



# 400 YEARS of the TELESCOPE

A JOURNEY OF SCIENCE, TECHNOLOGY AND THOUGHT

A publication of the  
US IYA2009 Program



September 2008



*Very Large Telescope - UT2 Dome spins overhead. This is one of four telescopes that make up the world's largest telescope.*

is probably best known as the home of the famous Lick Observatory with its 36-inch refracting telescope. The mountain also hosts a handful of more modern observing instruments, including the Katzman Automatic Imaging Telescope which is currently conducting the most thorough supernova survey in history. This instrument and program, run by Dr. Alex Filippenko, examines the light curves of supernovas across the universe to help in studying the influence of dark energy on our bright universe.

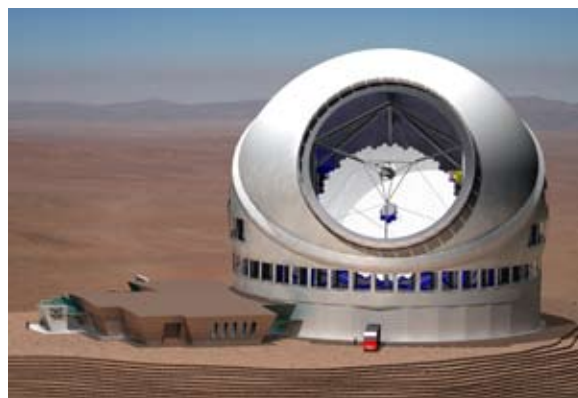
Just across the ridge is the 120-inch C. Donald Shane telescope, part of the Lick Adaptive Optics (LAO) program, a joint project with the Lawrence Livermore National Laboratory. It is also the telescope used by Geoff Marcy and Paul Butler as part of their on-going and famous exo-planet research.

[\*Continued on page 5\*](#)

## Thirty Meter Telescope: Building the next-generation observatory

Headquartered near the outskirts of Pasadena, California, a team of world-class scientists and engineers are busy designing the most technically advanced and capable telescope in history.

When it achieves "first light" in the latter half of the next decade, the Thirty Meter



*Artist concept of Thirty Meter Telescope as depicted at one of the candidate sites.*

Telescope (TMT) will enable scientists to study the Universe with unprecedented clarity, helping us answer many of the most complex and compelling questions in ast

[\*Continued on page 2\*](#)

### Production Update

## San Francisco to Santiago

After a well-earned ten days of rest and recuperation from our round-the-world trip in July, the crew and I began our August filming schedule atop Mt. Hamilton near San Jose, CA. Mt. Hamilton is steeped in astronomical history, but it is the home of some leading-edge astronomical technologies as well. The 4,200 foot Mt. Hamilton



## IYA2009 International Update

[www.astronomy2009.org](http://www.astronomy2009.org)

### Organisational Matters

The IYA2009 network keeps on growing. Presently we have 123 National Nodes and 26 Organisational Nodes. We would like to give a warm welcome to our new National Nodes: Ghana, Syrian Arab Republic, Trinidad & To-

[\*Continued on page 6\*](#)

## US IYA2009 Update

### Dragon\*Con lifts off in Atlanta

*By Douglas Isbell*

The US IYA2009 program garnered an enthusiastic reception at **Dragon\*Con 2008** in Atlanta over Labor Day weekend. Thanks largely to strong advance planning by US IYA2009 Web Developer and New Media team leader Pamela Gay (Southern Illinois University Edwardsville), the IYA2009 exhibit booth had a great location that drew a steady stream of interested visitors for all four days of the meeting.

Staff at the booth included Pamela Gay, Phil Plait (Bad Astronomy and the James Randi Educational Foundation), U.S. IYA2009 Single-Point-of-Contact Doug Isbell (National Optical Astronomy Observatory), and local friends and volunteers from the Skeptics Society. They handed out thousands of US IYA2009

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## *Thirty Meter Telescope* continued from page 1

ronomy and physics.

What gives TMT so much promise is that it will integrate the most successful technologies from modern-day telescopes, while harnessing new, frontier instrumentation and design.

