



400 YEARS *of the* TELESCOPE

A JOURNEY OF SCIENCE, TECHNOLOGY AND THOUGHT



It's our pleasure to present the first edition of the "400 Years of the Telescope" newsletter. This monthly downloadable or emailed PDF document will keep the reader updated on our production and other International Year of Astronomy events. Each issue will highlight a major observatory along with the research being conducted at the facility. Additional articles on saving our night skies and how you can enjoy stargazing will accompany educational materials for students and teachers. Finally, an inside view into the world of video production will be given as the high definition documentary goes from paper to 1/2 - inch tape for broadcast. We hope you enjoy our corner of IYA and that you take an opportunity over the next two years to look through a telescope and discover your universe.

Kris Koenig, *Producer*

Building the world's largest optical solar telescope

Dave Dooling
National Solar Observatory

A century after George Ellery Hale discovered intense magnetism inside sunspots, his successors are moving forward with plans



A rendering of ATST and Mees, looking south.

for a 4-meter optical telescope that will help unravel the mysteries of the "magnetic carpet" that blankets the Sun.

The Advanced Technology Solar Telescope (ATST) will be the world's largest optical solar telescope, combining high-order adaptive optics to compensate for seeing

conditions on Earth and provide views more than 30 times sharper than uncorrected ground-based telescopes can do. It will also explore magnetic structures in the corona and the relatively unknown solar infrared spectrum.

The 400th anniversary of sunspots as spots on the Sun closely follows the 400th anniversary of the astronomical telescope. While spots had been observed at least as early as 28 BC by Chinese court astronomers, they usually were discounted as imperfections in Earth's atmosphere, not a blemish on the perfect, unchanging Sun. Telescopes changed that.

During 1610-1612, Galileo, Thomas Harriot of England, Christoph Scheiner of Rome, and Johannes and David Fabricius of Germany used telescopes to project images of the Sun and discovered that spots evolved independent of terrestrial weather, and that they moved across the face of the Sun, implying its rotation. The nature of spots remained a mystery until 1908 when

Continued on page 5

The Universe, Yours to Discover...

The International Astronomical Union (IAU) has launched 2009 as the International Year of Astronomy (IYA2009) under the theme "The Universe, Yours to Discover". IYA2009 marks the four hundredth anniversary of Galileo Galilei's first astronomical observation through a telescope. It will be a global celebration of astronomy and its contribution to society and culture, with a strong emphasis on education, public engagement and the involvement of young people, with events at national, regional, and global levels

Continued on page 7



US Plans for the International Year of Astronomy – 11 Months and Counting

Douglas Isbell
National Optical Astronomy Observatory

Endorsed by the United Nations, UNESCO and the International Astronomical Union, the 2009 International Year of Astronomy (IYA) aims to stimulate worldwide interest in science through engagement in astronomy activities, under the central theme of "The Universe: Yours to Discover." More than 100 countries are organizing events.

Helping to lead overall US planning for the International Year of Astronomy has

Continued on page 6

PLANETARIUM NEWS: New capabilities enhance astronomers' views of the Universe

January 13 and 14th of 2008 started a new era for planetariums. Imiloa Astronomy Center of Hawaii's planetarium became the first in the world to have [stereoscopic capabilities](#), revolutionizing



the planetarium industry. The new system heightens general audience entertainment experiences, but more importantly becomes a tool for astronomers' research by allowing them to see how celestial bodies are situated and how the universe is changing.

To launch the new capabilities, Imiloa put together a two day event bringing together planetarium directors from around the world with astronomers and observatory directors from Mauna Kea. Astronomers shared their latest research on the new system providing professional development in a new and exciting way. Dr. Brent Tully who participated in the events remarked that the new planetarium "...has great potential as a visualization tool for astronomers."

Imiloa will be using Sky-Skan's cutting-edge definition planetarium theater technology integrated with Sony SXR D projectors. This creates a more vibrant picture than traditional systems and makes Imiloa's planetarium viewings exceptionally lifelike and engaging on its breathtaking 52-foot full planetarium dome.

