelope surrounding a young star in the Trapezium region of the Orion nebula, giving hope that the first extrasolar system planet will be imaged with the help of adaptive optics.

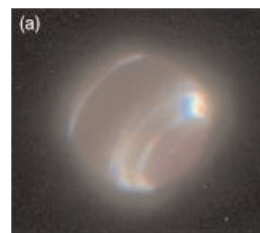
Our speaker for tonight served as the laser guide star project leader at both Lick and Keck Observatories.



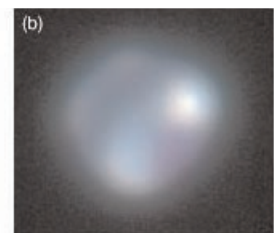
The Keck II telescope's "first light" using the laser guide star, December 23, 2001.



Protoplanetary disk surrounding a star in the Trapezium in Orion.



(a) Neptune as seen by Keck using adaptive optics.



(b) Neptune as seen by Keck without adaptive optics.

News & Notes

New Members

Welcome to our new members **Jim Nocar & Family**. Please say hello to them at the next meeting.

And a very big welcome to two future astronomers: TVS member **Alan Gorski** and his wife **Dascha** are the proud parents of twins – **Carl Patrick** and **John Robert**, born August 12. Congratulations!

2002 TVS Meeting Dates

Below are the remaining meeting dates for 2002. The lecture meetings are held on the third Friday of the month, with the Board meeting on the Monday following the lecture meeting. The *Prime Focus* deadline applies to that month's issue (e.g., the December 8th deadline is for the December issue).

Lecture Meeting	Board Meeting	Prime Focus Deadline
Nov. 15	Nov. 18	Nov. 3
Dec. 20	Dec. 16	Dec. 8
Jan. 17	Jan. 20	Jan. 5

Our December meeting is our Winter Solstice Potluck.

Money Matters

At the October Board meeting, Treasurer **Mike Anderson** reported the balances (as of October 21, 2002) of the following TVS accounts:

Checking	\$841.66	
CD #1	\$3,882.06	matures 11/17/02
CD #3	\$2,395.77	matures 11/27/02
CD #4	\$2,046.71	matures 01/16/03

Membership Renewal Time

We're one month into our drive for membership renewals. For those who subscribe to *Sky & Telescope* or *Astronomy* magazine through the club, it's better to renew early so that your magazine subscription continues without a gap.

We've had to increase our dues this year due to additional expenses added to our yearly budget over the years, such as club insurance and newsletter printing.

We've changed the dues categories as well. We've kept the Student category at \$5 a year, but have replaced the Individual and Family categories with Basic at \$25 and Regular at \$30. The only difference between the two is that the Basic membership will access the newsletter online, the Regular membership will get a paper version mailed to them.

For the few of you who are Patron Members, your Patron status will be renewed automatically. At this time, since the

Marling scope is still unoperative, we will not be collecting a Patron Membership fee. In the meantime, we will be placing one of the club's 10" dobs in the Sky Shack for Patron (and Open House star party) use.

TVS Elections This Month

We encourage every member to attend the November meeting, not only to hear Dee Pennington's talk, but to vote for the TVS Officer slate for next year. Our current Vice-President, **Gary Steinhour**, has decided to run for the position of Treasurer, which means we now have an opening for Vice-President. The other officers plan on running for their positions again, but probably wouldn't mind if someone else wanted to take over. Anyone that is interested in running for office is encouraged to do so.

The elected positions are:

President

The President conducts the lecture and board meetings, and is responsible for getting everything done (usually by delegating it to others).

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Calendar of Events

Classic Sci-Fi Film Series Chabot Space & Science Center

The movies are shown at the Tien MegaDome Theater. Tickets are \$5 per person and are available at the door, at TicketWeb.com, or the Chabot Box Office, 510-336-7373.

Movies:

2001: A Space Odyssey, December 6 – 8

Showtimes:

Friday – Sunday on the first weekend of each month.

Fridays – 7:30 p.m.

Saturdays – 4:00 & 7:30 p.m.

Sundays – 4:00 p.m.

Newsletter header image: M45, the Pleiades (a.k.a. The Seven Sisters) in Taurus. The Pleiades is a very pretty example of a reflection nebula, best viewed with the naked eye or binoculars. The nebula is illuminated by the young stars within it. The cluster and nebula are about 400 light years away.

