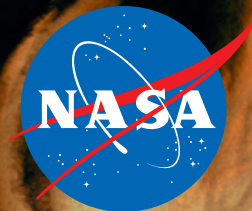


National Aeronautics and Space Administration  
www.nasa.gov  
Volume 2 Issue 15  
August 2006



# GooddardView

## “Our Earth As Art”

Pg 2

Savings Millions in Government Dollars:  
Landsat Helps Fight Crop Insurance Fraud

Pg 3

NASA and COBE Scientists Win  
Top Cosmology Prize

Pg 7



## Our Earth as Art

Edited By Laura Rocchio and Alana Little

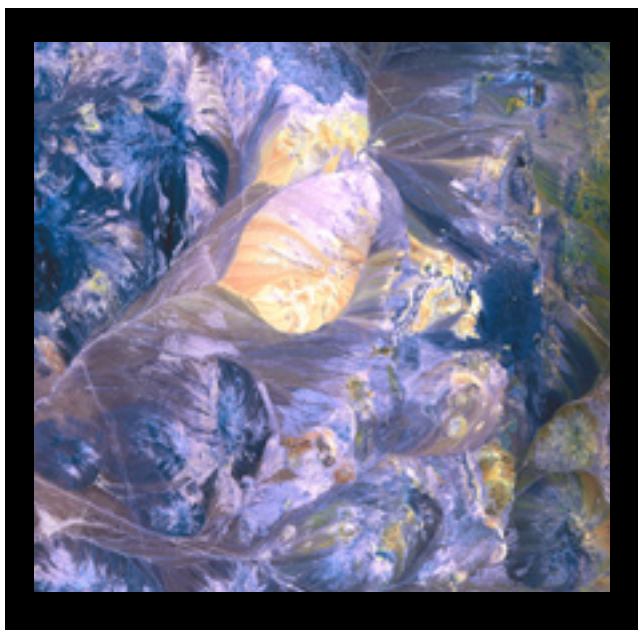


Image Credit: USGS National Center for EROS/NASA

*Caption: The Andes: Vivid colors belie the arid landscape of northern Chile where the Atacama Desert, one of the world's driest, meets the foothills of the Andes. Here, salt pans and gorges choked with mineral-streaked sediments give way to white-capped volcanoes.*

**The above image looks like a beautiful parlor-worthy abstract painting but is actually a Landsat 7 image depicting the Atacama Desert and the Andes mountains located in Chile.**

The image is part of a series of science-meets-art works titled "Earth as Art." The "Earth as Art" effort began as a collection of unusual and compelling Landsat images of locations around the world, chosen for their stunning visual qualities. The collection has since expanded to include images from other NASA satellites, including a wide variety of land forms and features, from the Yukon Delta to the Everglades, to the Syrian Desert, to the Lambert Glacier in Antarctica.

The "Earth as Art" online gallery premiered in July 2002 and has been hugely popular. In 2003, a second set of "Earth as Art" images was put together—this time using images from both Landsat 7 and the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) aboard the Terra Satellite.

The Landsat Program is a series of Earth-observing satellite missions jointly managed by NASA and the U.S. Geological Survey. Since 1972, Landsat satellites have collected information about Earth from space. This science, known as remote sensing, has allowed the collection of spectral information from Earth's surface, creating a historical archive unmatched in quality, detail, coverage, and length. Landsat calibration scientists, researchers, and education specialists work in the Hydrospheric and Biospheric Sciences Laboratory here at Goddard.

To learn more about the "Earth as Art" program please visit:

<http://earthasart.gsfc.nasa.gov/about.html> ■

## Table of Contents

**Goddard Updates**

Our Earth as Art - 2

Saving Millions in Government Dollars:

Landsat Helps Fight Crop Insurance Fraud - 3

SOHO Discovers 1,000th "Sungrazing" Comet - 4

**Goddard Family**

NASA and COBE Scientists Win

Top Cosmology Prize - 7

**Employee Spotlight**

Kenneth Silberman - 8

Cover Caption: As air flows over and around objects in its path, spiraling eddies, known as "Von Karman vortices," may form. The vortices in this image were created when prevailing winds sweeping east across the northern Pacific Ocean encountered Alaska's Aleutian Islands..