Planetarium manager Shawn Laatsch commented "The new

system will enable the planetarium to become a resource for astronomers and the observatories on Mauna Kea, the 14,000-foot mountain summit, which sites ten world-class astronomical observatories. This system will now aid their research by creating visualizations that will broaden understanding of astronomical data." Imiloa will also be poised to share new astronomical research with today's young people and the broader community in exciting ways through a variety of special programs in the planetarium.

To highlight its new capabilities for the general public, Imiloa will also launch its "Dawn of the Space Age" planetarium show in stereoscopic 3D. The show will be playing Tuesday through Sunday daily starting January 19. Visitors will re-live history and the excitement of space exploration -- from the launch of Sputnik through the Apollo lunar landings in 3D. All monthly Mauna Kea Skies star shows at Imiloa Center will include tours of the Universe in 3D stereo.

Kris Koenig, President of Interstellar Studios was on hand for the opening events and showed a clip of the documentary on the history of the telescope for the International Year of Astronomy. This was very exciting for the gathering as it featured a number of the Mauna Kea observatories and astronomers from Hawaii. Imiloa Planetarium, Buhl Planetarium, and Interstellar Studios are currently partnered to produce a special digital full dome planetarium program on the same topic. The documentary and planetarium show will work in conjunction to promote the importance of telescopes in astronomical discoveries.

Imiloa Astronomy Center of Hawaii opened in February 2006. The world-class destination intertwines the Hawaiian cultural and navigational understanding of the stars with information direct from Mauna Kea's world-famous astronomy observatories. It is open to the public from 9 a.m. to 4 p.m. Tuesday through Sunday (closed Mondays). For more information, visit the [planetarium's web site](#).

Science & Technology

10 Podcasts of Nontechnical Astronomy Talks Available

Audio recordings of ten public lectures by noted astronomers are now available as free MP3 downloads at the web site of the nonprofit [Astronomical Society of the Pacific \(ASP\)](#).

The talks were recorded at Foothill College in the Silicon Valley Astronomy Lecture Series. Each hour-long lecture on some exciting development in our study of the universe is followed by an extensive question and answer period in which the speaker gives further details and personal glimpses about the topics under discussion.

A few talks are also available as video files (instructions can be found on the same

page). Among the talks available:

Dr. David Morrison (NASA Ames Research Center): "Taking a Hit: Asteroid Impacts and Evolution"

Dr. David Grinspoon (Denver Museum of Nature & Science): "Comparing Worlds: Climate Catastrophes in the Solar System"

Dr. Bruce Margon (UC, Santa Cruz): "Glimpsing the Edge of the Universe: Results from the Hubble Space Telescope"

Dr. Dale Cruikshank (NASA Ames): "The Planet Pluto: Maligned but Not Forgotten"

Dr. Alex Filippenko (UC, Berkeley): "Dark Energy and the Runaway Universe"

Dr. Frank Drake (SETI Institute): "Estimating the Chances of Life Out There"

Dr. Nathalie Cabrol (SETI Institute): "The Mars Exploration Rover Mission"

These lectures are co-sponsored by NASA's Ames Research Center; The SETI Institute, the Foothill College Astronomy Program and the Astronomical Society of the Pacific.

400 YEARS *of the* TELESCOPE

The Total Eclipse of the Moon, February 20, 2008

*A Resource Guide by Andrew Fraknoi
Foothill College and Astronomical Society of the Pacific*

On Wednesday evening, Feb. 20, a beautiful total eclipse of the Moon will be visible from North America.

Event	EST	CST	MST	PST
Partial eclipse begin	8:43 pm	7:43 pm	6:43 pm	5:43 pm
Total eclipse start	10:00 pm	9:00 pm	8:00 pm	7:00 pm
Mid-point	10:26 pm	9:26 pm	8:26 pm	7:26 pm
Total eclipse end	10:52 pm	9:52 pm	8:52 pm	7:52 pm
Partial eclipse end	12:09 am	11:09 pm	10:09 pm	9:09 pm

What happens during an eclipse of the moon?

The full Moon and the Sun are exactly opposite each other in our skies, and the Earth gets between them. The Earth's shadow falls on the Moon, darkening it over the course of several hours. Such a lunar eclipse is visible to everyone on the Earth who can see the Moon.

What is visible during a lunar eclipse?

