

PRIMEFOCUS

Tri-Valley Stargazers



February 2020



Meeting Info: Securing Earth from Space Threats & Climate-Change Effects

Who:
Prof. Larry Lapin

When:
February 21, 2020
Doors open at 7:00 p.m.
Meeting at 7:30 p.m.
Lecture at 8:00 p.m.

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

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February Meeting

Securing Earth from Space Threats & Climate-Change Effects By Prof. Larry Lapin, San Jose State (Retired)

As an author and speaker, Dr. Lapin presents the case for upgrading the security of our Planet from space-threats. His simple 40-minute talk is sometimes frightening, but nevertheless inspiring.

Sadly, we have no true defense against big meteors. NASA gives very limited attention to extra-terrestrial hazards, with physical effort limited to sky-watching. There is no ready infrastructure for stopping another "dinosaur-killer" from space. This talk tells how to remedy the missing security. That would involve a new space program devoted to defending our Planet. Funding for that might come from premiums collected for a new category of insurance, covering damages from space objects. We might think of that as health insurance for patient Earth.

Dr. Lapin's talk lays out the problem while noting that we have the capability to secure our Planet from another "dinosaur-killing" meteor. He notes that our primary handicap is the public's lack of awareness. Unlike so many disastrous natural events that cannot be prevented—such as earthquakes, tornadoes, hurricanes, and volcanoes—extra-terrestrial threats can actually be mitigated. We already have key technology for that.

Dr. Lapin outlines steps for achieving a secure Earth. The key element is an independent Planet Security Guard, equal to and separate from NASA. Dr. Lapin believes that saving our Planet from extra-terrestrial threats will inspire us and lead the way to successfully deal with a twin problem: the effects of Climate Change.

Dr. Larry Lapin is a retired business professor from San Jose State University, where he taught decision-theory to MBAs. He authored textbooks on management science and statistics, though his courses were basic and primarily non-mathematical. His main forte is communication. Larry entered a public-speaking career after researching space threat mitigation as a hobby and is qualified to write and speak on this topic. His experience stems from hands-on duty in Air Force ballistic-missile program management and consulting work with Navy anti-ballistic missiles. All of that has culminated with his latest book, "Giant Leaps for Mankind: Space Threats and Planet Security," now undergoing the pre-publication process.



Caption: The airburst explosion of a comet or asteroid leveled trees over 830 square miles near the Tunguska River in 1908. Credit: By CYD - From English Wikipedia, en:Image:Tunguska01.png, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=134407>

News & Notes

2020 TVS Meeting Dates

Below are the TVS meeting dates for 2020. 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	Feb. 07
Mar. 20	Mar. 23	Mar. 06
Apr. 17	Apr. 20	Apr. 03
May 15	May 18	May 01
Jun. 19	Jun. 22	Jun. 05
Jul. 17	Jul. 20	Jul. 03
Aug. 21	Aug. 24	Aug. 07
Sep. 18	Sep. 21	Sep. 04
Oct. 16	Oct. 19	Oct. 02
Nov. 20	Nov. 23	Nov. 06
Dec. 18	Dec. 21	Dec. 04

Money Matters

As of the last Treasurer's Report on 01/19/20, our club's checking account balance is \$14,481.47.

TVS Welcome to New Members

TVS would like to welcome new members Murtaza Amiji, Ron Baskett, Brian Blau, James Fogerson, Katie Fogerson, Peter Shearer, and Debbie Tee. Please say hello and chat with them at upcoming club meetings.

Outreach Star Party

February 22: Dublin High School, 8151 Village Parkway, Dublin, Event: 9:30am - 3:00pm; set-up TBD

Time to Renew Club Membership for 2020

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 2019 and all of 2020. The regular club membership remains a bargain at \$30. Student membership (full-time High School or College student) is only \$10! Alternatively, Patron Membership, which grants use of the club's 17.5" reflector at H2O, is available at the annual rate of \$100.00. 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.

2019 RASC Handbooks and Calendars

The Astronomical League is now offering for purchase the Royal Astronomical Society of Canada's (RASC) annual Observer's Handbook and Observer's Calendar. Please go to <https://store.astroleague.org> where you can purchase them at a significant discount. Plus your RASC publications will be shipped directly to your home! For more information, go to the above website or refer to page 30 of the September issue of Reflector magazine.