Image Credit Courtesy USGS National Center for EROS/NASA

Correction from Issue 14:

Volume 2 Issue 14 *Wallops and NOAA Monitoring the Chesapeake Bay*, stated that second author Tracey Riley was a student at Snow Hill High School. Tracey Riley is a teacher at Snow Hill High School.

## GoddardView Info

*Goddard View* is an official publication of the Goddard Space Flight Center. It is published biweekly by the Office of Public Affairs in the interest of Goddard employees, contractors, and retirees. A PDF version is available online at:

<http://www.nasa.gov/centers/goddard/news/index.html>

**Managing Editor:** Trusilla Steele

**Editor:** Alana Little

**Deadlines:** News items and brief announcements for publication in the *Goddard View* must be received by noon of the 1st and 3rd Wednesdays of the month. You may submit contributions to the editor via e-mail at [alittle@pop100.gsfc.nasa.gov](mailto:alittle@pop100.gsfc.nasa.gov). Ideas for new stories are welcome, but will be published as space allows. All submissions are subject to editing.

# Saving Millions in Government Dollars: Landsat Helps Fight Crop Insurance Fraud

By Laura Rocchio

Farming is a risky business. A farmer must deal with the precarious nature of the weather, the volatility of commodity prices, and the perils of insects and disease, all so that you and I can eat.

The U.S. Department of Agriculture (USDA) helps farmers manage their risks through the Federal Crop Insurance Program. But through the years, fraud and abuse by a small percentage of farmers has put this essential program in jeopardy, forcing the Government to seek stricter enforcement methods. Enter Landsat data.

## Armed and Armored with Landsat Data

"Landsat has played a major role in shifting the tide of fraud cases," says Dr. John Brown, an agricultural private investigator, who analyzes Landsat satellite images of farms suspected of fraudulent insurance claims. Landsat imagery is typically employed if a USDA field investigator determines that claim verification is warranted. The image investigation is performed either internally by the USDA's Risk Management Agency (RMA) or contracted out to a private remote sensing expert like Brown. Over the past three years, the RMA has used an average of 600 Landsat scenes per year for investigative purposes. Typically, about half of the Landsat image analyses support a farmer's insurance claim and half indicate fraud. "The overwhelming majority of the American farmers who buy crop insurance are honest," says Dr. Jim Hipple, a remote sensing and GIS advisor with the RMA. "The instances where Landsat highlights egregious fraud are important, but there are also many times when the use of Landsat supports a producer's claim of an insurable loss—a situation where the forces of disease, drought, and weather looked out of the norm," says Hipple.

## Landsat and the Investigation

When Brown is hired to investigate a questionable claim, he looks for evidence of whether or not a farmer actually planted or harvested what they said they did.

Brown has testified as an expert witness 26 times solving over \$50 million in crop fraud cases, mainly for the Government. In some cases, Brown is able to show that a field that a farmer claimed had failed was never even plowed. "A Landsat image catches them in the act," Brown says, referring to both the bi-monthly Landsat image acquisition schedule and the robust U.S. Landsat data archive.

Hipple explains, "because fraud does not occur in a predictable pattern, and those who commit fraud may try to hide or cover up the fraud, we need a data source of adequate spatial resolution (30 meters or better) that systematically images the entire continental U.S., Alaska, Hawaii, and Puerto Rico—places where crop insurance is available."

Success using Landsat data to support program compliance has prompted the RMA to train their compliance investigators in image analysis. These analyses can mean a sizable cost savings for the U.S. Government, who no longer has to underwrite as many fraudulent claims. "A conservative estimate would be that Landsat saves the U.S. Government \$100 million per year," says Brown. "More importantly, the criminals now know they are being watched," Brown surmises. In regions where Brown has testified, the number of claims and appeals has dropped, and farmers have even come into USDA offices to admit guilt.

## Weeding Out Fraud

Such cases of multimillion dollar insurance fraud precipitated the Agriculture Risk Protection Act (ARPA) legislation, passed in 2000. The act stated that data mining technologies and tangible punishments, such as jail time and restitution, should be employed to improve program compliance.

In order to prosecute a farmer with an anomalous claim, an investigation must be done. Satellite imagery, such as Landsat, is often used to determine if the imagery of the ground matches the farmer's claim.