As the shadow of the Earth covers the Moon, note that our satellite doesn't become completely dark. Light bent through the Earth's atmosphere still reaches the shadowed Moon and gives it a dull brown or reddish glow. The exact color of the glow and its darkness depend on the "sooty-ness" of our atmosphere – how recently volcanoes have gone off and how much cloud cover, storm activity, and human pollution there is around the globe.

Is it safe and how do I watch?



© 2007 Insterstellar Studios "400 Years of the Telescope"

Since the Moon is always safe to look at, and the eclipse only makes the Moon darker, there is no danger in watching this eclipse with your eyes or through a telescope. (The dangerous eclipse is the solar one, where it is the Sun that gets covered.) A lunar eclipse is one astronomical phenomenon that doesn't really require you to have fancy equipment or to go to a dark location to see it. You can bring binoculars to see the Moon larger & friends to enjoy it with.

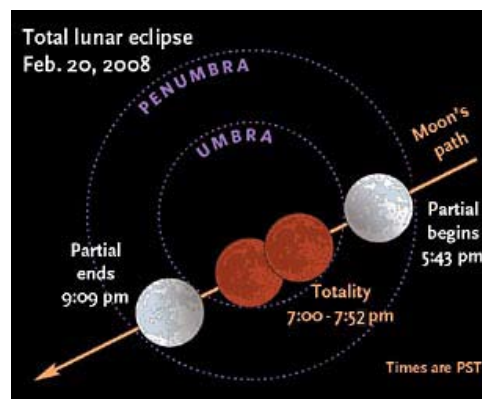
How often do lunar eclipses occur and when are the next ones?

We can get anywhere from 0 to 3

lunar eclipses per year. Some of these will be total eclipses, where the Moon is completely inside the dark part of the Earth's shadow, while others are partial, meaning that only some of the Moon is in shadow. Between 2000 BC and 3000 AD, there are 7718 eclipses of the Moon, for an average of 1.3 per year. The next total eclipse of the Moon visible from the U.S. will be Dec. 21, 2010, so catch this one if you can.

What can we learn from such eclipses?

Be sure to take a careful look at the shadow of the Earth as it moves across the bright face of the Moon. What shape is it? A tree's shadow looks like the tree, your little brother's shadow looks like him. The round shape of the Earth's shadow suggested to the ancient Greeks, more than 2000 years ago, that the Earth's shape must be round too. Eclipse after eclipse, they saw the Earth cast a round shadow, and deduced that we lived on a round planet – long before spacecraft and astronaut pictures showed the Earth's blue globe from orbit.



*Gregg Dinderman diagram,
courtesy of Sky & Telescope Magazine*

400 YEARS *of the* TELESCOPE

Astronomy Club News — A Big Hidden Valley and a Giant Bowl of Stars: Golden State Star Party 2008

Recently, Toyota released a television commercial for their new Sequoia wagon. Would you believe it? The setting was a desert star party featuring a 20" Dobsonian telescope and a group of amateur astronomers. One fellow Bay Area observer wrote about his co-workers reactions the day after it aired, when they asked him in disbelief, "do people really do that?" The answer, of course, is YES! This may have been the first time a Dob was featured in a television commercial, but it's certainly not the first time a group of enthusiasts have hauled their equipment to a remote location to enjoy a dark summer sky.

We're fortunate enough to live in the San Francisco Bay Area, which is a hotbed for amateur astronomy as well as professional astronomical research. Out of this rich primordial soup comes a unique organization of amateur astronomers called "The Astronomy Connection" or TAC for short. Many years ago TAC was founded by a small group of die-hard observers who decided that creating an informal "non-club" that communicates through internet list servers would be a very effective means of securing observing site permits throughout the Bay Area and attracting observing enthusiasts.

The result is an extraordinarily active and well disciplined list whose members organize frequent (almost weekly) astronomy gatherings throughout the region. Soon after its founding, the TAC idea spread to Sacramento, and then Southern California; both regions sporting active email lists and enthusiastic TAC observers.

It was only a matter of time until TAC par-

ticipants decided to create a larger summer event. Beginning in 1994, TAC began to organize an annual star party at Mt. Lassen. As the years went by, TAC outgrew the available camping and observing space at



Dobsonian telescope in the early 1980's

Mt. Lassen and joined up with the Shingletown Activities Council to create the Shingletown Star Party on an abandoned airstrip outside of town.

