



400 YEARS of the TELESCOPE

A JOURNEY OF SCIENCE, TECHNOLOGY AND THOUGHT

A publication of the
US IYA2009 Program



July 2009



The intrepid crew: Nils Koenig, Dan Shimer, Anita Ingrao, Kris Koenig and Scott Stender

Production Update

Filmmaking is a Team Effort

By Kris Koenig

The creative process to create a film takes many hands. Rarely, can an individual

write, shoot, edit and deliver a program on his or her own. A small army of dedicated specialists including grant writers and advisors to productions assistants and camera operators created *400 Years of the Telescope*. Each one applying their efforts to ensure that the goals of our NSF grant are achieved. Some of this work is conducted over several months and some over the course of a couple of years - but the acquisition of the moving images and interviews that were used to tell our tale occurred over ten intense weeks of eighteen hour work days. The stress on the field production team is a unique mixture of meeting a timetable while demanding superior results in sometimes less than perfect conditions.

Weather, poor lighting and fatigue worked overtime during our filming last summer. Traveling five continents, conducting interviews and trying to capture the grandeur of the world's greatest observatories was arduous and tasked our team at every turn of our journey. This on top of the normal stress of working in close quarters with five

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Featured Observatory

SOHO and the Sun

SOHO (the Solar and Heliospheric Observatory) is well into its 13th year as the primary spacecraft monitoring solar activity and studying the Sun's processes since its launch on December 2, 1995. Data and images from its 12 instruments have given us significant information about the internal structure of the Sun, its extensive outer atmosphere, and solar storms. Weighing two tons and measuring about 25 feet across, it orbits at a point

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US IYA2009 Update

Astronomy Featured by Year of Science 2009

By Douglas Isbell

US IYA2009 Single-Point-of-Contact

Astronomy is the featured topic for the month of July at the Year of Science 2009 website. Watch for a variety of blogs and other info, as well as public imaging contest via a collaboration between the NASA MicroObservatory project and a variety of science centers across the country. Check it out at http://www.yearof-science2009.org/themes/astronomy/celebrate_and_mo-www.cfa.harvard.edu/microobs/guestobserverportal.

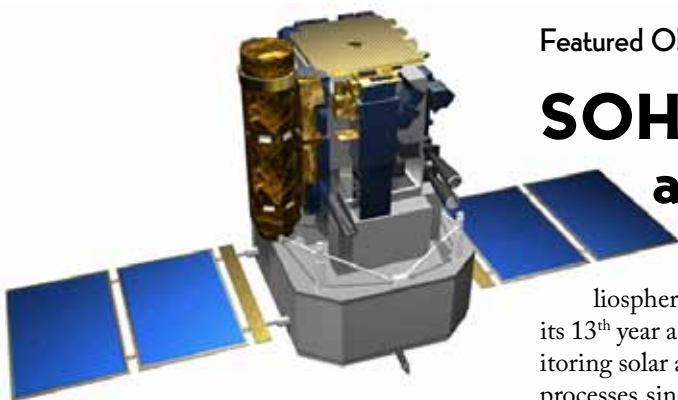
Galileoscope Update

More than 85,000 Galileoscope kits [see the April issue of this newsletter for details] are now in production, with the first ones arriving in peoples' hands as I write this column. The project is at a critical phase of determining whether we have enough additional orders to continue to keep production lines open longer through IYA2009 and—we hope—far beyond, especially at the \$15 cost per unit (\$12.50 for orders of 100 or more). So if this sounds interesting to you, check out www.galileoscope.org soon!

Successful Astronomy Bazaar in Pasadena

The U.S. IYA2009 program hosted an outdoor public astronomy bazaar on Saturday, June 6, at the summer meeting of the American Astronomical Soci-

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SOHO was launched in December 1995 by an Atlas Centaur rocket and became operational in March 1996. SOHO weighs about two tons and with its solar panels extended stands about 25 feet across. It was launched in December, 1995.

SOHO will continue operating well past the next solar maximum in 2001. Illustration by Alex Lutkus

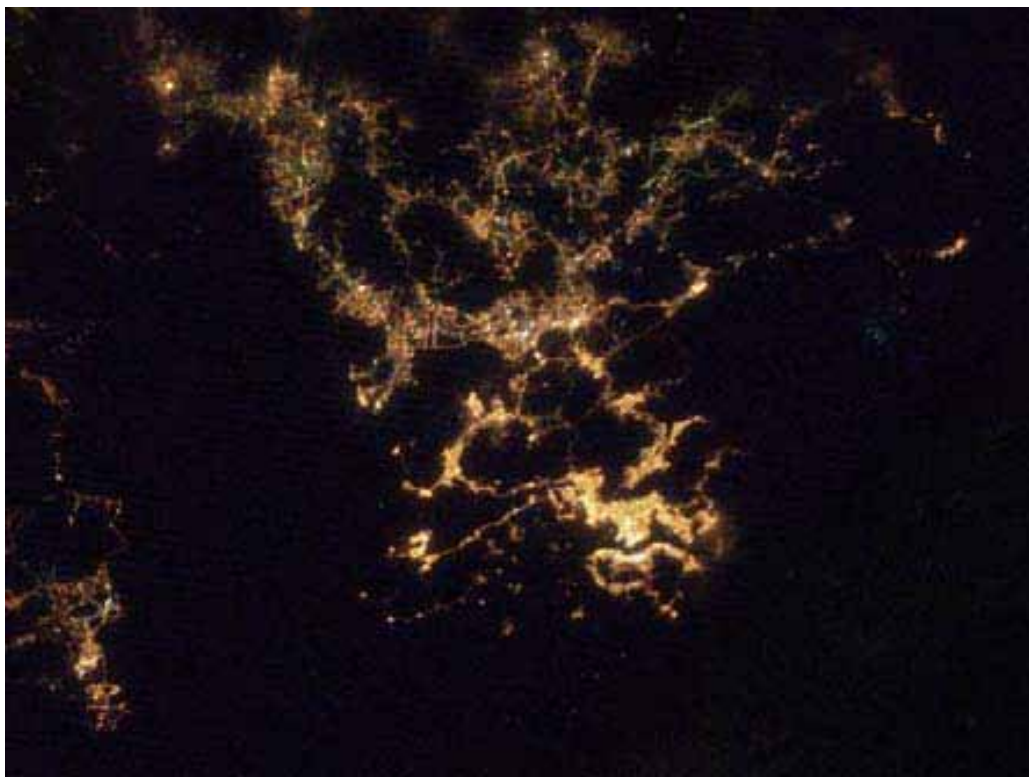
Measuring the Night Sky Brightness to understand the problem of Light Pollution in Hong Kong

