



SONOMA SKIES



March 2015 E-Newsletter of the
[Sonoma County Astronomical Society](#)



*501(c)(3) Scientific and Charitable Organization
Please support us with your donation*



Hello everyone,

A big thank you to Keith Payea for his great presentation at last month's meeting. Please take some time to visit with him at the next Robert Ferguson Observatory Public Solar day.

I have taken the privilege to rename our online monthly E-Newsletter the 'Sonoma Skies' in keeping with all the past history that you are familiar with. You can read back issues by clicking on our link at <http://www.sonomaskies.org/Newsletters.html> We have issues available going back to 2003!

This month is our annual 'Striking Sparks' Awards Program, hosted by our Treasurer Larry McCune. Five local grade school children will receive a brand new Orion 6" Reflector on a Dobson mount with accessories! All winners had to participate in an essay contest that explained their interest in astronomy, and why they would benefit from a telescope. Their teachers also had to write about why their student is deserving of this award.

The Sonoma County Astronomical Society is committed to public outreach, and education in astronomy and science. We thank those who sponsored a telescope.

Next SCAS General Meeting

Wednesday March 11, 2015

7:30pm - 9:00pm

Location:

Proctor Terrace Elementary School Multipurpose Room

1711 Bryden Lane

Santa Rosa, California

[\(Map Link\)](#)

Parking entrance is off of Grosse Ave. through a chain link fence gate. The SCAS banner will be visible.

★ 'STRIKING SPARKS' ANNUAL AWARDS PROGRAM ★



2014 'Striking Sparks' Winners

Please join us for a wonderful evening of sharing, awarding of telescopes, and getting to know this year's winners. Our program is hosted by Mr. Eric Swanson, 'Striking Sparks' Coordinator.

MARCH 2015 - CALENDAR OF EVENTS

Wednesday - March 11, 2015

Sonoma County Astronomical Society General Meeting

7:30pm - 9:00pm

'Striking Sparks' Awards Program

Tuesday - March 17, 2015

Night Sky Spring Series

7:30pm - ?

[Robert Ferguson Observatory](#)

Saturday - March 21, 2015

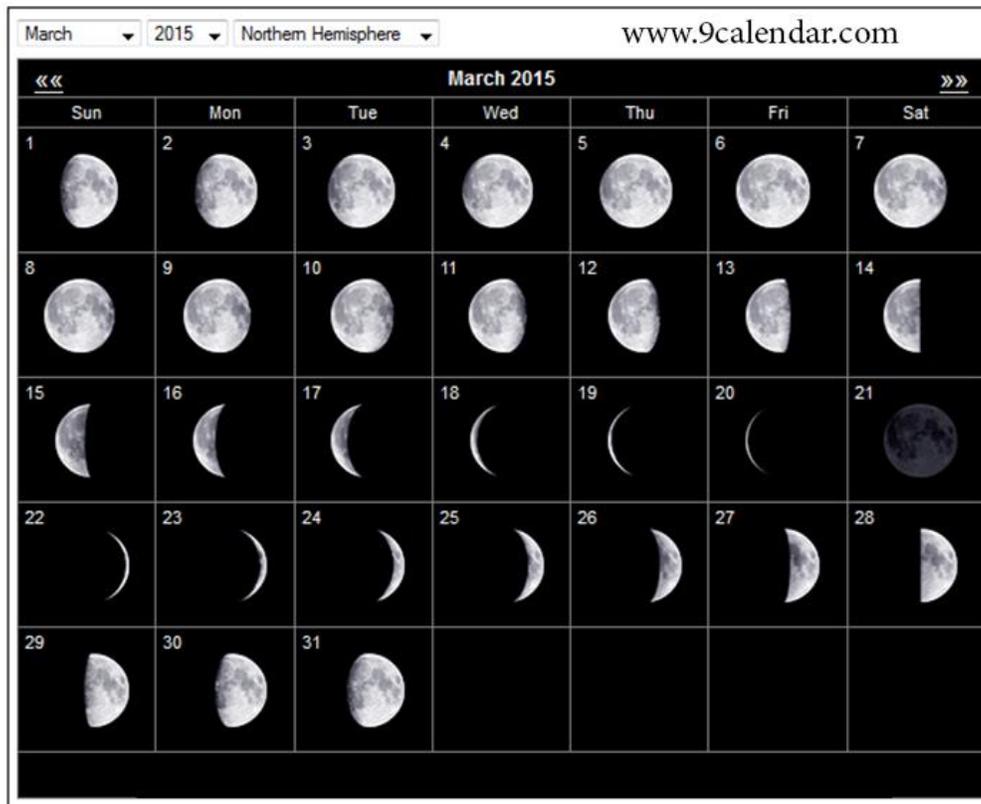
Public Solar Observing & Public Star Party

Solar Observing 11:00am - 3:00pm

Public Star Party 9:00pm - 11:00pm

[Robert Ferguson Observatory](#)