This year, TAC has moved its event further east. To take advantage of the wide open spaces, and the near-total-absence of light pollution along the border of Lassen and Modoc counties, TAC has moved its event to an unused corner of Frosty Acres Ranch in Adin California. Frosty Acres is a family owned cattle ranch specializing in grass fed, naturally raised cattle. Its owners caught the astronomy bug after joining TAC for a

night of dark sky observing at Mount Lassen.

This year's event will be held over four nights, from July 2nd through July 6th. The organizers (ourselves included) have literally spent years searching for the "perfect site" with ink black skies and no intrusive light domes, 360 degree horizons, minimal dust problems, and an area big enough to fully accommodate a large group of avid astronomers and their gear. This new location meets all of these important criteria.

The star party has accommodation for camping and RV's, on-site BBQ's featuring locally raised beef and locally grown produce, showers, sanitary facilities, and water. Off-site accommodations and services are also available in the nearby towns of Adin and Bieber. In addition to unparalleled stargazing at night, there are many daytime attractions and activities nearby as well.

GSSP is 100% organized and run by astronomers for astronomers. At this new venue, and with the support of avid astronomers and the local community, GSSP promises to be an annual event that will rival the top Star Parties in the country, including the Oregon and Texas Star Parties.

For more information about some of the organizations and events listed here, you can visit the following web site.

www.goldenstatestarparty.org

Richard Ozer
Bill Porte

Classroom Activities

For more information about Globe At Night and how it can be used in the classroom, read the article from Connie Walker in the quarterly newsletter, Universe in the Classroom, published by the Astronomical Society of the Pacific on their website at <http://www.astrosociety.org/uitc>

Archives are also available and each issue includes an informative article, hands-on activities that are ready to go into the classroom along with references for those who want to dig deeper on each subject.

400 YEARS *of the* TELESCOPE

Optical continued from page 1

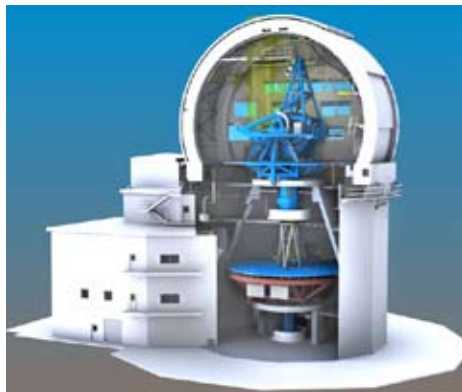
Hale considered that the filigree structure of a sunspot penumbra resembled iron filings sprinkled on paper above a bar magnet. Mindful of Pieter Zeeman's 1896 discovery that strong magnetic fields split spectral lines into multiples, Hale placed the slit of a spectrograph across a sunspot, and saw the spectral line split from one line into three in the middle of the spot, indicating a magnetic field more than 2,000 times stronger than Earth's. A year later, John Evershed observed Doppler shifts in sunspot spectral lines that revealed the flow of gases from the umbra outward through the penumbra.

Now we understand that the same magnetism that forms them is intertwined with space weather that affects terrestrial climate and human technologies. Studies of the Sun increasingly are dominated by the need to understand the dynamics of magnetism in spots, flares and even across the "quiet" Sun in a "magnetic carpet" that constantly reweaves itself. Like a tapestry viewed from across a museum gallery, its major threads now can be seen with moderate resolution instruments. But to understand their warp and woof, we need a microscope to analyze the individual fibers. From these, we expect to learn more about the internal dynamo that controls solar activity. That is the mission of the 4-meter ATST, scheduled for first light in 2015.

Until recently, such a large aperture made sense only for nighttime telescopes that needed to collect more photons from faint objects. It was not the case with the blinding Sun at an apparent magnitude of -26.8. Further, blurring in Earth's atmosphere limited spatial resolution to about 1 arcsecond (0.5" if the atmosphere cooperated for a few minutes). So the apertures of most solar telescopes topped out at 0.5 to 1 meter (the exception being the 1.5m McMath Pierce Solar Telescope).