Calendar of Events

February 21-23, 8:00am-11:00pm

What: Death Valley Dark Sky Festival
Who: NPS Staff, SETI, NASA,
Where: Furnace Creek Visitors Center
Cost: Adults 21+ Only; Members \$90, General \$95

Explore the park's unique landscape and dark night skies that help us better understand the wonders beyond our world. This event is a collaboration between the park, Death Valley Natural History Association, NASA, and many other organizations.

Death Valley offers some of the best stargazing in America. The International Dark-Sky Association has designated Death Valley National Park as a Gold Tier Dark Sky Park, the highest rating of darkness

During the day, the Dark Sky Festival features guided hikes, ranger talks, family programming, an exploration fair, and planetarium programs. At night, visitors can attend evening programs, night sky photography meet ups, and a star party

For more information see: <https://www.nps.gov/deva/planyourvisit/death-valley-dark-sky-festival.htm>

Header Image: Native American Guide giving a tour of Meteor Crater in 2007. Credit: Ken Sperber

Calendar of Events (continued)

February 25, 7:15pm

What: Interactive Program to Build Planetarium Projectors
Who: Jeff Adkins, MDAS
Where: Mt. Diablo Astronomical Society, Lindsay Wildlife Experience, Community Room, 1931 First St., Walnut Creek, CA 94597
Cost: Free.

Details not available.

For more information see: https://nightsky.jpl.nasa.gov/event-view.cfm?Event_ID=97160

March 2, 7:30pm

What: Unlocking the Atmospheres of Extrasolar Worlds
Who: Dr. Tiffany Kataria, Jet Propulsion Laboratory
Where: California Academy of Sciences, 55 Music Concourse Dr., Golden Gate Park, San Francisco, CA
Cost: Advanced ticketing required. Academy members \$12, Seniors \$12, General \$15. Reserve a space online or call 1-877-227-1831.

Extrasolar planets now number in the thousands, spanning a wide range of orbital and physical properties. Unlocking the atmospheric properties of these exotic worlds using facilities such as the Spitzer Space Telescope and Hubble Space Telescope have enabled us to probe chemistry, radiation and weather regimes beyond our own solar system. This talk will describe key observations to understand the atmospheres of extrasolar planets with comparisons to three-dimensional models, and how these models inform comparative exoplanet studies using current and future ground- and space-based telescopes, including the James Webb Space Telescope.

For lecture and reservation information see: <https://www.calacademy.org/events/benjamin-dean-astronomy-lectures/baby-planets-and-their-nurseries>

March 4, 7:00pm

What: The Vera Rubin Observatory (formerly the LSST)
Who: Dr. Phil Marshall, SLAC and Stanford
Where: Foothill College, Smithwick Theatre, 12345 El Monte Road, Los Altos Hills, CA 94022
Cost: Free, \$3 parking (Credit Cards or \$1 dollar bills)

No details available.

For more information see: <https://foothill.edu/astronomy/> or phone 650-949-7888.

March 17, 7:30pm-9:30pm

What: San Jose Astronomical Association Imaging Meeting
Who: Bruce B.
Where: Houge Park, 3972 Twilight Drive, San Jose, CA
Cost: Free

The Imaging SIG meets roughly every month at Houge Park to discuss topics about imaging. The SIG is open to people with absolutely no experience but want to learn what it's all about, but experienced imagers are also more than welcome, indeed, encouraged to participate.

For more information, see: <https://www.meetup.com/SJ-Astronomy/events/lkxnnmybcfbwb/>

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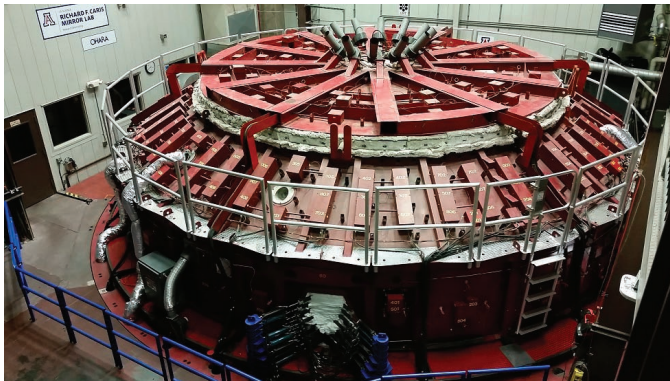
TVS E-Group
 To join the TVS e-group just send an e-mail message to the TVS e-mail address (info@trivalleystargazers.org) asking to join the group. Make sure you specify the e-mail address you want to use to read and post to the group.