Light pollution, caused by excess night time lighting, is quickly becoming a severe environmental problem worldwide. Researchers at the Department of Physics of The University of Hong Kong carried out the first comprehensive survey of the condition of light Pollution in Hong Kong, namely A Survey of Light Pollution in Hong Kong, in the past 15 months. Utilizing almost 2000 sets of night sky brightness data from over 200 different sites in Hong Kong, the study exposed the seriousness of the problem: the Hong Kong night sky is over 500 times brighter than a pristine night sky!

A direct consequence of light pollution is the reduction of brightness contrast of the night sky, leading to a diminishing number of stars visible. The night skies in the worst polluted areas such as Mongkok and Wanchai were over 500 times brighter than the darkest sites in Hong Kong such as eastern Sai Kung and southern Lantau. "At the city center, even on a cloudless and clear night sky, one can hardly see any stars. All that is left is a brightly-illuminated sky background. Famous constellations and the Milky Way were drowned by the city lightings," said Dr Jason Chun Shing PUN, As-

sistant Professor at the University of Hong Kong and the coordinator of the survey. "It is clear from this survey that we are in danger of losing this valuable natural treasure of the starry night sky for our further generations if nothing were done."

Using the night sky survey data collected, Dr Pun and his team compiled the first Light Pollution Map of Hong Kong. The



Night time photo of Hong Kong and the Pearl River Delta Region taken from the International Space Station. This shows that sky brightness is closely related to population. NASA photo.

map shows that urban night skies were on average 100 times brighter than the darkest rural sites, indicating that high population and thus high lighting densities in dense urban areas can cause severe light pollution. With the sprawling urbanization in Hong Kong, many of the currently darker sites are at risk. Moreover, the survey also showed that time is also an important determining factor of the night sky darkness. The team found that the sky after 11pm to be on average darker than the sky before 11pm. The difference was attributed to the turning off of the majority of public and private outdoor lighting throughout the city in late evenings. The full "Hong Kong Light Pollution Map" is available for the general

public on the survey website: <http://night-sky.physics.hku.hk>.

This survey was supported by the Environment and Conservation Fund of the HKSAR Environmental Protection Department. Results of the survey will be submitted to the Environment Bureau in order to provide scientific data for the Government related to possible future legislations

on usages of external lighting. The study would also be helpful for studies of the relations between night sky brightness and other astronomical, meteorological, and environmental factors. Dr Pun stressed, "In addition to legislation, I hope our society will choose not to abuse the use of outdoor lightings, and if they are truly needed, choose to use lighting with proper shielding to limit its effect to the environment."

HKU is currently planning to establish a more comprehensive night sky brightness monitoring network which is a series of automatic observing stations spread around urban and rural locations which can collect data automatically. This makes the continuous data collection at remote sites possible and extends the range and depth of the study.

Illustrations can be obtained by internet via http://www.hku.hk/science/news/press_release.html. For press enquiry, please contact Ms Cindy Chan, Communication Manager of Faculty of Science, at 2241 - 5286/6356 - 5626 or by email at cindycst@hku.hk.



Black Holes

Before the bright lights of cities began to outshine the wonders of the night sky, the Milky Way was a common nighttime sight. Legends from various cultures described this region of the sky as a road, a river, or a flock of birds. The Greeks and Romans thought the hazy appearing feature above them at night looked like milk, which is where the name Milky Way is derived.

When Galileo pointed his small telescope towards this band of light, he didn't see milk or birds. He wrote that "The Milky Way is nothing else but a mass of innumerable stars planted together in cluster." We know now that the Milky Way Galaxy is

indeed a collection of gas, dust and billions of stars, including our Sun.

Our galaxy also includes the intriguing objects known as black holes. In the very dense center of the Milky Way, there is good evidence that a super-massive black hole exists with over 2 million times the mass of the Sun. Astronomers think that most large galaxies contain giant black holes at their centers. But, we can't point a

telescope at a black hole and see it directly. We only see a black hole's effects on the things around it, like stars and gas. And, interestingly, the mass of any black hole can be determined using physics developed by Galileo's contemporary, Johannes Kepler.