The availability of adaptive optics (AO) that compensate for seeing effects revolutionized nighttime astronomy starting in the 1990s. The National Solar Observatory and its partners led the way for AO in solar physics. The challenges that faced solar AO were reduced contrast between target and background and more rapid daytime fluctuations,

as compared to what faced by nighttime astronomers. By late 2003 NSO and its team had demonstrated an AO system that used solar features as "landmarks" in rewriting the prescription for driving a deformable mirror that now became the optical reverse of the atmosphere's "rubber lens." Older solar telescopes suddenly were back on the front lines. The Dunn Solar Telescope, opened in 1969, now sees up to seven times sharper than when it opened in 1969. (The benchmark is a diffraction limit of 0.14" at 430.5nm, as



Rendering of the ATST Observatory Facility, December 2007

compared to the 1" limit due to seeing effects. This is G-band, which reveals sunspot structures in high contrast.)

Equally important, the new AO system showed that the technique could be scaled up to handle even larger apertures. Scientists had been studying concepts for 2.4m to 4m apertures since the late 1980s. The ATST project was initiated by the NSO in 2000 with broad support from the solar physics community. In particular, co-principal investigator institutions are the University of Hawaii's Institute for Astronomy, the High Altitude Observatory, the New Jersey Institute of Technology, and the University of Chicago. The U.S. Air Force Research Laboratory lent considerable support to the pathfinding AO development.

Designing ATST posed several challenges in order to peer deeper into a range of solar magnetic phenomena. Scientists wanted to observe the Sun with a spatial resolution of 0.03" at 630.2nm (the center of two magnetically important spectral lines), observe both the bright disk and the faint near corona (though not at the same time), and observe deep into the unexplored infrared

spectrum. These requirements converged on a 4-meter aperture. Observing the corona — only a millionth as bright as the disk — required that no support structures be in the field of view, lest they scatter light. Diving into the deep infrared, where Zeeman splitting is more pronounced as wavelength increases, bans windows or lenses that would absorb radiation past 2,000 or 3,000nm (2-3 μ m). These led to an off-axis design, where the primary mirror is a segment of a larger, imaginary 12-meter parent.

Other challenges lay ahead. Ironically, the world's largest solar telescope must be protected from the Sun. Temperatures of the primary mirror and of the telescope mount assembly must be maintained with 1.5 °C of ambient or cause internal seeing effects. Significant effort has been devoted to fine-tuning the design of an enclosure that presents as little frontal area to the Sun as possible, and incorporates a complex array of louvers and fans to ensure that warm air does not stagnate inside the enclosure.

Equally demanding thermal engineering is involved in the Top-End Telescope Assembly, housing the secondary mirror in a Gregorian arrangement that places a heat stop in front of the mirror. The stop will limit ATST's field of view to 300" (about 17 times the apparent diameter of Earth) and carry away solar heat from outside the field of view.

Following the primary and secondary mirrors, several mirrors will fold and relay light down into the co-rotating coude lab. These allow an extremely long focal length. In the lab, a 16m-diameter platform will host an array of permanent and guest instruments to complete the solar microscope that will study the Sun's fine magnetic structure.

To cope with atmospheric seeing effects, ATST will use the most complex adaptive optics (AO) system yet designed for a solar telescope. Where the Dunn Solar Telescope uses an AO76 system — dividing the view into 76 subapertures to measure and correct the incoming wavefront — ATST will have an AO1236 system. In addition, the deformable mirror that reshapes to correct for the atmosphere will be 215mm

Continued on page 6

400 YEARS *of the* TELESCOPE

US Plans continued from page 1

been an exciting and challenging task over the past year. In addition to being the associate director for public affairs and educational outreach at the National Optical Astronomy Observatory in Tucson, I serve as the US single-point-of-contact and co-chair of the US IYA Program Committee established by the American Astronomical Society (AAS), along with Dr. Susana Deustua. (A separate US IYA Development Committee chartered by the AAS is charged with finding the funds to support our best ideas for activities and programs, supplemented by a recently hired private fundraiser and by significant NSF grant funds that we hope to obtain. NASA also has a point-of-contact and lots of creative plans tied to its missions.)