MARCH MOON PHASES



SONOMA COUNTY ASTRONOMICAL SOCIETY

2015 MEETING CALENDAR



March 2015 - 'Striking Sparks Awards Program' - Annual Event

April 2015 – Professor Michelle Silvans, Planetary Geophysicist - **Confirmed**

May 2015 - Jose Eduardo Alatorre, Taylor Observatory - **Confirmed**

June 2015 – Mr. Martin Bradley, Ukiah Latitude Observatory

July 2015 – Mr. Paul Lynam, staff astronomer at the Lick Observatory - **Confirmed**

August 2015 - SCAS Star-B-Que - Annual Event

September 2015 – Dr. Adrienne Cool, San Francisco State University - **Confirmed**

October 2015 – Kurt Kruger, Piner High School Observatory - **Confirmed**

November 2015 – Popcorn & Movie Night - Annual Event (Video to be announced)

December 2015 – John Whitehouse, Speaking on the Lick Observatory - **Pending**

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## Contact us

President – Mike Dranginis  
[President@sonomaskies.org](mailto:President@sonomaskies.org)

Vice President & Program Director – Jim DeManche  
[VicePresident@sonomaskies.org](mailto:VicePresident@sonomaskies.org)

Membership Director – Laura Sparks  
[Membership@sonomaskies.org](mailto:Membership@sonomaskies.org)

Director of Community Activities – Lynn Anderson [Activities@sonomaskies.org](mailto:Activities@sonomaskies.org)

## ***Interstellar* technology throws light on spinning black holes**

The computed code used to generate the movie's iconic images revealed that when a camera is close up to a rapidly spinning black hole, peculiar surfaces in space create more than a dozen images of individual stars and of the thin, bright plane of the galaxy in which the black hole lives.

By Institute of Physics Publishing, Bristol, England | Published: Monday, February 16, 2015

### **RELATED TOPICS: [BLACK HOLES](#)**



The computer code used to produce the amazing visuals in *Interstellar*, have revealed interesting properties about black holes.

Paramount Pictures

The team responsible for the Oscar-nominated visual effects at the center of Christopher Nolan's epic *Interstellar*, have turned science fiction into science fact by providing new insights into the powerful effects of black holes.

In a recent paper, the team describe the innovative computer code that was used to generate the movie's iconic images of the wormhole, black hole, and various celestial objects, and they explain how the code has led them to new science discoveries.

Using their code, the *Interstellar* team, composed of London-based visual effects company Double Negative and Caltech theoretical physicist Kip Thorne, found that when a camera is close up to a rapidly spinning black hole, peculiar surfaces in space, known as caustics, create more than a dozen images of individual stars and of the thin, bright plane of the galaxy in which the black hole lives. They found that the images are concentrated along one edge of the black hole's shadow.

These multiple images are caused by the black hole dragging space into a whirling motion and stretching the caustics around itself many times. It is the first time that the effects of caustics have been computed for a camera near a black hole, and the resulting images give some idea of what a person would see if they were orbiting around a hole.

The discoveries were made possible by the team's computer code, which, as the paper describes, mapped the paths of millions of light beams and their evolving cross-sections as they passed through the black hole's warped space-time. The computer code was used to create images of the movie's wormhole, the black hole; Gargantua, and its glowing accretion disk with unparalleled smoothness and clarity.

It showed portions of the accretion disk swinging up over the top and down under Gargantua's shadow, and also in front of the shadow's equator, producing an image of a split shadow that has become iconic for the movie.

This weird distortion of the glowing disk was caused by gravitational lensing — a process by which light beams from different parts of the disk, or from distant stars, are bent and distorted by the black hole, before they arrive at the movie's simulated camera.

This lensing happens because the black hole creates an extremely strong gravitational field, literally bending the fabric of space-time around itself, like a bowling ball lying on a stretched out bed sheet.

Early in their work on the movie, with the black hole encircled within a rich field of distant stars and nebulae instead of an accretion disk, the team found that the standard approach of using just one light ray for one pixel in a computer code — in this instance, for an IMAX picture, a total of 23 million pixels — resulted in flickering as the stars and nebulae moved across the screen.

Co-author of the study and chief scientist at Double Negative, Oliver James, said: "To get rid of the flickering and produce realistically smooth pictures for the movie, we changed our code in a manner that has never been done before. Instead of tracing the paths of individual light rays using Einstein's equations — one per pixel — we traced the distorted paths and shapes of light beams."

Co-author of the study Kip Thorne said: "This new approach to making images will be of great value to astrophysicists like me. We, too, need smooth images."

Oliver James continued: "Once our code, called DNGR for Double Negative

Gravitational Renderer, was mature and creating the images you see in the movie *Interstellar*, we realized we had a tool that could easily be adapted for scientific research.”

In their paper, the team report how they used DNDR to carry out a number of research simulations exploring the influence of caustics — peculiar, creased surfaces in space — on the images of distant star fields as seen by a camera near a fast-spinning black hole.