Photo taken with a 4" Takahashi with f/5.9 focal reducer, IDAS light pollution filter, and hypered Kodak Supra 400. October 5, 2002, 1:18 a.m.–2:48 a.m.

Photo by TVSer Ken Sperber.

Calendar of Events *continued*

November 10, 1:00 p.m.

What: *SJAA 2002 Fall Swap Meet*

Who: San Jose Astronomical Association

Where: Houge Park in San Jose.

Cost: Free

Telescopes, eyepieces, mountings, mirrors, lenses, clock drives, books, camera equipment, star charts, finders, tubes, diagonals, photographs, space art – everything you need to make your hobby more enjoyable. You name it – it's likely to be there! Check your garage and closets for anything astronomical you would like to sell. Anyone can buy and sell! It's fun and easy! This is the second year for the swap, which is a follow-up to the Spring Auction that has been run for some years. There is no auction, just the swap sale. Get your holiday shopping done early this year!

Joe Sunseri of Earth and Sky Adventures is expected to be there with many fine new and used items (www.astrosales.com).

Doors open at 12:30 p.m. to set up tables and bring in material for sale. Selling will begin at 1 p.m., and will run as long as needed (probably 3 p.m.). Each buyer pays the seller. Sellers are to keep track of their sales and pay 10% commission (fully tax deductible), with a cap of \$50 for any one item, \$500 maximum per seller. There are no table fees. Please bring items that would interest the astronomical audience such as astronomical stuff, science items, and tech items. The SJAA reserves the right to turn away inappropriate items for the swap.

Do you have a large item to sell, such as a telescope? Please email swap@sjaa.net with a description and a photo of the item or a link to your own web site for some pre-swap publicity.

For more Information and directions, visit our web site at www.sjaa.net or www.sjaa.net/swap.html.

November 12, 7:30 p.m.

What: *A Heretic's Approach to Solar System Formation*

Who: Dr. Alan Boss (Carnegie Institute of Washington)

Where: Morrison Planetarium, S.F.

Cost: \$3.00. Purchase in advance of lecture date recommended.

Did our Solar System's giant planets form slowly by planetesimal collisions in a quiet, dark cloud? Or did they form rapidly through a gas disk instability in a region of massive star formation?

Make checks payable to Morrison Planetarium. Send self addressed stamped envelope and check to:

Dean Lecture Series, Morrison Planetarium
California Academy of Sciences
Golden Gate Park
San Francisco, CA 94118

November 13, 7:00 p.m.

What: *A Personal View of the Big Bang*

Who: Dr. Arno Penzias

Where: Smithwick Theater at Foothill College, Los Altos

Cost: Free

Silicon Valley Astronomy Lecture Series presents a non-technical illustrated talk in the Smithwick Theater at Foothill College (El Monte Road and Hwy 280 in the Los Altos Hills).

In this rare public appearance discussing the work that earned him the 1978 Nobel Prize in Physics, Dr. Penzias will describe how he and Robert Wilson used a sensitive

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Officers

President:

Chuck Grant
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Treasurer:

Mike Anderson
andersonm@prodigy.net

Secretary:

Maggie Halberg
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Board of Directors

Alane Alchorn, Jim Alves, Dave Anderson, Dennis Beckley, Paul Caswell, Rich Combs, Debbie Dyke, Gert Gottschalk, Kathleen

Kelley, Signe McIntire, Dave Rodrigues, Frank Rogue, Mike Rushford, Debbie Scherrer, John Swenson, Norm Thomas, Phil Waide

Volunteer Positions

Librarian:

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925-461-3003

Program Director: unfilled

Loaner Scope Manager:

John Swenson
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Webmaster:

Chuck Grant

Observatory Director/

Key Master:

Chuck Grant

School Star Party Chair:

Rich Green (unofficially)
richgreen@pacbell.net
925-449-2190

Public Star Party Chair:

Roger Gathers
925-846-1525

Historians:

Paul Caswell & Debbie Dyke

Addresses

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

Lecture Meeting:

Unitarian Universalist Church
1893 N. Vasco Road, Livermore

Board Meeting:

Round Table Pizza
1024 E. Stanley Blvd., Livermore

Web & E-mail

www.trivalleystargazers.org

tvst@trivalleystargazers.org

Eyes on the Skies

Eyes on the Skies is a robotic solar telescope run by Mike Rushford (rushford@eyes-on-the-skies.org). You may access it by visiting www.eyes-on-the-skies.org.