This duty has taken us to international IYA meetings in Garching, Germany, and Athens, Greece, and to US meetings in Honolulu, Chicago and Austin, Texas, where our plans and proposed activities have garnered generally positive and supportive reactions.

We decided early in 2007 to aim high, with a goal of offering an engaging astronomy experience to every person in the country, nurturing existing partnerships, and building new connections to sustain public interest in astronomy. Some energetic brainstorming among our committees led to the following 10 major program areas:

Looking through a Telescope (star parties, sidewalk astronomy activities, etc.)

A Simple Telescope of Your Own (the Galileoscope) and Other Hands-on Optics Activities.

Astronomy for Classrooms, Afterschool Programs, and Families.

Dark-Skies Awareness (including programs to measure local sky brightness).

Reaching the Public through New Media (Facebook, Second Life, Podcasts, etc.)

Astronomy in the Arts and Entertainment Storytelling Activities and Cultural Astronomy

Research Experiences for Schools and Citizens

Programs at Science Centers, Planetaria and Observatory Visitor Centers.

From the Earth to the Universe: A Localized Exhibit of Astronomical Imagery

Each of these thematic areas has a working group of roughly 10 professional and amateur education and public outreach specialists (in addition to the three dozen people on the program and development committees), meaning we have engaged the volunteer efforts of well over 130 people. We hope to augment this soon with a central US IYA program office and full-time staff. More details about many of these themes and proposed activities is available (or will be soon) at the US IYA 2009 Web site: www.astronomy2009.us. I'll also try to highlight some of them in future columns for this blog.

But this month, I really want to encourage you to consider attending and presenting at a major meeting designed to prepare all of North America and beyond for IYA: the 2008 Meeting of the Astronomical Society of the Pacific in St. Louis, MO, from May 31 - June 4, 2008

Held in conjunction with the summer meeting of the American Astronomical Society, this exciting meeting will consist of hands-on workshops (over the weekend) and then a three-day symposium to help educators, scientists, public information professionals, and everyone working in astronomy and space-science outreach to prepare for the year-long celebration of 400 years of astronomy (since Galileo first turned his telescope to the skies).

Visit the following two websites for detailed information on presentation format opportunities and suggested themes.

www.astronomy2009.us
www.astrosociety.org/events/meeting.html

For information on registration and abstract submissions check at www.aas.org

If you are interested in presenting a workshop, please send a preliminary proposal to the ASP Symposium Program Committee no later than March 1, by emailing: 2008meeting@astrosociety.org. Please include a title, a brief description of your plans, and the names, institutions, and emails of the presenters.

The IYA Symposium and associated work-

shops represent a coordinated effort by the ASP and the AAS to prepare scientists, educators, science communicators and other groups to use the International Year of Astronomy as a vehicle to engage the American public in astronomy, education, and science literacy. We hope you will participate in this landmark meeting.

Optical continued from page 1

wide as compared to the Dunn's 77mm, and backed by 1,3969 actuators compared to the Dunn's 96. Two relay mirrors can be converted later to deformable mirrors to provide a more powerful multiconjugate AO (MCAO) system.

Building the world's best solar telescope has also meant selecting the world's best site. After an extensive survey, a site next to the existing Mees Solar Observatory at Haleakalā, Maui, Hawai'i (elev. 3 km), was selected for its excellent seeing and dark infrared skies with little seasonal variation.

What might come from such a telescope? Hints are provided by the addition of AO to the 76cm Dunn and the 98cm Swedish Solar Telescope (SST). Both have provided substantially sharper images and diffraction-limited spectro-polarimetry of solar activity. ATST's AO will have a fourfold improvement in linear resolution over the SST.

Even in the age of space-based observatories, a bright future lies ahead for large ground-based observatories designed to last decades longer than spacecraft, and having the ability to incorporate new technologies as they evolve. ATST's ability to study the Sun deep into the relatively unexplored thermal IR spectrum, combined with the capacity to measure the elusive coronal magnetic fields, will advance solar astronomy by a leap as big as those of Galileo and Hale.

This work utilizes data obtained by the Advanced Technology Solar Telescope (ATST) project, managed by the National Solar Observatory, which is operated by AURA, Inc. under a cooperative agreement with the NSF.