Southwest Astronomy Tour By Ken Sperber

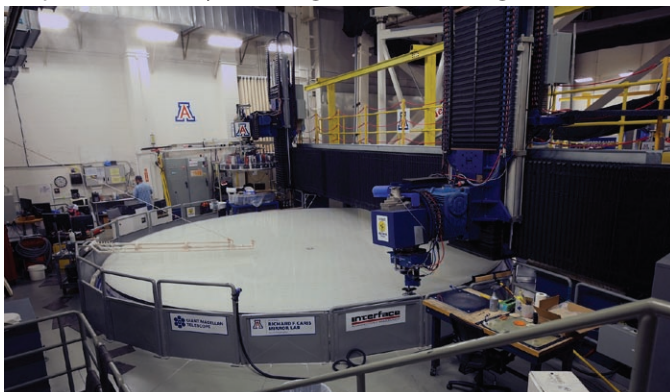
In late November, Karen and I took a driving tour of the southwest to visit some points of astronomical interest. Our first stop was Anza-Borrego Desert State Park in southeast California. The park is a designated International Dark Sky Park. Using my Sky Quality Meter, I obtained zenith readings of about 21.4 mag/arc sec² while still relatively close to town. Park officials should set aside a dedicated astronomical observing site. After setting up where the park rangers suggested, we were told to leave by the park police. The park police suggested a location quite a distance away and the effort to pack up our equipment, relocate, and set-up again was too much to consider. In his scheduled TVS presentation in March, Curtis Macchioni highlights the Nightfall Star Party and Imaging Conference that will be held in Borrego Springs on October 15-18 (see: <https://nightfallstarparty.com/general-information/>).

For those who like hiking there is no shortage of trails in the park. Also, there is plenty of road art, with the main roads around town adorned with animal sculptures made of metal, including dinosaurs and dragons.

We next set off to Tucson to visit the Richard Caris Mirror Lab at the University of Arizona. Our pre-booked tour of the facility was very informative. The lab is in the process of casting seven 8.4 meter mirrors for the Giant Magellan telescope. The mirror casting, in which the Ohara E6 borosilicate glass is melted in a rotating oven (see below), takes about 100 days.

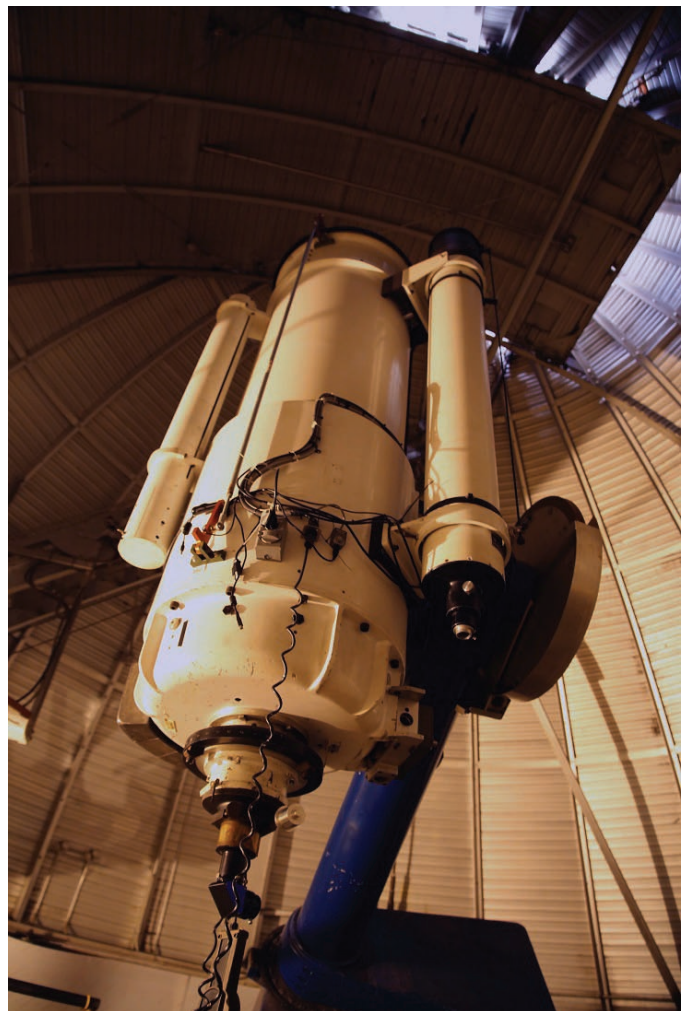


The rotation causes the molten glass to assume a parabolic shape, dramatically reducing the amount of glass that needs



to be removed to achieve a fine figure. They were in the process of slowly cooling a cast mirror, anticipating taking it out of the oven one week later. As seen in the 2nd photo in column 1, in an adjacent room we saw the ongoing fine polishing of a previously cast mirror. It will take 1 year of polishing to achieve final figure. Every few weeks the mirror is put into an adjacent interferometer to assess the polishing progress to see where the most attention is needed back in the polishing bay. For more information see: <https://mirrorlab.arizona.edu/>