This artist's depiction demonstrates what scientists believe is happening very close to Sgr A. The supermassive black hole is surrounded by a disk of gas (yellow and red). Massive stars, shown in blue, have formed in this disk, while small disks represent where stars are still forming. The Chandra results show that stars have formed locally in this disk, rather than being deposited there by a star cluster. (Illustration: NASA/CXC/M. Weiss)*

Smaller, more common types of black hole with only a few times the mass of our Sun



A black hole concept drawing by NASA.

x-rays before it is lost forever. So searching for sources of x-rays is another way to detect black holes, and this is how NASA's Chandra Observatory studies the black hole at the center of our galaxy.

Scientists are also using x-rays to research the behavior of black holes with the Suzaku and XMMNewton space observatories. The Hubble Space Telescope has even discovered medium sized black holes. With future generations of telescopes, like the James Webb Space Telescope, astronomers will be able to gain ever-greater understanding of black holes and their roles in galactic evolution. While we can't see black holes directly, you can use the star maps [here](#) to find out where they are located in the night sky.



Hong Kong Dims the Light Fantastic

Green activists have claimed a victory in their battle against light pollution, saying the sky above Victoria Harbor in Hong Kong was 60 per cent darker than normal last night during the two-hour *Dim It Brighten Up* campaign on June 21, 2009. In the first *Dim It* campaign last year about 140 buildings took part, making Victoria Harbor 32 per cent dimmer than usual, according to the organizers, the Friends of the Earth. June 21 was chosen because it is the summer solstice and marks the start of peak electricity usage.

More than 3,500 buildings and organizations in the city turned their lights off at 8pm for 2 hours as part of an attempt to raise public awareness of light pollution and energy conservation. Organizers set up 100 telescopes to let people look at the stars. Over 50,000 people participated, counted down for the light off event and looked through the telescopes. More than 1000 people signed the "Dark Sky Declaration", a charter to encourage building owners to switch off lights on exterior walls by midnight.

More information and photographs are on the IYA webpage for Hong Kong: <http://www.astronomy2009.hk/activities/DarkSky/621.php>.

Photographs by Sedonia Chu and Eimund Loo show Hong Kong from the

harbor before lights were turned off and after lights were turned off:

[http://www.astronomy2009.hk/tmp/621 by Sedonia Chu and Eimund Loo before.jpg](http://www.astronomy2009.hk/tmp/621%20by%20Sedonia%20Chu%20and%20Eimund%20Loo%20before.jpg)

[http://www.astronomy2009.hk/tmp/621 by Sedonia Chu and Eimund Loo after.jpg](http://www.astronomy2009.hk/tmp/621%20by%20Sedonia%20Chu%20and%20Eimund%20Loo%20after.jpg)

Brazil's Citizen-Science Milky Way Marathon

Brazil is holding a *Milky Way Marathon*, a national star-hunting citizen-science campaign that serves as a reminder that the Milky Way is becoming less and less known by Brazilians as a result of increasing light pollution in the country.

The star-hunting campaign is called "Que nota você daria ao céu de sua cidade?" which stands for "How would you rate the sky of your hometown?". For each of the months from June to September, during the week from New Moon to First Quarter, people are asked what kind of "grade" they would give to measure the quality of their local skies. The grades go from 0 (no stars at all) to 7 (a perfect sky). A lower grade represents a sky with more light pollution.

To make the Milky Way Marathon a success, the whole amateur astronomy community in Brazil is communicating through a network of "nodes". This has brought together a collaboration between amateurs and professionals, working together for IYA2009. One of the results of that effort was recently seen during the 100 Hours of Astronomy - Brazil was the second country worldwide as far as the number of events (second only to the USA).

Further information can be found at <http://www.astronomia2009.org.br/>. There is also a presentation in Portuguese (<http://www.darksbiesawareness.org/files/Maratona%20da%20Via%20Lactea.pdf>), containing instructions on how to participate in the

campaign.

Japan's Candle Night

Japan's Candle Night initiative simply suggests that people switch off their lights for two hours, from 8:00 to 10:00 p.m. on the night of the summer solstice to enjoy some time by candlelight. On June 21, 2009, major facilities and businesses in Japan turned their lights off from 8 to 10 pm. This year's summer solstice also marks the sixth anniversary of an event called *Candle Night* since it was started in 2003. The idea of holding *Candle Night* in Japan, where people turn off their lights and light candles in unison, was originally inspired by the *Voluntary Blackout* movement in Canada, launched in 2001.

During the summer of 2008, businesses and facilities all over Japan turned out their lights during two events. One was *Black Illumination 2008*, held on June 21. The other was *Lights-Down* at the Star Festival on July 7. Between the two events, a total of 149,939 facilities joined the campaign, reducing the amount of electricity used by approximately 2,371,786.51 kilowatts. This translates into 925 tons of CO2 emissions, equivalent to the total daily emission of 64,000 households.

The event now spreads across the world. The *Korean Environmental Women's Network*, a non-governmental organization in Korea, worked closely with Japanese *Candle Night* organizers to hold their own *Candle Night*. Events were also held in Taiwan, Australia, China (Shanghai), Mauritius, and many other countries. The Candle Night Committee now sends out newsletters in English to over 70 countries in its bid to connect activities and shared feelings in each country and around the world.

For more information, visit <http://www.candle-night.org/English>.

Spirited GLOBE at Night Campaigns throughout the world

Indiana

A campaign in and around Mishawaka, Indiana, led by astronomy outreach coordinator Chuck Bueter, produced 3,400 Orion measurements. Bueter worked with 14 schools in the Penn-Harris-Madison (PHM) School Corporation in northern Indiana to have students answer the question, "How much of the night sky have we already lost?"