News & Notes *continued*

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Vice President

The Vice President does the President's job when the President is unavailable.

Secretary

The Secretary takes the minutes at the board meetings and takes care of general correspondence.

Treasurer

The Treasurer handles the memberships and reimbursements, maintains the financial records, prepares the club's budget, pays the rent and insurance. The Treasurer also works with the newsletter editor by providing the mailing label file and sending out the *Prime Focus* e-mail notification messages each month.

Board of Directors

The following people are candidates for the 2003 Board of Directors. If you'd like to be on the Board, let any TVS officer know and we'll add you to the ballot list.

Alane Alchorn
Jim Alves
Mike Anderson
Paul Caswell
Debbie Dyke
Gert Gottschalk
Signe McIntire
Frank Rogue
Mike Rushford
John Swenson

All these positions (Officer & Board) require attendance at the majority of the board meetings.

We're also looking for someone to fill the volunteer position of Program Director. The Program Director is responsible for getting speakers for our monthly lectures.

Miscellaneous Bits of News

At the October meeting, the demise of Lumicon, and with it the demise of being able to buy hypered film off the shelf, was discussed. A suggestion was made that perhaps there might be a TVS member with a hypering kit that would be willing to hyper film for other members. If you are interested in performing that task, let any club officer or board member know.

TVS has placed orders for the RASC Observer's Handbook and their Calendar. We're not sure if they'll arrive in time for the November meeting, but they'll definitely be available for purchase at the December meeting. The Handbook is \$15, the Calendar \$10. If you'd like more information about these items, visit the RASC web site at www.rasc.ca and click on the 'Publications' link.

A Visit to the James Clerk Maxwell Telescope

In October Gert Gottschalk and his girlfriend Sibylle Fröhlich took a little trip to Hawaii. Here is Gert's report on their visit to the James Clerk Maxwell Telescope (JCMT).

The JCMT currently is the largest Radio telescope dedicated to millimeter and sub-millimeter radio astronomy. The range of frequencies covered extends from 0.3mm to about 2mm. The receiver dish has a diameter of 15m and consists of 276 individually adjustable aluminum panels that give it the near perfect parabola shape needed to image the sky in radio waves. The dish is supported by a massive truss support structure that minimizes flexure of the dish when moving across the sky. The moving mass of the telescope is about 70 tons which is tracking the sky in sub arc second accuracy.



The James Clerk Maxwell Telescope on top of Mauna Kea in Hawaii. *G. Gottschalk*



The whole dish.

S. Fröhlich

transparent in the radio spectrum and does not interfere with observations. So the telescope is conveniently protected from wind, rain and dust. It also allows observations very close to the sun or the sun itself. Otherwise the sun would be reflected from the dish and burn the receiver electronics.

The telescope mounting is structurally separate from the telescope dome. There is a yellow line on the ground that marks the gap. This prevents vibrations from movements

The protective Gore-Tex membrane curves around the telescope on the left. *S. Fröhlich*



News & Notes *continued*

of the dome as from wind loads to be transferred to the telescope which is held perfectly pointed to the celestial object under study.



The yellow line on the ground marks the gap between the telescope and the building. Sibylle is standing to the left. *G. Gottschalk*

Each of the radio windows in the atmosphere is matched with a dedicated receiver. As the signals from space are in a spectral range where the heat of the telescope itself contributes to background noise, special techniques are

necessary to detect the signals. At first the detectors itself are cooled to nearly absolute zero using liquid helium. Next, the telescope's secondary mirror can quickly switch between the object under study and nearby blank sky. The difference is then the desired signal from the object.

Object of interest in the mm and sub-mm radio astronomy are mostly interstellar dust and molecules.

We would like to thank Bernd Weferling from JCMT for the very special guided tour.