## Landsat as Evidence

When Landsat data are used as evidence in a courtroom, there are two main challenges: an expert witness must be able to convince a jury unfamiliar with remotely sensed imagery to trust Landsat data, and the prosecution must assure that the judge admits the Landsat images as evidence into the courtroom—a legal protocol known as the "Daubert Challenge." Brown gives a brief presentation explaining what a Landsat satellite is and how it works so that jurors can understand and trust Landsat data. And, it is relatively easy for Brown to mount a "Daubert Challenge" given the wealth of scientific literature documenting Landsat data usage, the sensor's unparalleled calibration standards, and an abundance of proven data analysis methods.

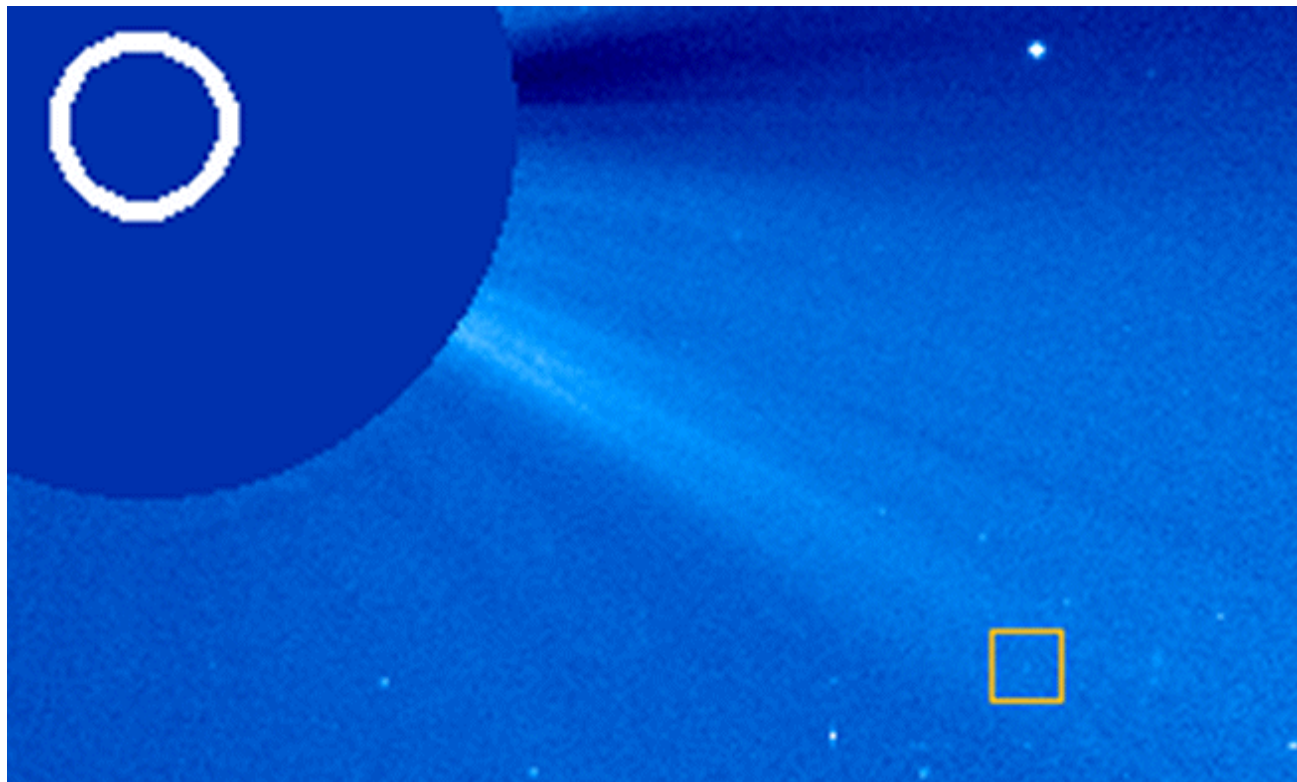
"The history of Landsat applications in agriculture is strong, therefore, I have numerous scientific protocols that are accepted in the scientific community and readily accepted in court," Brown says.