One of these technologies, which has been proven by the very successful Keck Telescopes, is a segmented primary mirror. This innovation enables engineers to create a giant primary mirror by shaping individual smaller segments and holding them in place with very high precision. Comprised of 492 individual segments, this core technology of TMT will measure 30 meters in diameter, dwarfing existing mirrors. This massive, yet exquisitely precise mirror, will enable TMT to achieve the best possible resolution and light-gathering power of any observatory to date.

The TMT also will be the first telescope to integrate an adaptive optics system into its original design. This sophisticated optical-mechanical system will measure the blurring effects of the atmosphere and make minute adjustments hundreds of times per second to counteract these effects.

The result will be a telescope that will reach further and see more clearly than any previous telescope by a factor of 10 to 100, depending on the observation. This will give TMT a resolution that is many times sharper than that of the Hubble Space Telescope.

### Scientific Capabilities

What this means for science is that TMT will help astronomers explore the “big picture” questions of the distant and ancient Universe as well as reveal new and intriguing details of objects in our own galactic neighborhood.

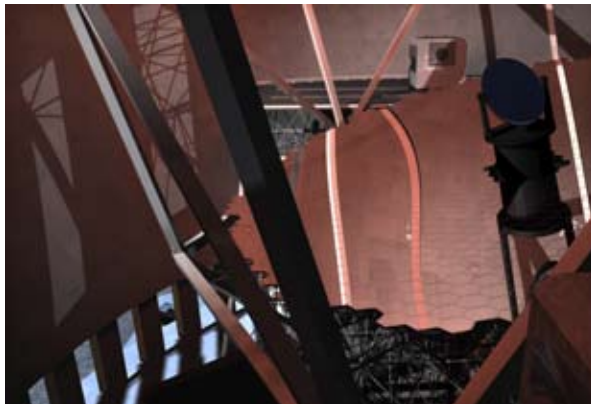
With an estimated decades-long lifespan, TMT will provide new observational opportunities in essentially every field of astronomy and astrophysics. TMT will be a fundamental tool for investigating a very wide range of topics, including:

- Exploration of galaxies and large-scale structure in the young Universe, including the era in which most of the stars and heavy elements were formed and the galaxies in today’s Universe were assembled.
- Investigations of massive black holes and their correlation to the formation of galaxies in the very early Universe.
- Exploration of planet-formation processes and even the direct observation of extra-solar planets.

And, as has been the case for every previous increase in capability of this magnitude, TMT will be on the forefront of new discoveries, uncovering new questions and new phenomenon.

### Site Selection

One of the most essential elements for the success of TMT is selecting the best site to construct the telescope. For the last four years, the TMT project has undertaken a very detailed and in-depth study of the best sites for astronomy in the world. The two sites that TMT has selected for further consideration are Mauna Kea in Hawaii and Cerro Amazones in the Atacama Desert in Chile.



*An artist's view, showing the tertiary mirror in the center of the segmented primary mirror.*

To ensure that proposed TMT sites would provide the greatest advantage to the telescope’s capabilities, a global satellite survey was conducted, from which a small sample of outstanding sites was chosen for further study using ground-based test equipment. This ground-based study of two sites in the northern hemisphere and three in the southern was the most comprehensive survey of its kind ever undertaken.

Atmospheric turbulence above each candidate site, and wind characteristics, temperature variations, amount of water vapor, and other meteorological data at some of the candidate sites, were continuously monitored for up to four years. Based upon this campaign, the TMT project will now further evaluate the Hawaiian and Chilean sites.

The next step in the site analysis process is the preparation of an Environmental Impact Statement (EIS) that will thoroughly evaluate all aspects—including environmental, cultural, socio-economic, and financial—of constructing and operating the Thirty Meter Telescope in Hawaii. An environmental assessment for Cerro Amazones has already been completed and submitted to the Chilean government for their review.

Regardless of whether Mauna Kea is selected as the Thirty Meter Telescope site, information generated from the EIS will be useful in the management of Mauna Kea.

The TMT is currently in the final stages of an \$80 million design phase. The plan is to initiate construction in 2010 with first light in early 2018. This project is a partnership among the University of California, California Institute of Technology, and ACURA, an organization of Canadian universities. The Gordon and Betty Moore Foundation has provided \$50 million for the design phase of the project and has pledged an additional \$200 million for the construction of the telescope.