Along with Art Klinger, director of the PHM planetarium, Bueter worked with hundreds of teachers and thousands of students preparing them to answer this question.

Nearly 6,500 students in grades 3-8 quantified sky glow across the district through 3,391 visual observations of Orion. A small group of students from each PHM school also measured their local sky glow with hand-held SQMs. After all the classes discuss and interpret the results, teams from each school will build a model out of LEGO® blocks to show visually how much has been lost. A subset of students will then present recommendations to the school district's energy education manager and to the PHM School Board.

Chile

Fourteen schools in Chile took visual and SQM measurements during GLOBE at Night in partnership with Cerro Tololo Inter-American Observatory (CTIO) in La Serena and the Centro de Apoyo a la Didactica de la Astronomia (CADIAS). Dr. David Orellana (director of CADIAS), Daniel Munizaga (staff assistant at CADIAS) and Hugo Ochoa (outreach coordinator at CTIO) worked with the Ministry of Education to identify fourteen "star teachers" who excel in science. Even though many of the classrooms were at remote locations, Orellana, Ochoa and Munizaga traveled to the schools to train the teachers and students on how to use

the SQMs.

As a result, 793 Orion measurements and 74 SQM measurements were reported from Chile. An additional 112 Orion and 112 SQM measurements were taken by Orellana, Ochoa and Munizaga around CTIO in an effort to monitor year-to-year changes in the night-sky brightness around NOAO observatories.

Oklahoma

In Norman, Oklahoma, high school students, their teachers and local amateur astronomers produced a map of nearly 500 SQM measurements that canvassed their city. Local teacher and amateur astronomer Eileen Grzybowski, with students Brittany, Emily and Braden, then made a well-received presentation of the results to their local Environmental Control Advisory Board.

"They want us to partner with them and be the outside agitating voice in the newspapers and elsewhere to put the issue of revising our lighting ordinances front and center," Grzybowski reported. "They made suggestions as to how the presentation could be revised to make a bigger impact. They want us to obtain pictures taken from the sky down to the Earth from an airplane and pictures of our ground-based sites of high light pollution and dark oases, and they want us to include data about security issues and cost savings. Our next step is to go before the City Council and do the light demo and discuss our preliminary results."

Connecticut and Collaborators from Other Countries

Three elementary schools in Willemantic, Connecticut, and Three Rivers Community College in Norwich, Connecticut, collaborated with national and international partners on the GLOBE at Night program. Their partners included a fifth grade class in Waynesville, OH, a sixth grade science class in Mirimichi, New Brunswick, Canada, a high school class in Slatina, Romania, and a school in Vale of Glamorgan, Wales. In all, their team consisted of 10 teachers and about 150 students.

As with the PHM schools in Indiana, the Connecticut-based team had several training sessions for students and teachers. The first session introduced "light pollution," Orion, moon phases and how to build a simple telescope. Each classroom then held training sessions on how to record the measurements, access the GLOBE at Night Web site and use the SQM. Also, during the new moon phase, the students practiced using an SQM at home so that they would be ready for Globe at Night. Finally, the schools had a Skype/Bridgit session with Walker, as the GLOBE at Night program director, and that included their long distance partners in a final training and questions and answers session.

Canada: Areas within Two National Parks Earn the Dark Sky Preserves Designation

This summer, the RASC has designated another two permanent Dark Sky Preserves (DSPs). They both have exceptional skies and are located within two National Parks: The Kouchibougauc National Park (239.2 km²) in New Brunswick, and the Bruce Peninsula / Fathom Five Marine National Park (267 km²) in Ontario between Lake Huron and Georgian Bay. This brings our total to nine.

Two more applications this year may be coming from New Brunswick. There is generally very limited light pollution in the province because it is sparsely populated (750,000 people) yet with an area about that of West Virginia.

Conservation Authorities and Land (and water) Stewardship organizations are particularly receptive to the message to reduce light pollution. Although astronomy catches their attention, the impact of light pollution on wildlife (scotobiology) is the impetus that coaxes them into action. The impact of their property and shoreline lighting comes as a surprise to most people, but their corrective action is swift. Scotobiology is also proving to be the main driver behind the DSPs in our Federal Parks.

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SOHO continued from page 1



SOHO on the Atlas II-AS (AC-121), Cape Canaveral Air Station, launching on 2 December 1995. NASA photo.

one million miles (1.5 million km) sunward of the Earth. SOHO is a cooperative effort between the European Space Agency and NASA, and one of many international missions studying the Sun. SOHO often coordinates its observations with other missions including STEREO and TRACE. Its operations are managed at NASA's Goddard Space Flight Center in Greenbelt, MD.