## Adding It All Up

By and large, Landsat data play a critical role in agricultural fraud investigations because of Landsat's regular coverage over the U.S. and its well-populated data archive. ■

## SOHO Discovers 1,000th “Sungrazing” Comet

By Karl Battams/Naval Research Lab and Joe Gurman



*Caption: Comet SOHO-1185, the 1000th comet of the Kreutz family of “sungrazing” comets discovered in SOHO images*

Image Credit: NASA

**Images from the Solar and Heliospheric Observatory (SOHO) spacecraft have been used to find 1,000 “sungrazing” comets, a special class of comet that comes extremely close to the Sun. Polish amateur comet hunter Arkadiusz Kubczak made the latest discovery, which marks the 1000th SOHO comet discovery in the Kreutz group of “sungrazing” comets.**

Kubczak used SOHO Large Angle and Spectrometric Coronagraph (LASCO) images, available to all over the Internet, to make the find, which happens to be his third using SOHO imagery. The faint object is officially designated C/2006 P7 (SOHO) by the Minor Planet Center of the International Astronomical Union.

To date, 1,185 comets have been discovered in data from the SOHO LASCO or Solar Wind Anisotropies (SWAN) instruments (the other 185 are not members of the Kreutz group), making SOHO the most prolific comet hunter in recorded history.

The SOHO Experimenters’ Operations Facility is located in Building 3 at Goddard, and SOHO’s mission operations center nearby is part of the Integrated Mission Operations Center (IMOC).

**While there is no formal definition of a “sungrazing comet,” the term typically refers to the Kreutz-group comets, whose orbit takes them as close as 1,460,000 km (about 900,000 miles) to the solar surface.**

Compared to terrestrial distances, this doesn’t seem like a near miss, but it is less than 1% of the distance between Earth and the Sun. Before the launch of SOHO in December 1995, only about 30 members of the Kreutz group were known. All 1,000 Kreutz comets are believed to be fragments of a single comet observed c. 371 BCE by Aristotle and Ephorus, and the fragments themselves continue to fragment, making more “sungrazing” comets.

More about SOHO comets, “sungrazers,” and the Kreutz group can be found at: <http://ares.nrl.navy.mil/sungrazer> ■

## Aura Field Campaign Checks Our Air Quality

By Steve Cole and Lynn Chandler



Photo Credit: Deborah McCallum

*Caption: Students filling balloon with helium in preparation of launch*

**On August 3, under the blistering Sun of a typical Washington-area summer afternoon, Goddard scientists, their colleagues, and students braved the heat and the poor air quality to launch instrument-laden balloons as part of the Water Vapor Validation Experiment–Satellite/Sondes (WAVES).**

**Launched from the Howard University Research Campus in Beltsville, this six-week long field experiment brings together a unique collection of instruments on the ground and in the air to acquire a set of summertime measurements of atmospheric water vapor, aerosols, and trace gases for comparison to the data received from NASA's Aura spacecraft.**

The balloon launch was timed for precisely 1:51 p.m. to coincide with the overpass of Aura some 400-miles overhead. As Aura looked down from above to make measurements of the “chemical soup” of gases in the atmosphere, the instruments tied to the end of the helium balloon took measurements at the same time.

Researchers from NASA, the National Oceanic and Atmospheric Administration (NOAA), and Howard University watched their computer screens in mobile trailers as data began streaming down from the balloon instruments immediately after launch. Ultimately, they want to use Aura and other satellites to help predict air quality, but they need to check its data against proven sources, like the instruments on the weather balloon.

David Whiteman and Belay Demoz, of the Mesoscale Atmospheric Processes Branch, co-lead the NASA research team, which also included advanced lidar systems that use a beam of laser light pointed straight up into the sky to detect different gases and aerosol particles in great detail. Other teams from Howard and the Pennsylvania State University brought instruments and expertise to the sprawling wooded campus just north of the Capital Beltway.

“With a large collaboration like this, you can really investigate a lot of interesting aspects of air quality,” said Whiteman. “You can look straight down through the atmosphere to the ground from the satellite, and at the same time you see in great detail the whole chemical soup of pollutants near the surface from the State of Maryland’s air quality monitoring site located here, at the Howard University Campus.”

The experiment also evaluated for the National Weather Service the next generation of instruments used in daily weather forecasting, as well as tracking one of the strongest greenhouse gases involved in climate change—water vapor, which at increased levels we feel as humidity.