For more information and updates on TMT visit [www.tmt.org](http://www.tmt.org).



The Astronomical Society of the Pacific

## Science literacy through astronomy: The Great Planet Debate

By Suzanne Gurton

The Astronomical Society of the Pacific's main mission is to advance science literacy through engagement in astronomy. The International Year of Astronomy (IYA2009) promises to bring the excitement of astronomical discovery to a new and wider audience worldwide. In this renewed spirit of exploration and education, we invite you to check this column in the coming months for ideas that will be linked to resources and themes that NASA will be highlighting for both formal and informal educators associated with the ASP. As an example of the types of resources that will become available for IYA2009 are two recent webcasts addressing the controversial issues of water on the Moon and the definition of a planet. Both are great examples of science in action.

One webcast is called "The Great Planet Debate" (GPD). It was inspired by some dissatisfaction with the new and somewhat controversial definition of a planet that was approved by the IAU in 2006. Four hundred years ago the definition of a planet was relatively simple. In those days, a planet was one of seven bodies that wandered across the backdrop of the fixed stars, all of which were presumed to be orbiting the Earth. This almost forgotten definition

meant that the Sun, Moon, Mercury, Venus, Mars, Jupiter and Saturn were all considered planets. Copernicus stirred things up a bit with his idea of a heliocentric solar system. For the first time, Copernicus described how the Moon orbited the Earth, and all the other solar system bodies known to exist at the time orbited the Sun. Yet the definition of a planet remained wide-ranging and all-inclusive. So today, as we continue to discover more irregularly-shaped bits of rock and ice in the solar system in orbits not considered to be quite normal, it has become necessary to create a formal definition of the term "planet". The debate resulted from a three-day conference, held in August, which brought together a variety of planetary scientists to discuss the various characteristics of a body, from its size, shape, dynamics, and where it formed that might or might not be of concern in the definition. Science, as we're well aware, is done by scientists and is not easily separated from politics, history or emotion. A fascinating set of recordings from the conference are posted on [The Great Planet Debate](#) website. They include audio and video from panel discussions debate and explain:

- How formation issues and physical characteristics determine planetary definitions
- The current planet classification schemes and the role of The Great Planet Debate in science and education

And, you'll find a video from a webcast of a debate between Neil deGrasse Tyson and Mark Sykes, moderated by NPR's Ira Flatow, on how they each believe Pluto should be classified.

What is most exciting about these types of discussions and debates is that they are examples of an aspect of science in action in which the general public doesn't usually have an opportunity to participate. Too often we teach a "body of knowledge" in our schools—what we already know rather

than explaining and showing the exciting process of discovery that must adapt and be revised as new discoveries arise.

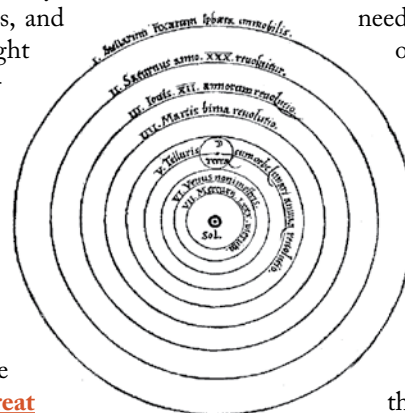
The second resource we'd like to call attention to is the archive of a webcast designed to share basic information about the LCROSS mission, its science goals and how we can all bring the excitement of this mission to the public.

What's more basic to our survival than air and water? Long before the time of Galileo, the large and prominent surface features of the Moon known as maria were named for oceans and seas. Galileo's primitive telescope revealed a dry, barren, craggy and crater-ridden landscape. If we hope to ever live and work on the Moon, we'll

need a readily available source of water. Previous lunar exploration missions—[Clementine](#) in 1994 and [Lunar Prospector](#) in 1998—gave us hope of finding water on what had traditionally been thought to be a completely dry and barren Moon. LCROSS will attempt to confirm the presence of water on the

Moon. On the webcast you will find a description of LCROSS mission basics and some fun activities to demonstrate where water on the Moon might have come from, and where on the Moon we might find it. And, you'll find some fun and messy ways to bring this science alive. The activities and demonstrations you'll find in the webcast demonstrations include making craters in a pan filled with flour and topped with cocoa powder, and cooking up a comet nucleus with water, dirt, window cleaner and dry ice. The [archive](#) of the webcast will provide background and full descriptions for these activities.