Don't shortchange yourself, there are plenty of other astronomical points of interest on campus. A short walk from the mirror lab is the Steward Observatory. Originally housing a 36-inch Newtonian reflector, the observatory opened in 1923, being remote from what was then the city center. That scope was later moved to Kitt Peak Observatory, and it was replaced by a 21-inch Cassegrain telescope in 1964. This telescope, seen below, is used by graduate students to do basic research. The observatory was closed, but one of the administrative staff took us on a brief private tour of the telescope. We were very appreciative of the kindness of the staff for providing an impromptu tour.



continued on p.5

TVS Member Astrophotos



Image Caption: Mo Yassine took this image of IC443, the Jellyfish Nebula, using a H-alpha, filter. The total exposure time was 3 hours using his Celestron Edge HD 1100 with Hyperstar 3 and using a ZWO ASI1600mm-Pro camera.

Southwest Astronomy Tour (continued)



Also on campus is the James C. Wyant College of Optical Sciences. It houses an amazing Museum of Optics that is spread across numerous floors of the Meinel Optical Sciences Building. They have a world-class exhibit of antique telescopes, cameras, and binoculars. The image above shows but a few of the hundreds of telescopes that are on exhibit. Next to the Galileo Museum in Firenze, Italy, this is the finest exhibit of

antique telescopes I have seen.

If you haven't had enough astronomy for one day, there is a planetarium across the street where you can see a show and pick up some souvenirs.

We also had a reservation at the Mt. Lemmon SkyCenter for a night of observing, but a snow storm hit two days before and the observatory could not be accessed. The tour was to have included a light dinner, an astronomy lecture, binocular observing, and then observing through the 32-inch Schulman and 24-inch Phillips Telescopes! We will make a reservation for another time, as this seems like a great night out. For more information see: <https://skycenter.arizona.edu/>

Had we had more time we might have considered going to Lowell Observatory in Flagstaff, but 2500 miles in 10 days was enough.

Image Credits: K. Sperber

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

All times are Pacific Standard Time until March 8 at 2am Pacific Daylight Time

February

- 15 Sat Last-Quarter Moon (2:17pm)
- 16 Sun The Moon is $\sim 1^\circ$ from Beta Scorpius (Dawn)
- 18 Tue Mars emerges from being occulted by the Moon at $\sim 4:27$ am, being only $\sim 8^\circ$ above the southeast horizon
- 19 Wed The Moon and Jupiter are $\sim 4^\circ$ apart in Sagittarius (Dawn)¹
- 20 Thu The thin crescent Moon is 2° to the lower-right of Saturn (Dawn)
- 23 Sun New Moon (7:32am)
- 27 Thu The crescent Moon and Venus are $\sim 5^\circ$ apart (Dusk)
- 28 Fri Algol at minimum brightness for ~ 2 hours centered on 7:55pm

March

- 1 Sun Mars, Jupiter and Saturn span 19° to the left of the Teapot in Sagittarius (Dawn)
- 2 Mon First-Quarter Moon (11:57am)
- 8 Sun Daylight Savings Time Begins at 2am
- 9 Mon Full Moon (10:48am)
- 11 Wed Zodiacal light visible in the west from a dark site (Evening)
- 16 Mon Last-Quarter Moon (2:34am)
- 18 Wed The Moon, Mars, and Jupiter form a triangle with Saturn $\sim 7^\circ$ to their left (Dawn)
- 19 Thu Algol at minimum brightness for ~ 2 hours centered on 10:40pm
- 20 Fri Mars catches up to Jupiter, less than 1° apart (Dawn)
- 21 Sat Thin crescent Moon and Mercury are $\sim 6^\circ$ apart in the east-southeast (Dawn)
- 24 Tue New Moon (2:28am)
- 24 Tue Venus, high in the west, is at greatest eastern elongation (Evening)
- 28 Sat The crescent Moon, Venus, and Aldebaran form a triangle in the west (Dusk)
- 31 Tue Mars catches up to Saturn, less than 1° apart, with Jupiter 5° to their upper-right (Dawn)

NASA Night Sky Notes

Spot the Young Stars of the Hyades and Pleiades

By David Prosper

What happens when a star dies? Stargazers are paying close attention to the red giant star Betelgeuse since it recently dimmed in brightness, causing speculation that it may soon end in a brilliant supernova. While it likely won't explode quite yet, we can preview its fate by observing the nearby Crab Nebula.