The author is the education and public outreach officer at the National Solar Observatory in Sunspot, NM.

Universe continued from page 1

throughout the whole of 2009. IYA2009 has been endorsed by UNESCO, which has recommended it for adoption by the United Nations. The IYA2009 was proclaimed by the United Nation on the 20th of December 2007.

The International Year of Astronomy 2009 is, as of today, supported by 103 National Nodes, 15 Organizational nodes, 9 Organizational Associates, 11 Global Cornerstone projects and 7 IYA2009 Task Groups. These are global programs of activities centred on a specific theme and represent the means to achieve the IYA 2009's main goals; whether it is the support and promotion of women in astronomy, the preservation of dark-sky sites around the world or educating and explaining the workings of the Universe to millions, the eleven cornerstones will be the key facets for success of the IYA 2009:

100 Hours of Astronomy

The "100 hours of astronomy" will take place in the weekend of Thursday, April 2nd, through Sunday, April 5th, 2009. This includes two weekdays (school days), which is ideal for students and teachers, and two weekend days, which is ideal for families. The Moon is at first quarter on the 2nd, so it is at a good phase for early-evening observing that whole weekend.

The Galileoscope

This cornerstone shares observational and personal experience with as many people as possible across the world. The task group is developing a simple, accessible, easy-to-assemble and easy-to-use telescope that can be distributed by the millions. Ideally, every participant in an IYA2009 event should be able to take home one of these little telescopes.

Cosmic Diary

Since October 2007, the Cosmic Diary Cornerstone Project has made important progress. The first aim is to set up a blog, where a group of astronomers will be able to discuss their work, their lives and hobbies, and communicate science to the public. Although this is the main objective of

the project, we are making every effort to take it beyond and produce a Cosmic Diary Book and a Cosmic Diary Documentary.

The Portal to the Universe

The Portal to the Universe will enable innovative access to, and vastly multiply the use of, astronomy multimedia resources – including news, images, videos, events, podcasts, vodcasts, etc. ESA/Hubble, is prepared to sponsor a considerable amount of manpower for the construction and first year or two of operation. The work will be done in close cooperation with the IAU IYA Secretariat.

She is an Astronomer

The aim of the project is to provide neutral, informative and helpful information to female professional and amateur astronomers, students and those who are generally interested in the gender equality problem in science. We believe that providing this information can help to increase the interest of young females to study and pursue a career in astronomy.

Dark Skies Awareness

For this cornerstone project, IAU will collaborate with the U.S. National Optical Astronomy Observatory, International Dark-Sky Association and other national and international partners in dark sky and environmental education. Several related themes, including worldwide measurements of local dark skies by thousands of citizen-scientists using both unaided eyes and digital sky-quality meters, star parties, new lighting technologies, arts and storytelling.

Astronomy and World Heritage

UNESCO and the IAU are working together to implement a research and education collaboration as part of UNESCO's Astronomy and World Heritage project. This initiative aims at the recognition and promotion of achievements in science through the nomination of architectural properties, sites or landscape forms related to the observation of the sky through the history of mankind or connected with astronomy in some other way.

Galileo Teacher Training Programme

The goal of this cornerstone is to create by 2012 a world-wide network of certified Galileo Ambassadors, Master Teachers and Teachers. Included in the program is the use of workshops and on-line training tools to teach the topics of robotic optical and radio telescopes, web cams, astronomy exercises, cross-disciplinary resources, image processing, and digital universes (web and desktop planetariums).

Universe Awareness

UNAWE is an international outreach activity that inspires young disadvantaged children with the beauty and grandeur of the universe. UNAWE enables the exchange of ideas and materials through networking and interdisciplinary workshops.

From Earth to the Universe - an exhibit of astronomical images

This cornerstone will generate and facilitate exhibitions of astronomical images around the world in a variety of settings during IYA2009. One crucial goal of this effort would be to place these images in "non-traditional" locations. That is, we hope that in addition to having these images featured in "traditional" settings such as science centres and planetariums, other types of locations such as public parks, metro stations, art centres, and others would be host to these images. In short, we hope to expose astronomy to the general public in an unexpected yet accessible manner.