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IYA2009 Dark Skies

## The Starlight Reserve concept: Opening Earth's windows to the starlit sky

By Cipriano Marin

Coordinator of the Starlight Initiative

On the occasion of the Starlight Conference promoted by the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Instituto de Astrofísica de Canarias (IAC), and the La Palma Biosphere Reserve (BR), the Declaration in Defense of the Night Sky and the Right to Starlight was approved by representatives of more than 40 countries and several international organizations and bodies in April 2007 on the island of La Palma. It constitutes the general and conceptual framework of the Starlight Initiative.

The proposal to develop a "Starlight Reserve" was one of the additional recommendations to the Starlight Declaration. It will be carried out with the support of the organizations which promoted the Declaration and the Starlight Scientific Committee, in cooperation with UNESCO's World Heritage Centre through its initiative known as "Astronomy and World Heritage".

By definition, a Starlight Reserve is a site where a commitment to defend the night sky quality, and the access to starlight, has been established. A Reserve's main function will be to preserve the quality of the night sky and its associated values, whether they are cultural, scientific, astronomical, natural, or landscape-related.

The Starlight Reserve concept goes beyond the protection of the astronomical quality of the night sky by preserving other dimensions. It aims to recover and protect the ex-

isting values related to the contemplation of the firmament, with a special emphasis on the importance of the associated cultural heritage, both tangible and intangible, in addition to astronomical observation. The Starlight Reserve concept also includes the nature dimension, by recognizing the importance of darkness for landscapes, wildlife species and biodiversity conservation at night. It is therefore applicable to many different situations such as protected nature areas, biosphere reserves, nocturnal skylscapes, areas surrounding astronomical observatories, cultural heritage sites, rural and urban oases, and also "starlight tourist destinations".

Some people may think it is paradoxical to discuss starry sky reserves, but it is certain that the starlight dimension has fallen into the oblivion, in spite of its utmost importance, when we look at the instruments of international protection already existing.

To properly function, Starlight Reserves will rely on appropriate zoning. A Starlight Reserve will have a "core" or "dark" zone. A core zone is an unpolluted area where natural night sky light conditions are kept intact. The core zone will be protected by a "buffer" or "protection" zone to avoid the adverse effects of air and light pollution that could reach into the core zone. Surrounding the buffer zone is the "external" zone where the use of intelligent and responsible lighting will be enforced, protecting the night sky quality from other harmful factors.

The idea underlying the Starlight Reserve concept not only preserves exceptional sites, it also makes available a large ensemble of benchmark areas and situations to allow the replication of best practices, showing the benefits related to the access to starlight. Starlight Reserves represent the first step in spreading a night sky culture as a common heritage.

Web site: [www.starlight2007.net](http://www.starlight2007.net)

*US IYA* continued from page 1

buttons and informational postcards, and talked with hundreds of attendees. The typical reactions? "Cool!" "Awesome." "I love astronomy!"



Astronomer Bill Keel (University of Alabama) conducted remote telescope observations on several nights in the name of IYA2009, which were greatly appreciated



and extremely popular, and IYA2009 was mentioned in numerous Dragon\*Con sessions in the space, podcasting, and skeptics tracks at the meeting.

The US IYA2009 group plans to be back at Dragon\*Con in September 2009 with even more creative activities.

*Photos: Darth Elvis, R2-D2 "talking" with Pamela!*

# 400 YEARS *of the* TELESCOPE

*Santiago* continued from page 1

We had the opportunity to interview Alex, Dr. Claire Max and Geoff, in addition to in-



*Catherine Cesarsky and Laura Ventura at 5,250 meters, above the ALMA site.*

terviewing the immediate past director of the Hubble Space Telescope, now vice-president of research at the University of California system, Steven Beckwith. All of these interviews were exceptional, and will be featured in the *400 Years of the Telescope* program.