Aura, launched in 2004, carries a group of instruments designed to take global measurements of air pollution on a daily basis. Aura sensors can detect five of the six air pollutants regulated by the U.S. Environmental Protection Agency. For more information, please visit:

[http://www.nasa.gov/vision/earth/environment/washington\\_air.html](http://www.nasa.gov/vision/earth/environment/washington_air.html) ■



## Organizational Silence

By Lynn Chandler

The topic of the August 2nd Knowledge Sharing Workshop was Organizational Silence. The distinguished panelists were Chris Scolese, NASA's Chief Engineer; Brian O'Connor, NASA's Chief Safety Officer; Charles Camarda, Principal Engineer, NESC, and STS-114 Astronaut; Rodney Rocha, Division Chief Engineer, Space Shuttle; Jeff O'Konek, retired Navy SEAL; and Ginger Malone, Chief Nurse Executive, Children's Hospitals and Clinics of Minnesota.

Ed Rogers, Chief Knowledge Management Officer opened by saying that this workshop came about as a result of the Fall 2005 Goddard Leadership Education Series (GLES) class. One of the groups within this GLES class chose the topic of Organizational Silence as their final project and presented it to the Executive Council earlier this year.

After each presenter shared their personal experiences with organizational silence and the impact it has on missions, organizations, and lives, the workshop was opened up to questions. The audience of a few hundred participants submitted their questions anonymously, which initiated the interactive session after the presentations.

The messages delivered by the presenters were clear and concise and basically the same.

**Speak up! If you see a problem, let somebody know. If they don't hear you, continue up the chain of command until you are successful in getting your message heard. Never give up, especially if you feel very strongly about your concerns and you have the facts and data to support them.**

The *Columbia* tragedy was held up as the ultimate example. During this incident, Chief Engineer (Space Shuttle DGE) Rodney Rocha made seven separate attempts to get more images of the wing before re-entry and all seven attempts went unheard.

If people feel they are not listened to, then they become frustrated and begin to shut down. Some people expressed concerns that their careers could be destroyed for speaking up. There was some discussion regarding whether employees are still struggling to be heard.

Some employees still feel that their ideas will be rejected or let go. It was suggested that employees need to learn what the barriers to openness are and find out why our environment is so rigid that people are still afraid to speak up.

"For our organization to move away from 'organizational silence,' support has to come from the top," said Camarda. "People shouldn't have to put their badges on the line or jeopardize their career just to be heard."

All of the presenters agreed that communication is the most important thing in all organizations.

**Employees DO NOT have the right NOT to speak up. If you think or feel something is wrong, but don't think you are in a position to speak up, do it anyway because every employee has an obligation to speak up.**

**Did You Know?**

### Athletic Shoes:

Shock-absorbing material used in Moon boots helped astronauts walk safely on the Moon and makes today's athletic shoes lighter and more stable. ■

"If the issue is very important, either pick up the phone, or better yet, make a personal visit because e-mail doesn't work," said Chris Scolese, NASA Chief Engineer and former deputy Center Director. He also added "it is very important to learn from close calls. Do not ignore mistakes, failures, and near misses. Acknowledge these and learn from them."

Some of the discussion also focused on the need for Goddard to create an environment of courage. Employees need to be encouraged to speak up and rewarded when they do. Talk during the workshop centered around creating a new award based on integrity for those who speak up.

This workshop, offered by the Office of Mission Success, shows that the topic of organizational silence is important to Center management. This workshop was a good start because it made employees start thinking of ways to prevent/limit organizational silence in their own organizations and it opened dialogues about the subject. ■

# NASA and COBE Scientists Win Top Cosmology Prize

By Dwayne Washington



Caption: John Mather

**The 2006 Gruber Cosmology Prize has been awarded to John Mather and the Cosmic Background Explorer (COBE) Science Team for their ground-breaking studies confirming that our universe was born in a hot Big Bang.**

A gold medal and \$250,000 prize was presented to Dr. Mather of NASA Goddard Space Flight Center in Greenbelt, Md., who represented the COBE team at the opening ceremony of the International Astronomical Union's General Assembly in Prague on August 15.

"The COBE mission was amazingly difficult, but it worked beautifully thanks to a brilliant team of scientists and engineers, and it changed cosmology forever," said Mather, who was COBE mission project scientist and now serves as Senior Project Scientist for the James Webb Space Telescope. "COBE succeeded beyond my wildest dreams. When we started in 1974, cosmology was very speculative. Now it's extremely quantitative, and we can answer questions that nobody had ever asked before."