“A light beam emitted from any point on a caustic surface gets focused by the black hole into a bright cusp of light at a given point,” James continued. “All of the caustics, except one, wrap around the sky many times when the camera is close to the black hole. This sky-wrapping is caused by the black hole’s spin, dragging space into a whirling motion around itself like the air in a whirling tornado and stretching the caustics around the black hole many times.”

As each caustic passes by a star, it either creates two new images of the star as seen by the camera, or annihilates two old images of the star. As the camera orbits around the black hole, film clips from the DNDR simulations showed that the caustics were constantly creating and annihilating a huge number of stellar images.

The team identified as many as 13 simultaneous images of the same star and as many as 13 images of the thin, bright plane of the galaxy in which the black hole lives.

These multiple images were only seen when the black hole was spinning rapidly and only near the side of the black hole where the hole’s whirling space was moving toward the camera, which they deduced was because the space whirl was “flinging” the images outward from the hole’s shadow edge. On the shadow’s opposite side, where space is whirling away from the camera, the team deduced that there were also multiple images of each star, but that the whirl of space compressed them inward, so close to the black hole’s shadow that they could not be seen in the simulations.



**~MEMBERSHIP APPLICATION & BENEFITS~**

- *Monthly public meetings with interesting professional and amateur guest speakers.*
- *Social interaction and sharing astronomy interests and experience.*
- *Outreach to our community and individuals through astronomy education, SCAS Star Academy, Striking Sparks, Young Astronomers, Field Trips and our annual public Yosemite Park Star Camp.*
- *Annual August Star-B-Que at the [Robert Ferguson Observatory](#).*
- *Membership in the [Astronomical League](#), and quarterly REFLECTOR magazine.*
- *Discount subscriptions to [Astronomy Magazine](#) and [Sky & Telescope Magazine](#).*
- *Up to date SCAS news and information through our [SCAS Blog](#) & monthly E-Bulletin*

**~How to Join~**

- *Annual Membership & Renewals \$25.00 each June 1<sup>st</sup>. \$12.50 after December 1<sup>st</sup>.*
- *New Memberships after December 1<sup>st</sup> are \$12.50*
- *Student Membership with copy of student ID card \$10.00 annually each June 1<sup>st</sup>.*

**~Print Clearly~**

Name/s

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Home Address

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City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Home Phone # \_\_\_\_\_ Cell Phone# \_\_\_\_\_

Email Address (for monthly e-bulletin and updates on events)

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*Please make your check payable to:  
Sonoma County Astronomical Society  
(Attn: Membership Dues)  
P.O. Box 183  
Santa Rosa, CA 95402-0183  
501(c)(3) educational and charitable organization*

# HELP WANTED!

If you are a member of the Sonoma County Astronomical Society you might consider helping us in our mission to introduce our community to the wonders of the Universe.

SCAS Needs Your Help! A small contribution of your time will go a long way in helping us out.

## **Special Events Coordinator**

Occasionally we get requests from various organizations to provide astronomical events like star parties, and other presentations. We're looking for someone who would be willing to "coordinate" these events. That person would not be in charge of the event but would help SCAS review the potential participation, work with the person requesting the event to see if we could find a SCAS volunteer to be the point person for SCAS for the event and to provide the SCAS Board with short reports on the event.

This would be a good position for someone interested in finding out what our community is doing to promote astronomy.

## **Membership**

We need someone to help our current Membership Chairperson. She could use help in representing the Membership Committee at some of the General Meetings, and help during the annual membership drive.

This would be a good position for someone who is interested in meeting more of our members and willing to welcome new people to our Monthly General Meetings.

## **Hospitality & Greeters**

Jim DeManche has hospitality running like a clock. It's been greatly improved and simplified. He'd be happy to show someone how it works and could use the help in setting up and taking down before and after the meetings.

This would be a good position for someone who wants to be involved in helping provide one of the most popular services that our club offers. Oh, did I mention free cookies?

## **SCAS Yosemite Star Party Campground Host**

Each year SCAS participates in a Weekend Glacier Point Star Party Event. We won't find out the actual dates this year until March. This year we will need a Campground Host to get there a bit early and identify the campsites designated for SCAS and mark them assign them to SCAS participants. This is a fun weekend in one of the most beautiful areas you'll ever see. This

is a good position for someone who would enjoy FREE CAMPING in Yosemite National Park and wants to help SCAS in a way that would commit him or her to only one weekend.

## Young Astronomers Coordinator

Our current Coordinator; Len Nelson, has developing this group of Young Astronomers into a well-run, dynamic group of youngsters who are both accomplished astronomers and program presenters. He's stepping down in May, so this would be a great time for an interested party to get involved.

It's easy and rewarding.

Mike Dranginis, President, Sonoma County Astronomical Society.  
My email is [mjd880@att.net](mailto:mjd880@att.net)

Thank You,

Mike Dranginis



Triple conjunction between Venus, Mars, and the Moon  
February 20, 2015  
Credit: Jim DeManche