Next, we drove down Mt. Hamilton and twenty miles into the Silicon Valley to interview Dr. Seth Shostak. Seth is one of the most outstanding communicators in the field of astronomy we've met. He is always a joy to chat with due to his passion for astronomy and the search for extraterrestrial intelligence for which he is world famous. If anyone can "will" ET into existence, it will be Seth. After a conversation with him one can walk away truly believing that his estimate for discovering a signal from beyond our solar system in the next twenty years is not simply pure speculation, but a foregone conclusion.

After three days of Bay Area astronomy, we buckled ourselves into an American Airlines flight and headed to Chile's starry southern skies.

To say that I have a fondness for this country would be an understatement. The sheer beauty of its topography and dark-night skies, combined with Chilean culture, makes this one very special place on earth. Our ten-day Chilean adventure began with two attempts to fly from Santiago to the coastal city of La Serena. A heavy winter storm turned our first landing attempt back to Santiago. Two

hours later, we succeeded and found ourselves at the Hotel Casa Real, an unscheduled lay-over, waiting for the storm to pass and the roads to clear so we could ascend to our intended destination of Cerro Tololo.

We left the hotel the next morning for the Cerro Tololo Intercontinental Observatory (CTIO) which is operated by a multi-national collaborative and administered by the Association of Universities in Research of Astronomy (AURA). This site is home to the Blanco

four-meter telescope, a twin to the Mayall four-meter telescope at Kitt Peak National Observatory near Tucson, Arizona.

Our return to CTIO was like visiting a close relative. Each time we have visited CTIO the facility's entire staff -- from the cooks to the telescope operators -- have greeted us with warm smiles and offers to make our stay as productive and comfortable as possible. This visit was no exception, as everyone at CTIO pitched in to make sure that we obtained the film footage we needed. And just like a close relative, the natural beauty and splendor of the Chilean Andes served to tug at our hearts, reminding us that we need to make a return visit as soon as possible.

A short and winding eighteen kilometers distant, rises Cerro Pachon, home of the SOAR and Gemini South observatories. Unfortunately, six meters of snow in recent days kept us from visiting these two exceptional telescopes, a not-so-subtle reminder that it's winter in the southern hemisphere. On a subsequent attempt to visit four days later, we were again turned away by difficult logistics associated with ice and snow. Still, I look forward to returning as I envision the many images yet to be captured at these two great observatories.

For the next stops on our filming itinerary, we divided the crew into two teams: Scott and Nils headed to the European Southern Observatory (ESO), near La Silla, and Dan, Anita and I went to the Carnegie and Las Campanas observatories. These two facilities are separated in a fashion similar to that of Cerro Tololo and Cerro Pinchon. La Silla hosts a wide variety of astronomical research instruments. The crew's host was Laura Ventura, an astronomer specializing in astronomical outreach. Laura was also our guide at the high-altitude site of Altiplano de Chajnantor, home of the Atacama Large Millimeter Array.

Our visit to Las Campanas was rewarded with fabulous footage of the twin six-meter Magellan telescopes. The food was so good at both locations, as well as CTIO, that we are considering a cooking show based on the southern hemisphere observatories for our next project. Of course that show would have to include the fine cooking we experienced at the Anglo Australian Observatory in July.



*VLT - UT1 is prepared for another night of research.*

After a half-day respite at the beachside city of La Serena, we boarded a LAN Airlines flight to the port city of Antofagasta, a launching point to Cerro Paranal and the Very Large Telescopes. Our charming host for this part of our journey was Hernan Julio who also served as our host during last year's visit. We quickly rekindled our friendship and turned to the task of shooting this spectacular facility. As we stood above the desolate landscape surrounding the advanced technology of the European Southern Observatory, it was easy to see why the producers of the next James Bond feature film

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bago, Madagascar and Lebanon and to our new Organisational Nodes, the Space Generation Advisory Council and the International Education and Resource Network. More information here: <http://www.astronomy2009.org/iya2009-nodes-mainmenu-122.html>

## IYA2009 Products

The IYA2009 Secretariat would like to advertise some resources that provide excellent opportunities for SPoCs and stakeholders. These products of undeniable quality can easily be adapted to your language and needs, and used to enhance your activities. The Secretariat will make them available to you at very attractive prices and it is up to you to find a way to take advantage of this unique business and/or communication opportunity. More information: <http://www.astronomy2009.org/resources-mainmenu-47/products.html>