Betelgeuse, despite its recent dimming, is still easy to find as the red-hued shoulder star of Orion. A known variable star, Betelgeuse usually competes for the position of the brightest star in Orion with brilliant blue-white Rigel, but recently its brightness has faded to below that of nearby Aldebaran, in Taurus.

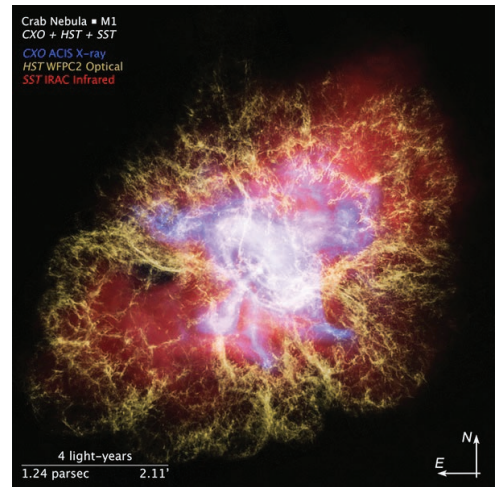


Betelgeuse is a young star, estimated to be a few million years old, but due to its giant size it leads a fast and furious life. This massive star, known as a supergiant, exhausted the hydrogen fuel in its core and began to fuse helium instead, which caused the outer layers of the star to cool and swell dramatically in size. Betelgeuse is one of the only stars for which we have any kind of detailed surface observations due to its huge size – somewhere between the diameter of the orbits of Mars and Jupiter – and relatively close distance of about 642 light-years. Betelgeuse is also a “runaway star,” with its remarkable speed possibly triggered by merging with a smaller companion star. If that is the case, Betelgeuse may actually have millions of years left! So, Betelgeuse may not explode soon after all; or it might explode tomorrow! We have much more to learn about this intriguing star.

The Crab Nebula (M1) is relatively close to Betelgeuse in the sky, in the nearby constellation of Taurus. Its ghostly, spidery gas clouds result from a massive explosion; a supernova

observed by astronomers in 1054! A backyard telescope allows you to see some details, but only advanced telescopes reveal the rapidly spinning neutron star found in its center: the last stellar remnant from that cataclysmic event. These gas clouds were created during the giant star's violent demise and expand ever outward to enrich the universe with heavy elements like silicon, iron, and nickel. These element-rich clouds are like a cosmic fertilizer, making rocky planets like our own Earth possible. Supernova also send out powerful shock waves that help trigger star formation. In fact, if it wasn't for a long-ago supernova, our solar system – along with all of us – wouldn't exist! You can learn much more about the Crab Nebula and its neutron star in a new video from NASA's Universe of Learning, created from observations by the Great Observatories of Hubble, Chandra, and Spitzer: bit.ly/CrabNebulaVisual

Our last three articles covered the life cycle of stars from observing two neighboring constellations: Orion and Taurus! Our stargazing took us to the “baby stars” found in the stellar nursery of the Orion Nebula, onwards to the teenage stars of the Pleiades and young adult stars of the Hyades, and ended with dying Betelgeuse and the stellar corpse of the Crab Nebula. Want to know more about the life cycle of stars? Explore stellar evolution with “The Lives of Stars” activity and handout: bit.ly/starlifeanddeath



Caption: This image of the Crab Nebula combines X-ray observations from Chandra, optical observations from Hubble, and infrared observations from Spitzer to reveal intricate detail. Notice how the violent energy radiates out from the rapidly spinning neutron star in the center of the nebula (also known as a pulsar) and heats up the surrounding gas. More about this incredible “pulsar wind nebula” can be found at bit.ly/Crab3D Credit: NASA, ESA, F. Summers, J. Olmsted, L. Hustak, J. DePasquale and G. Bacon (STScI), N. Wolk (CfA), and R. Hurt (Caltech/IPAC)

Check out NASA's most up to date observations of supernova and their remains 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).

_____ Patron member (\$100). Patron membership grants use of the club's 17.5" reflector at H2O. You must be a member in good standing for at least one year, hold a key to H2O, and receive board approval.

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.