**The Cosmology Prize, given by the Peter Gruber Foundation, recognizes individuals who have contributed to fundamental advances in the field of cosmology. The purpose of the Gruber Cosmology Prize is to acknowledge and encourage further exploration in a field that shapes the way we perceive and comprehend our universe.**

COBE was built by NASA Goddard and launched in 1989 to measure microwave and infrared light from the early universe. COBE determined that the cosmic microwave background, which is essentially the afterglow of the Big Bang, has a temperature of  $2.725 \pm 0.002$  Kelvin, or about minus 455 degrees Fahrenheit. This observation matched the predictions of the hot Big Bang theory extraordinarily well and indicated that nearly all of the radiant energy of the universe was released within the first year after the Big Bang.

In addition, COBE discovered slight temperature variations (about 10 parts per million) in this relatively uniform light. These variations—a little more heat here, a little less there—pointed to density differences which, through gravity over the course of billions of years, gave rise to the stars, galaxies, and hierarchal structure we see today. Steven Hawking, independent of the COBE team, called these variations "the most important discovery of the century, if not of all time."

The COBE mission ended in 1994 and carried three instruments: The Far Infrared Absolute Spectrophotometer (FIRAS), which measured the temperature and spectrum of the cosmic microwave background (Mather was also the FIRAS Principal Investigator (PI), and Richard Shafer of NASA Goddard was Deputy PI); the Differential Microwave Radiometer (DMR), which measured the temperature variations, called anisotropy (George Smoot of the University of California, Berkeley, was the DMR PI, and Charles L. Bennett, then at Goddard and now at Johns Hopkins University, was the Deputy PI) and lastly, the Diffuse Infrared Background Experiment (DIRBE), which measured the cosmic infrared background, the "core sample" of the universe, containing the cumulative emissions of stars and galaxies dating back to the epoch of first light hundreds of millions of years after the Big Bang.

The result was surprising: the universe has produced twice as much light as had been thought, and hidden it from view. A previously unknown population of galaxies made this light. Michael Hauser, then of Goddard and now at the Space Telescope Science Institute in Baltimore, was the DIRBE PI. Tom Kelsall of Goddard was the Deputy. NASA's Wilkinson Microwave Anisotropy Probe (WMAP), now in orbit, builds on the COBE legacy, exploring in far greater detail the temperature variations the COBE discovered.

Continued on Page 8

## Employee Spotlight: Kenneth Silberman

By Alana Little

**Kenneth Silberman of NASA/GSFC made his first parachute jump on Saturday, July 29, 2006. He bailed out at over two-and-a-half miles above the Delmarva Peninsula. During his one minute of freefall, he completed three 360 degree right-hand turns and linked up with a videographer for a handshake in midair. After popping the chute at 5,000 feet, he completed a high-G left hand turn and softly landed in the drop zone with his instructor.**

**An awesome accomplishment for anyone, this feat was especially awesome because Ken is blind.**

When asked why he decided to try parachuting, he simply said “a friend thought it would be fun.” Fun is something Ken is definitely about but he works hard also.

At Goddard, Ken is a computer engineer and IT security specialist and has been working for Goddard for over 16 years. He's also the first blind U.S. Patent Attorney and the first blind Aerospace Engineer. As if that's not enough, Ken is also the first blind Community Emergency Response Team member in Greenbelt, Md. He enjoys HAM radio and ARIS radio—a program that allows kids to talk to astronauts in space. This busy man is also a member of the Goddard Dance Club. ■

A picture of Kenneth Silberman was unavailable at the time of publishing.

---

## NASA and COBE Scientists Win Top Cosmology Prize

Continued From Page 7

Along with the scientists previously mentioned, the recipients include the other members of the COBE Science Working Group: Eli Dwek, S. Harvey Moseley, Robert F. Silverberg, and Nancy Boggess (retired) of NASA Goddard; Edward Cheng, formerly with Goddard and now president of Conceptual Analytics; Samuel Gulkis and Michael A. Janssen of the NASA Jet Propulsion Laboratory; Rainer Weiss of the Massachusetts Institute of Technology; Stephan Meyer of the University of Chicago; Philip Lubin of the University of California, Santa Barbara; Edward Wright of the University of California, Los Angeles; Thomas Murdock of Frontier Technology; and the estate of the late David T. Wilkinson of Princeton University.

The Peter Gruber Foundation was founded in 1993 and has established a record of charitable giving principally in the U.S. Virgin Islands, where it is located. The Foundation supports five international awards: Cosmology, Justice, Genetics, Neuroscience, and Women's Rights. Since 2001, the Cosmology Prize has been co-sponsored by the International Astronomical Union. ■