*Astronomical Pictures at an Exhibition*, an Adler Planetarium video suite, produced and directed by Jose Francisco Salgado, with music by Mussorgsky and orchestrated by Rave. As part of its mission of inspiring the exploration and understanding of our Universe, the Adler Planetarium is partnering with symphony orchestras and educational institutions to reach broader audiences in and outside of the USA. These partnerships started in 2006 when the Adler produced a suite of high-definition videos to accompany two performances of Gustav Holst's *The Planets* by the Chicago Sinfonietta. The positive reception by audience members and critics prompted more collaboration between these two institutions, resulting in a second video/concert production entitled *Astronomical Pictures at an Exhibition* and a repeat free concert of *The Planets* in the Summer of 2008 in Chicago's Millennium Park. In addition to presenting these inspirational and educational works, a lecture or Q&A session is usually offered as a pre- or post-concert event, and educational materials are distributed to audience members. More information: [http://www.astronomy2009.org/files/reports/astronomical\\_exhibit.pdf](http://www.astronomy2009.org/files/reports/astronomical_exhibit.pdf)

*The Lives of Galileo*, a journey through the

history of Astronomy, the official IYA2009 cosmic comic book by Fiami. For the first time, astronomy and Galileo are presented in an historical, accessible and humoristic comic book. In 40 colour-filled pages organised into six stunning chapters, Galileo plays different roles through the ages of great astronomical discoveries. More information: [http://www.astronomy2009.org/files/reports/Fiami\\_IYA2009\\_Lives\\_Galileo.pdf](http://www.astronomy2009.org/files/reports/Fiami_IYA2009_Lives_Galileo.pdf)

*Eyes on the Skies*, 400 years of telescopic discovery, by Govert Schilling and Lars Lindberg Christensen. The International Astronomical Union's official book and movie celebrating the 400th anniversary of the telescope. The telescope unveiled an embarrassment of astronomical riches, and led to a dramatic increase in knowledge about the wider world we live in. The *Eyes on the Skies* DVD movie and accompanying book explore the many facets of the telescope — historical development, scientific importance, technological breakthroughs, and the people behind this ground-breaking invention, their triumphs and failures... More information: [http://www.astronomy2009.org/files/reports/eyes\\_on\\_the\\_skies\\_flyer.pdf](http://www.astronomy2009.org/files/reports/eyes_on_the_skies_flyer.pdf)

*IYA2009 Planispheres* These are standard and customised planispheres or starfinders. You can have your own planisphere, in your language, for the latitude you want and in the colours, design, size and number you like. You can have the perfect planisphere for your IYA2009 activities. More information: [http://www.astronomy2009.org/files/reports/IYA2009\\_Planispheres.pdf](http://www.astronomy2009.org/files/reports/IYA2009_Planispheres.pdf)

## World Space Week

World Space Week (WSW) 4-10 October is organized every year since its Declaration by the United Nations in 1999, celebrating the contributions made by space science and technology towards the betterment of humankind. It has been celebrated by a wide variety of organizations in around 50 nations and is meant to educate the public about space, demonstrate public support for space to government leaders, and use space to inspire students about learning.

Strong Connection with initiations to Astronomy is often used during the WSW

celebrations. Hence, World Space Week -2008 (WSW-2008) is one of the best platforms to informally launch and propagate an IYA2009 program. It is also an opportunity to have common-goal programmes organized around the world at the same time leading toward IYA2009.

As a participating organisation/country in the WSW programme, everyone is encouraged to take a lead in organising outreach and public relations programmes during this week. A wide variety of activities will run during World Space Week. Outreach activities will encompass exhibitions, conferences, seminars and scientific lectures, as well as TV and radio programmes for larger audiences. Activities will be organised for primary, secondary and high schools, including a space quiz, and painting, essay and model rocket launching competitions.