Developing Astronomy Globally

A cornerstone project that responds to the acknowledgement that astronomy needs to be developed, both professionally (universities, research), publicly (communication, media, amateur groups) and educationally (schools) in various countries that do not have strong astronomy communities. The implementation would be focused upon training and development at each of the levels mentioned above. For more information please check out the IYA2009 main web site: www.astronomy.org or contact us:

Continued on page 8

Foothill College Astronomy Teacher, Wins National Physics Prize

Andrew Fraknoi is a 400 Years of the Telescope partner in collaboration with the [Astronomical Society of the Pacific](#).

What were the atoms in your body doing eight billion years ago? At least some of them were inside a star that later exploded, says Foothill College Astronomy and Physics Instructor Andrew Fraknoi, who has been answering questions like that for students, on the radio and in books and articles, for more than 30 years. Those atoms, he tells students, are on loan to them from the universe, and it's up to the students to make the best possible use of those atoms while they are borrowing them. It's that kind of excitement about space—and his unique ability to share that excitement through his writing—that has won Fraknoi the prestigious American Institute of Physics Andrew Gemant Award.



A resident of San Francisco, Fraknoi was presented with the Gemant Award at the 211th annual meeting of the American Astronomical Society in Austin, Texas, Jan. 9. In addition to the invitation to deliver his guest lecture, From the West Wing to Pink Floyd to Einstein Advertising: Astronomy in Popular Culture, to the society's membership and the public, he receives a citation and a \$5,000 monetary award, and is given the opportunity to designate one or more academic institutions that will share a \$3,000 grant to further the public communication of physics. Fraknoi has selected Foothill College and the Astronomical Society of the Pacific as the grant recipients.

The American Institute of Physics (AIP) award committee selected Fraknoi for "his extraordinary contributions as a teacher, a public lecturer, co-author/editor of a syndi-

cated astronomy newspaper column, host/producer of a weekly radio show and numerous guest appearances on national TV." The committee also lauded his tremendous breadth. "His rare combination of skills has resulted in his being sought nationally and internationally as a spokesperson for physics, astronomy, the history of science, and the connection of science to all human activities."

"I am awed to be included among the recipients of this award, which has been won by some of the most eminent figures in the popularization of physics and its cultural dimensions," Fraknoi said. "People like Philip Morrison, Stephen Hawking and Steven Weinberg have been heroes of mine for so many years."

A prolific author, Fraknoi co-edited *The Planets* and *The Universe*, two collections of science articles and science fiction stories for Bantam Books in the 1980s. His children's book on astronomy, *Wonderful World of Space*, was published by Disney in 2007, and features really bad astronomy puns using Disney and Pixar film characters.

For 14 years, Fraknoi served as the executive director of the Astronomical Society of the Pacific, an international scientific and educational organization founded in 1889.

Asteroid 4859 has been named Asteroid Fraknoi by the International Astronomical Union to honor his work in sharing the excitement of modern astronomy with students, teachers and the public.

Educated at Harvard and the University of California, Berkeley, Fraknoi has taught astronomy and physics at San Francisco State University, City College of San Francisco, Cañada College, and several campuses of the University of California Extension Division. For UC Extension, he has taught large weekend programs, including "Violence in the Universe," "The Science of Science Fiction," and "Einstein: The Man & His Legacy" (the last with previous Gemant winner Alan Friedman.)

Read the complete article here:
www.foothill.fhda.edu/index.php

Universe continued from page 7



Pedro Russo
International Year of
Astronomy 2009 Coor-
dinator

International Astro-
nomical Union

E-mail: prusso@eso.org
Phone: +49 (0) 89 320 06 195
Fax: +49 (0) 89 320 06 703

Volume 1 Issue 1
February 2008

400 Years of the Telescope e-newsletter is a production of Interstellar Studios, a digital media production company with a focus on astronomical, educational and cultural programming. All contents are copyright of Interstellar Studios.

Editorial Team

Executive Producer
Kris Koenig

Editors
Jennifer Oman
Anita Berkow

Design & Production
Michael Moretti

Contact
jennifer@interstellarstudios.com

Interstellar Studios
11 Ilahee Lane
Chico, California 95973
(530) 343 5635

Current Production
"400 Years of the Telescope. A
journey of science, technology and
thought"
www.400years.org