From Brobdingnag to Lilliput: My Travels Through 30 Years of the Space Program

By Diane K. Fisher

In the early 70s, as minor character in the Apollo Program, I worked in the Vehicle Assembly Building at KSC. Stepping into the VAB, I felt like the incredible shrinking woman. The space inside accommodated six 45-story office towers with vast open spaces to spare. In the vertical spaces between the office towers, the 363-foot high Saturn Vs were assembled.

From my third floor office in one tower, I often delivered documents to higher floors in other towers. Between riding the stomach-dropping glass elevators and dashing across to other towers on narrow, open catwalks at the 28th or 44th floor levels, I soon overcame my fear of heights.

On these excursions, I would see the Saturn Vs come together in the 500-foot high bays. After hundreds of

engineers and technicians had toiled around the clock for months, the morning of high-bay rollout would arrive. Slowly, the Crawler Transporter would bear forth the Mobile Launch Platform and the majestic Saturn V rocket. The morning sun reflecting off its gleaming white form would take my breath away.

The last Apollo mission was 30 years ago. As the Apollo program ended, some thought human missions to the Moon, Mars, and beyond would continue apace. Though they didn't continue, the Apollo program remains a single, large step in our technological evolution as a species. It is a great tribute to the intelligence, ingenuity, and dedication of the people responsible for the Apollo missions that they were so successful and the disasters so few. NASA's program today continues to build on the technological and managerial legacy bequeathed us by Apollo.

And just where are we now? Among its other tasks, the International Space Station is teaching people to live in space for long periods. Robotic space missions are studying issues like land use and global warming and discovering the wonders of the universe, its history, and our place in it. With humanity's many other pressing needs, such quests must be done efficiently.

Part of NASA's mission is to develop the technologies to do cost-effectively what has never been done before at all. NASA's New Millennium Program develops and validates new technologies for space. Missions such as Deep Space 1 and Earth Observing 1 carry and test multiple new technologies (such as ion propulsion and advanced imaging instruments) previously untried in space. And, unlike the Saturn V, the ultimate gas-guzzling muscle car of the 70s, the new technologies must be the "zero emission" vehicles of the 21st century—small, efficient, and capable beyond anything done before.

Many of the New Millennium technologies are described for adults at nmp.nasa.gov and for children at The Space Place, spaceplace.nasa.gov.

Diane K. Fisher is the developer and writer for The Space Place web site.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



The Saturn V and Mobile Launch Platform are carried to the launch pad on the Crawler Transporter. Notice the tiny humans below the platform.

What's Up *by Debbie Dyke*

All times Pacific Standard unless otherwise noted.

November

- 4 Mon **New Moon** 12:34 p.m.
- 6 Wed Ramadan begins.
- 8 Fri 1656 Edmond Halley born.
- 11 Mon **Veterans' Day**
First Quarter Moon 12:52 p.m.
1572 Tycho Brahe sees the brightest supernova seen in 900 years.
- 12 Tues 1980 Voyager 1 flies by Saturn.
N. Taurid meteors peak 11:00 p.m.
- 13 Wed Mercury in superior conjunction (Sun occults Mercury) 9:00 p.m.
1577 Tycho Brahe discovers a comet.
1971 Mariner 9 becomes the first spacecraft to orbit Mars.
- 15 Fri **Tri-Valley Stargazers general meeting.** 7:30 p.m. at the Unitarian Universalist Church,
1893 N. Vasco Road, Livermore.
1738 Wilhelm Herschel born.
- 16 Sat Moon at apogee (251,593 mi) 3:00 a.m.
- 17 Sun **Tri-Valley Stargazers discussion meeting.** 2:00 p.m. at the Round Table Pizza on 1024
E. Stanley Blvd., Livermore. Chat about all things astronomy related with your fellow members.
1970 Luna 17 becomes the first wheeled vehicle on Moon.
- 18 Mon **Tri-Valley Stargazers Board meeting.** 7:00 p.m. at the Round Table Pizza in Livermore.
Leonid a meteors peak 8:00 p.m.
- 19 Tues **Leonid b meteors peak** 2:30 a.m.
Full Moon 5:34 p.m. **Penumbral Lunar Eclipse.** From the Bay Area, about 95% coverage.
Eclipse starts before Moon rises, maximum about 5:34 p.m., ends at 7:57 p.m.
- 20 Wed 1889 Edwin Powell Hubble born.
- 22 Fri Saturn 2.8° S of Moon 4:30 a.m.
- 23 Sat Mercury at aphelion.
- 27 Wed **Last Quarter Moon** 7:46 a.m.
- 28 Thurs **Thanksgiving Day.**
- 30 Sat **Hanukkah begins.**