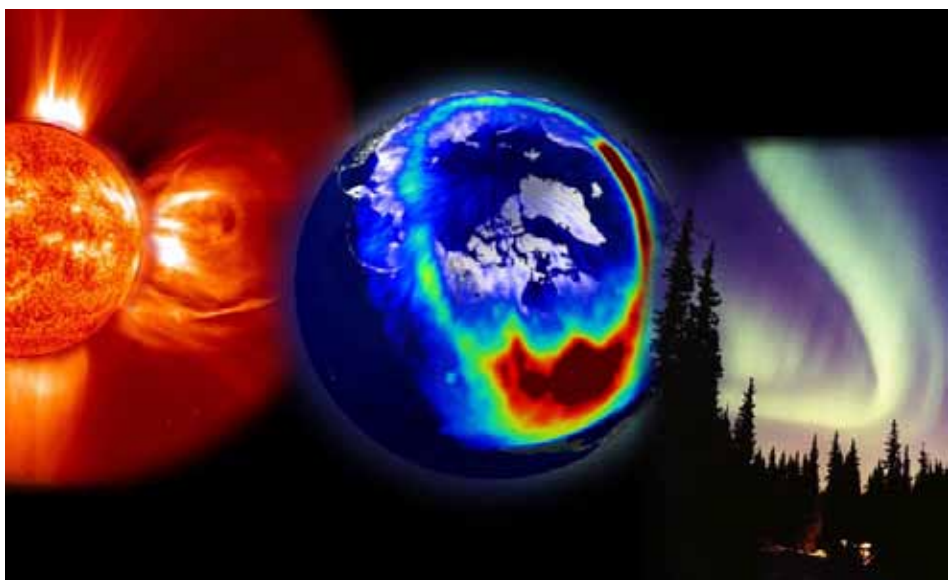
SOHO is perhaps best known for its solar movies and images taken in four wavelengths of extreme UV light. These have appeared on the covers of magazines, in textbooks, as CD art, on hundreds of web sites, and even on a snowboard. The video clips have been appeared in planetarium shows, TV productions, and even on YouTube. Because two of its instruments block out the Sun to see faint structures in the Sun's corona, SOHO (with the help of amateur astronomers around the world poring over its data) has discovered over 1,500 comets, more than anyone or any thing in history. The quality, extended observation span, and breadth of its data collected has made it a wonderful resource for researchers. More than one scientist has asserted that SOHO ushered in the Golden Age of Heliophysics. All of its images are available online and they

are updated very 15 minutes at soho.nascom.nasa.gov. We offer a new Pick of the Week each week, have educational activities, and offer a large archive of our best movies.

However, back in June, 1998, some of you may recall that we lost control of SOHO. Without its solar panels positioned to gather energy from the Sun and powered, we knew it would lose communication with Earth and become cold and lifeless. For months engineers and scientists tried everything they could think of to locate it. Finally, they were able to find it and coax it slowly back to life. Its rescue was cause for much celebration.

We often think of the Sun as a quiet star, a yellow ball out there, quietly producing energy that lights and warms us. A close-up of the Sun reveals an uneven, granulated surface often speckled with dark sunspots. Other images and video show a turbulent surface fraught with magnetic forces combating each other. While our Sun provides a steady stream of warmth and light, it also produces weather that is turbulent and dynamic. Powerful magnetic forces provoke the cosmic equivalent of winds, clouds, waves, precipitation, and storms. We call this space weather. One of SOHO's goals is to learn what drives these kinds of events.

The Sun is a huge thermonuclear reactor, fusing hydrogen atoms into helium and producing million degree temperatures and intense magnetic fields. Near its surface, the Sun is like a pot of boiling soup that circulates energy up from the interior and out into space. And the Sun constantly sends a stream of particles into space. This is called the solar wind and its presence carves out the sphere of influence of the sun, our solar system.



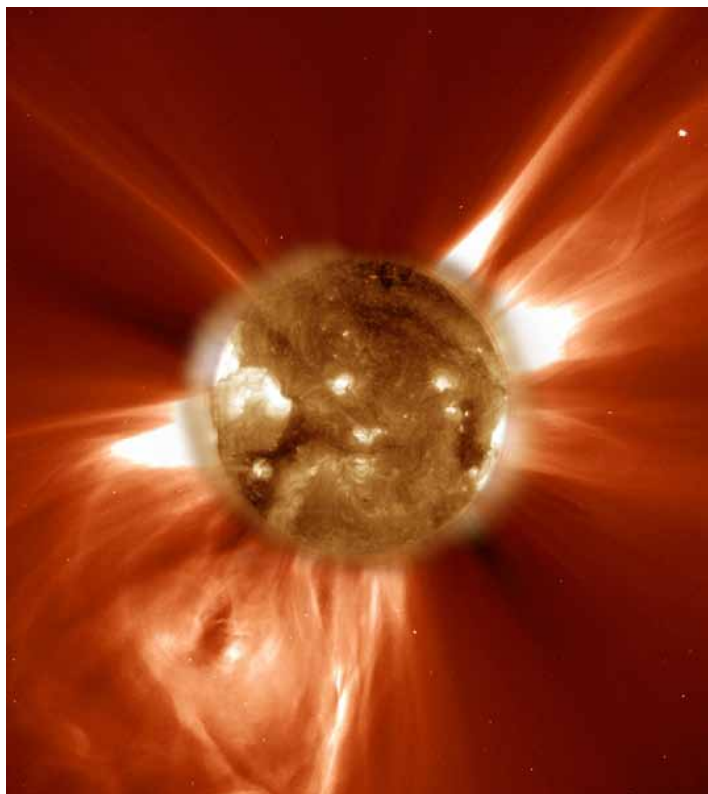
This composite image presents the three most visible elements of space weather: a storm from the Sun, aurora as seen from space, and aurora as seen from the Earth. The solar storm is a corona mass ejection (CME) composite from EIT 304Å superimposed on a LASCO C2 image, both from SOHO. The middle image from Polar's VIS imager shows charged particles as they spread down across the U.S. during a large solar storm event on July 14, 2000. Lastly, Jan Curtis took this image of an aurora display in Alaska, the visible evidence of space weather that we see here on Earth.