More info: [smenon@worldspaceweek.org](mailto:smenon@worldspaceweek.org)

## 100 Hours of Astronomy

The 100 Hours of Astronomy Cornerstone project has a new web site — [www.100hoursofastronomy.com](http://www.100hoursofastronomy.com) — where information will be available on all the plans for this exciting event. 100 Hours of Astronomy is a round-the-clock, world-wide event with 100 continuous hours of a wide range of public outreach activities during a four-day period, 2 – 5 April 2009. A new mailing list for the project — open to all — will provide regular updates on plans and developments. There are many exciting ideas to be announced soon!

There are some great activities planned. A 24-hour webcast from research observatories around the world, including live broadcasts, will give the public an insider's look at the world's greatest telescopes. A 24-hour global star party — the biggest astronomical event in history — will invite everyone to join in the celebration. And it all starts with the inspiration for IYA2009 — the telescope that Galileo used for his historic observations 400 years ago, live from a gala opening event. Schools, science centres, planetariums, astronomy clubs and more are joining in.

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*Santiago* continued from page 5

selected Paranal as the lair of Bond's evil nemesis. On this visit we enjoyed touring and learning about VISTA, a new infrared survey telescope soon to be observing its first light. The telescope will advance our knowledge of the obscure warm universe.

After two nights at Paranal, we were back in Antofagasta saying goodbye to our friend Hernan. We would meet up with him a little later in the trip, in Santiago. We headed to the high Atacama desert and the dusty little town of San Pedro which happens to have some of the finest restaurants in which I've ever dined. To have traveled to such a remote location on Earth and enjoyed such wonderful food is truly mind boggling.

The reason for our journey to San Pedro was to visit the ALMA site and re-interview the president of the International Astronomical Union (IAU) and past director of ESO, Dr. Catherine Cesarsky. Catherine was very gracious and kind in making room in her very busy schedule to fly from France to join us at the ALMA site, 16,000 feet in the Chilean Andes. Catherine's great intelligence, grace and charm, and her passion for astronomy, ALMA and ESO are very evident in the interview she provided for us for *400 Years of the Telescope*. We couldn't help but get caught up in her infectious enthusiasm and we believe that Catherine's interview will do the same for the show's viewers

Our interview of Catherine Cesarsky at the ALMA site tested the limits of the RED 4K cameras. We returned to Santiago for a half-day of relaxation and catching up with our old friends Dr. Richard Hills and Beverly Beavis. We rejoined Hernan who acted as our guide, along with our driver Victor, to experience some of the outstanding sights of Santiago. We ended our Chilean adventure in a great restaurant that I highly recommend to anyone who journeys to this wonderful southern hemisphere capital. With luck, you'll meet Rudy, one of the restaurant's fine managers. The crew's favorite recommendation is the guacamole-smothered hamburgers. The food left us feeling very satisfied as we regrettably departed the wonder-filled country of Chile.

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## Universe Awareness

Ever wanted to answer a kid asking how much they would weigh on another planet? Or what the phase of the Moon is right now?

Following demand from Universe Awareness communities we have started a website of simple astronomy tools: [http://www.unawe.org/unawe\\_tools/](http://www.unawe.org/unawe_tools/)

These are small useful reference items such as scaling the Solar System to any reference (distance or diameter), calculating telescopic magnification, observing the libration of the moon, etc. intended for all kinds of astronomy outreach. The idea is to complement reference sheets like the Astroguide (<http://astronomy2009.sao.ac.za/projects/astroguide/>) with something dynamic.

Feel free to use these and send us any feedback, bugs, feature requests, etc. You can send us an e-mail directly at [carolina.odman@unawe.org](mailto:carolina.odman@unawe.org) or use the online feedback form on the website.

## Upcoming IYA2009 meetings

JENAM2008 (Wien, Austria)  
8-12 September 2008  
<http://www.univie.ac.at/jenam2008/> or  
<http://www.roe.ac.uk/ukac/test/symposium.html>

IYA2009 Opening Event  
15-16 January 2008  
<http://www.astronomy2009.fr/opening>

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## About the US IYA2009 Logo

*US IYA2009 has created a new 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 new [giant postcard](#) (2.8 MB PDF) that summarizes the major themes and programs that are being developed.*

## 400 Years *of the* Telescope Newsletter

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*Current Production*  
"400 Years of the Telescope: A journey of science, technology and thought" [www.400years.org](http://www.400years.org)

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