December

- 1 Sun In the pre-dawn (around 5:00 a.m.) look low in the east for a thin crescent Moon, with Venus 1.6°
and Mars 3° to the right of the Moon.
- 2 Mon Moon at perigee (224,619 mi) 1:00 a.m.
- 3 Tues **New Moon** 11:34 p.m. Total Solar eclipse visible from eastern Australia and western Africa.
1973 Pioneer 10 becomes the first spacecraft to fly by Jupiter.
- 6 Fri Venus 1.5° S from Mars 4:30 a.m.
- 9 Mon Pluto in conjunction with the Sun 9:00 a.m.
- 11 Wed **First Quarter Moon** 7:49 a.m.

Calendar of Events *continued*

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radio telescope at Bell Laboratories in the 1960's to detect the "radiation echo" of the Big Bang — showing that the universe did indeed begin in an unimaginably hot, dense, explosive state.

Co-sponsored by the NASA Ames Research Center, the Foothill College Astronomy Program, the SETI Institute, and the Astronomical Society of the Pacific

Call the series hotline at 650-949-7888 for more information.

November 18, 9:00 p.m. – dawn

What: *Leonids Meteor Viewing*

Where: Chabot Space & Science Center, Oakland

Cost: \$10 Non-Members, \$8 Chabot Members

Being ever so hopeful of another storm, Chabot will host a Leonid Meteor shower/storm viewing party. Bring camp chairs, blankets, binoculars, and picnic in the employee parking lot.

November 19, 5:45 p.m.

What: *MDAS Fall Swap Meet*

Who: Mt Diablo Astronomical Society

Where: Concord.

Cost: Free

2002-2003 Questionnaire



If it's membership renewal time, it must also be Questionnaire time. We've streamlined the Questionnaire a bit, so hopefully we'll get a few more responses than we ordinarily do. If you need more space to write, feel free to continue your comments on another piece of paper.

1. What kind of instrument do you use the most for observing? _____

2. What program topics would you like us to cover at the meetings? _____

3. Are there any books, DVDs, etc., you would like to see added to the TVS library? _____

4. Do you have any suggestions about ways that the club

The Mt Diablo Astronomical Society will have its annual swap and sale meeting on Tuesday November 19th. Everyone is welcome to bring items for sale and hopefully purchase items for sale by others. The fee is a simple honorary 5% of sales. If you have something you'd like to sell, let Ralph Requa know at: rrequa@chw.edu

There is also a bake sale of goods provided by members and friends.

Doors open at 5:45 and the meeting begins at 7:15 p.m.

If you are interested in attending, contact me for directions to the meeting site in Concord CA.

Jim Scala

jscala2@attbi.com

<http://home.attbi.com/~jscala2>

November 21, 7:00 p.m.

What: *The Mimbres Plate: the Moon and the Supernova of 1054*

Who: Robert Garfinkle

Where: Chabot Space & Science Center, Oakland

Cost: \$5.00

In honor of Native American Heritage Month, Robert will talk about the Mimbres' astronomical observances depicted in their pottery. The Mimbres Indians were a New Mexico pueblo dwelling tribe.

could be improved, about activities you would like us to provide, etc.? _____

5. Are there any articles, features, etc., you would like to see in the newsletter? _____

6. Would you be interested in participating in a weekend public star party at Camp Shelly (Lake Tahoe) in the summer of 2003? _____

7. Would you be interested in participating in an telescope making workshop in the spring of 2003? _____

8. What improvements would you like to see at our dark sky site, H2O? _____

PRIMEFOCUS



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

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.
 - _____ \$25 Basic. You will receive e-mail notification when the PDF version of *Prime Focus* is available for download off the TVS web site.
 - _____ \$30 Regular. You will receive a paper version of *Prime Focus* in the mail.
 - _____ \$29.95 Subscription to *Sky & Telescope* magazine.
 - _____ \$29 Subscription to *Astronomy* magazine.
 - _____ \$20 Hidden Hill Observatory (H2O) refundable key deposit (key property of TVS).
 - \$ _____ 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.