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SOHO continued from page 6

Sunspots are dark splotches on the Sun caused by cooler (4000 degrees Celsius) areas amidst the roiling gases on the surface (6000 degrees C). These areas are cooler because much of their energy is



CME blast -- This dramatic coronal mass ejection was captured 7 August 2002 as it blasted billions of tons of particles millions of miles per hour out into space. The image was taken by the LASCO C2 instrument, which blocks out the Sun with an occulting disk so that we can see the fine details of the faint corona. An EIT 284Å image of the Sun itself, taken at about the same time, was enlarged and superimposed on the occulting disk.

tied up in intense magnetic fields. The buildup and interaction of these magnetic loops seems to supply the energy to heat the corona and produce the violent explosion called a coronal mass ejection or CME. A CME's cloud of particles moves at about 2 million miles per hour and carries billions of tons of matter into space and cause effects here at Earth. CMEs reach Earth in two to four days.

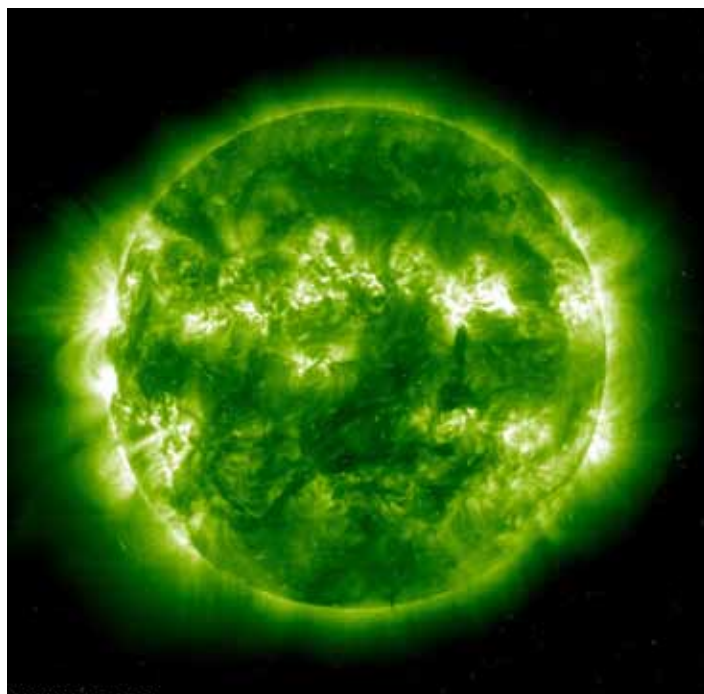
Solar flares, more intense solar storms, appear as explosive bright flashes on the surface of the Sun. They emit powerful radiation and charged particles that may strike the Earth, though most of the particles are absorbed by the Earth's atmosphere. The stron Spacecraft illustration -- SOHO was launched in December 1995 by an Atlas Centaur rocket and became operational in March 1996. SOHO weighs about two tons and with its solar panels extended stands about 25 feet across. It was launched in December, 1995. SOHO will continue operating well past the next solar maximum in 2001. (Image credit: Alex Lutkus) gest flares occur just a few times per year, while weaker flares are relatively common. The most exciting period for SOHO occurred during three weeks in

late October, 2003. The Sun unleashed 14 major solar flares and numerous coronal mass ejections.

Our planet is protected from the harmful effects of the radiation and hot plasma by our atmosphere and by an invisible magnetic shell known as the magnetosphere. This deflects most of the Sun's plasma into space. Some energetic particles enter our magnetosphere near the Earth's poles where our magnetic field lines guide them in. This energy excites mostly oxygen and nitrogen atoms, causing them to glow as the colorful, dancing lights of the aurora, a lot like neon lights do.

Besides producing beautiful aurora, space weather can set off electrical surges in power lines and cause power blackouts. It can lead to a loss of communications and GPS signals, upset satellites, and create a serious radiation danger to astronauts. NASA wants to be able to create models that will be able to better predict and track these events. The next generation SOHO is called Solar Dynamics Observatory (SDO). It is like a SOHO on steroids. SDO is set to launch by the end of this year.

By observing the Sun for over 13 years, SOHO has created a nearly continuous and richly detailed record of solar activity that is allowing scientists around the world to develop a greater understanding of our star, and, in fact, of all stars.



Near solar maximum in 2000, the Sun is peppered with active regions indicating a high level of solar activity. In fact, a half a day earlier the Sun had unleashed a coronal mass ejection as well as a mass of protons (some small white specks can still be seen). The material observed here is a million degrees K. in the emission line of 195 Angstroms.

Astronomy Education Review

Astronomy Education Review (AER), the web-based journal/magazine about astronomy education and outreach, has published the first part of its Volume 8 (the first under the aegis of the American Astronomical Society) and we invite you to take a look at <http://aer.aip.org>.

There is no charge for reading or downloading the articles in the journal. Note that many new features are available on the web site thanks to its expanded web platform. To see a full paper or article, you must click one of the blue buttons under "Full Text Options" on its abstract page.

AER actively solicits interesting papers and articles on all aspects of astronomy and space science education and outreach. In addition to research reports, we also welcome brief papers on innovative approaches, resource guides, dissertation abstracts, substantive op-ed pieces, and announcements of opportunities. All papers are refereed, and a set of guidelines for contributing to AER is available at <http://aer.aip.org>.

Manuscripts and questions can be directed to aer@aas.org. You can register on the site for quarterly updates.

Papers and articles in the current issue include:

Survey of K-12 Science Teachers' Educational Product Needs from Planetary Scientists by Stephanie Slater, Timothy Slater (Univ. of Wyoming) and Julia Olsen (Univ. of Arizona)

Clickers as Data Gathering Tools and Students' Attitudes, Motivations, and Beliefs on their Use in this Application by Edward Prather and Gina Brissenden (Univ. of Arizona)

Advanced Undergraduate and Early Graduate Physics Students' Misconception About Solar Wind Flow: Evidence of Students' Difficulties in Distinguishing Paradigms by Nicholas Gross (Boston Univ.) and Ramon Lopez (Univ. of Texas at Arlington)

Bill Gates' Great-Great-Granddaughter's Honeymoon: An Astronomy Activity for Several Different Age Groups by Andrew Fraknoi (Foothill College)



The Effect of 3D Computer Modeling and Observation-Based Instruction on the Conceptual Change Regarding Basic Concepts of Astronomy in Elementary School Students by Hüseyin Küçüközer (Balikesir University, Turkey), et al.

The Astronomy Education Research Charter by Aaron Price (Tufts Univ.) et al.

Good Reading from Other Sources on Astronomy Education and Outreach (Published in 2008)

"Discoveries in Planetary Science" Classroom Powerpoints

Astronomy Education Review Version 2.0: A Welcome and Guide from Your Editors

...plus a book review, announcements, and more.

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IYA2009 Astrophotography Opportunities

The Earth and Sky Photo Contest on Dark Skies Importance

This photography contest is open to amateur photographers of all ages living anywhere in the world. The theme of this contest is "Dark Skies Importance." Photos must combine some elements of the night sky (e.g., stars, planets, the Moon or celestial events) set against the backdrop of a beautiful, historic, or notable location or landmark somewhere in the world.

Photographs must be taken during 2009, the International Year of Astronomy, and submitted by September 21, 2009. Winners will be announced on October 31, 2009. Details on this program can be found at www.darkskiesawareness.org.

Capture the Colorful Cosmos with MicroObservatory Robotic Telescopes

The Harvard-Smithsonian Center for Astrophysics (CfA), NASA, and the Association of Science-Technology Centers (ASTC) are collaborating on the "Capture the Colorful Cosmos" astrophotography project. This program will give the public online access to the CfA's MicroObservatory robotic telescopes, to take photographs of astronomical objects, and use image processing tools the same way that professional astronomers do.

Participating museums, nature centers, libraries, and other informal education organizations will run public workshops that result in exhibitions of original visitor-created astrophotography displays. These images and displays will be featured not only at the participating institutions, but also on ASTC, IYA, and NASA websites. For Informal Educators: ASTC will host an online workshop in July 2009 about how to implement Capture the Colorful Cosmos. See details at: www.universeforum.org/iyacosmos/ Selected entries will be added to the "click!" web site, and may be eligible to receive a copy of the book *At First Sight: Photography and the Smithsonian*.

Music and Astronomy Under the Stars

Free Star-gazing offered at concerts on Long Island and at Tanglewood

Dr. Donald Lubowich, Coordinator of the Astronomy Outreach Program at Hofstra University, will give concertgoers a glimpse of the heavens this summer throughout Long Island and at the Tanglewood Music Festival.

Sponsored by a NASA grant, the star-gazing will include telescope observations of the sun prior to the concerts and of the moon, planets, stars, and nebulae after the events, combined with a multimedia astronomy presentation.

These events are part of the worldwide 2009 International Year of Astronomy celebration marking the 400th anniversary of Galileo using a telescope for astronomy. The Amateur Observers' Society of New York will be assisting with this program. For more information, visit www.hofstra.edu/astronomy.

Events and Times

July 12 – Nago Gato Afro–Brazilian Music and Dance Ensemble at the [44th Huntington Summer Arts Festival](#), Chapin Rainbow Stage in Heckscher Town Park, Huntington, N.Y., 8:30 p.m.

July 22 – [I Left My Heart](#), A Salute to the Music of Tony Bennett presented by Plaza Theatrical Productions, Rath Park, Franklin Square, N.Y., 8 p.m.

400 Years of the Telescope Available on iTunes

The Telly Award-winning documentary 400 Years of the Telescope is now available for purchase at the iTunes Store for \$1.99. The program can be found on iTunes using this link: [400 Years of the Telescope](#).

From climate change to space exploration, PBS Science Specials offers a wide-ranging slate of informative and thought-provoking programming about the natural world, environmental change and green technology.

400 Years of the Telescope is also available on DVD at [Shop PBS](#).

July 28 – [Tanglewood on Parade](#), Tanglewood Music Festival, Lenox, Mass., 2-11 p.m.

July 31 – Christine Ohlman with opening act Bossa Nova Beatniks at the [44th Huntington Summer Arts Festival](#), Chapin Rainbow Stage in Heckscher Town Park, Huntington, N.Y., 8:30 p.m. www.huntingtonarts.org

August 4 – [Andy Cooney/Ronan Tynan](#) (Irish Tenors), John J. Burns Town Park, Massapequa, N.Y., 8 p.m.

August 14 – [Night at the Museum 2 – Battle of the Smithsonian](#), outdoor movie, Marjorie Post Community Park, Massapequa, N.Y., 8:30 p.m. oysterbaytown.com

August 27 – [Wall-E](#), outdoor movie, North Hempstead Beach Park, Port Washington, N.Y., 8:15 p.m.

August 28 – [Almost Queen](#), Central Mall band shell, Jones Beach State Park, Wantagh, N.Y., 7:30 p.m.

October 24 – [Spooky Walk](#) nighttime Halloween fright garden, Clark Garden, Albertson, N.Y., 6-9 p.m.

Music and Astronomy Under the Stars is presented with the cooperation of the Townships of Hempstead, Huntington, Oyster Bay, and North Hempstead; the Huntington Arts Council, the Islip Arts Council; Heckscher State Park; Jones Beach State Park; and the Tanglewood Music Festival.

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very opinionated individuals who all had their take on how to shoot a given telescope or place an interviewee into a scene. But I consider their energy and the group's tension the catalyst that produced some of the most amazing footage that has been captured to tell an astronomical tale.

This opinion was verified last month when we received a Telly Award for Excellence in Cinematography. This award is the result of our field team efforts headed up by Scott Stender, Director of Photography, and Dan Shimer, First Assistant Cameraman. Anita Ingrao, Nils Koenig and myself also shot footage used in the production, but it is Scott and Dan that deserves the bow for this peer reviewed award. Congratulations gentlemen for a job extremely, well done!

We received three other Telly Awards for outstanding writing, use of animation and for the documentary overall, acknowledging the efforts and skills of the other team members. Everyone who graces the program credits should be proud of these achievements.

As we move forward over the next few months and years, our team will be working on achieving the less visible goal of educating the general public on the impact of the telescope on our concepts and knowledge of the universe - an achievement that will outshine the silver and bronze plating of the four new additions to our trophy case.

On a very personal note, I would like to congratulate my son Nils for graduating high school last month. Nils was our field sound recordist and production assistant. Two jobs he naturally took to with an exceptional level of attention and skill. Not only did Nils have to keep up with the workload in the field, he also had to study his senior coursework when the rest of the team got to sleep. Nils plans to attend community college for his general education requirements then transfer to UCLA or the Brooks Institute to study film. Good luck, son. May all the light you capture with your cameras shine brightly on you.

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Greece: A Conference and a Photo Contest on Behalf of Dark Skies

During the 9th Hellenic Conference (<http://www.helas.gr/conf/2009>) from September 20-24, 2009, a part of the conference will be dedicated to presentations on IYA2009 Dark Skies Awareness activities. In particular, photographs from the country's dark skies-related photo contest will be presented.

Austria: A Campaign and Light Meters to Monitor Dark Skies

Join thousands of other citizen-scientists hunting for stars during the International Year of Astronomy's "How Many Stars" campaign to preserve and observe the nighttime sky! "How Many Stars" encourages everyone—students, educators, and the general public—to measure the darkness of their local skies and contribute their observations online to a world map. One of the main constellations used to measure the night sky brightness, Ursa Minor, is high in the northern sky this summer. So come participate now! For more information, visit <http://starlit.astronomy2009.at>. Also more translators are needed for these webpages. Translations can be done easily online at the website.

Newly developed light meters will continuously measure the night sky brightness at many locations around the globe to monitor changes and provide an unbiased reference for the unaided eye measurements within constellations. Adopt a light meter and record the brightness of the night sky in your city, at your school or at your observatory. You need: (1) a computer with USB and Windows XP/NT/2000, (2) a place with a good view of the sky within 20 meters of the computer, and (3) about 100 Euros for the light meter. Contact Verein@Kuffner-Sternwarte.at to adopt a starlight meter! For more information, visit <http://wiki.sternhell.at>.

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ety (AAS) in Pasadena, CA. Conducted thanks to the help of NASA's Jet Propulsion Laboratory and its solar system ambassadors, the Old Town Sidewalk Astronomers, and the organizers of the AAS/NASA/Rochester Institute of Technology AstroZone team, along with major contributors such as staff from AstronomyCast and Galaxy Zoo, the event drew more than 750 attendees on a brisk cloudy day (see photo).

Shuttle Astronauts Visit Puerto Rico



NASA Astronaut Steve Swanson and students at a University of Puerto Rico event.

NASA astronauts Joe Acaba and Steve Swanson (pictured with students) visited Puerto Rico for a series of IYA2009 related events based at the University of Puerto Rico from June 1-5. The visit was a huge success, according to IYA2009 SPoC for Puerto Rico, Carmen Pantoja, with thousands of people participating, including Secretary of State Kenneth McClintock and Gerardo Morell, director of the Puerto Rico Space Grant Consortium

Moon Parties Ahead on August 1

The successful launch of NASA's Lunar Reconnaissance Orbiter/Lunar Crater Observation and Sensing Satellite (LRO/LCROSS) on June 18 is sure to give an extra boost to the mission's planned collaboration with IYA2009 on Moon-focused star parties on Saturday, August 1. Watch this space next month and the U.S. IYA2009 website (www.astronomy2009.us) for more details.

About the US IYA2009 Logo

*US IYA2009 has created a logo specifically for national events and activities. (Please use the international logo for programs related to the major IYA cornerstone projects or other international ventures.) Please **contact** the US IYA program for permission for use. The US IYA project has also created a **giant postcard** (2.8 MB PDF) that summarizes the major themes and programs that are being developed.*

400 Years *of the* Telescope

A Journey of Science, Technology & Thought

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