



National Aeronautics and  
Space Administration  
Goddard Space Flight Center

# GODDARD news

Greenbelt, Maryland/Wallops Island, Virginia

Mar. 1998 Vol. 2 No.9

The Goddard News is published weekly by the Office of Public Affairs, Goddard Space Flight Center, Greenbelt, MD 20771

## New Deputy Director of Goddard Named

William F. Townsend, Deputy Associate Administrator for Earth Science (Programs) at NASA Headquarters, has been named Deputy Director of Goddard. Townsend, an experienced manager who started his NASA career more than 30 years ago at Wallops, begins his new assignment on March 23.

"The Agency is fortunate to have a person of Bill's technical and managerial expertise accept this new challenge," said NASA Administrator Daniel S. Goldin. "His capabilities will be a real asset at Goddard."

Townsend was named Deputy Associate Administrator (Programs) for the Office of Earth Science at NASA Headquarters in August 1993 where he was responsible for the general management and direction of all Earth Science flight programs. For nearly two years, beginning in June 1996, Townsend served as acting Associate Administrator for the Enterprise. With Goddard being the Agency's lead center for the Earth Science enterprise, Townsend's experience in Earth science issues will greatly benefit Goddard's program.

Townsend's involvement in Earth Science programs dates back to his career

at Wallops where he had a variety of responsibilities mainly relating to the development of remote sensing instruments for flight on aircraft and satellites.

"I've known and respected Bill Townsend for a long time and am really looking forward to working with him," said Goddard Director *A.V. Diaz*. "I'm delighted he's returning home to Goddard. His background and experience makes him the absolute perfect choice for this job. Bill is an outstanding leader who is highly respected in the technical and scientific communities, and I know he will make important contributions to Goddard's space science, Earth science and technology programs benefiting both Goddard and the Agency.

Prior to being named the Deputy Associate Administrator (Programs), Townsend was Deputy Director of the Earth Science and Applications Division. From November 1988 to March 1991, he served as Chief of the Flight Program Branch in that same Division. His first assignment at NASA Headquarters was to lead the development of TOPEX/POSEIDON, a

cooperative program with France, whose purpose was to fully exploit the potential of altimetry for oceanography. During his tenure at Wallops, Townsend was Experiment Manager for the Seasat Radar Altimeter Experiment which flew in 1978 and provided the first decimeter quality altimeter data taken over the oceans from space.

Townsend was born in Nassawadox, Va. He received an electrical engineering degree with honors from Virginia Polytechnic Institute in Blacksburg, Va. He has received numerous awards, including the NASA Exceptional Service Medal in 1976 for his pioneering work in radar altimetry, and the NASA Medal for Outstanding Leadership and the French Space Agency's Bronze Medal for his work on the highly successful TOPEX/POSEIDON program. In 1994 he received the Presidential Rank Award for Meritorious Executive and he received the NASA Distinguished Service Medal in 1995 for his leadership and technical guidance of the Mission to Planet Earth (now Earth Science) program. The Center gives a warm welcome to Dr. Townsend!

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## Wallops Helps Assess Coastline Changes

by Keith Koehler, Office of Public Affairs

Winter storms have severely damaged some segments of the Maryland and Virginia coast, while having little impact in other areas, according to data recently obtained by NASA. Using airborne laser technology, the Wallops Flight Facility, Wallops Island, Va. has been able to provide a cost effective and highly accurate process of mapping beach erosion.

"The worst overwash appears to have occurred on the north end of Assateague Island, four to six miles south of the Ocean City Inlet," said *Bill Krabill*, a researcher in the Observational Science Branch at Wallops. According to Krabill, "Other features of interest are the dunes restored with beach grass in the National Park area on the north end of Assateague and how well they survived." Assateague is a barrier island on the coast of Maryland and Virginia.

Following recent powerful coastal storms in February, NASA, in cooperation with the National Park Service, conducted the mapping mission over 100 miles of coastline. By comparing the data obtained

to that received in 1997, federal, state and local agencies are able to accurately quantify beach damage.

A NASA P-3 research aircraft carrying the Airborne Topographic Mapper (ATM), a laser mapping instrument, flew over the coast at low tide from Cape Henlopen, Del. to Wallops Island. The instrument collected 5,000 spot elevations per second as the aircraft traveled over the beach at approximately 300 feet per second.

In addition, Krabill and a team from Wallops used the same technology to map extensive portions of the California and Oregon coast prior to the 1997-98 El Niño. Another mapping mission of the same area will be conducted following this year's storm season providing much needed information on the effects of El Niño driven storms.

Further information on the Airborne Topographic Mapper and the Assateague Survey can be found at the following URL: <http://aol.wff.nasa.gov/aoltm/projects/beachmap/>

## Lunar Prospector Finds Evidence of Ice at Moon's Poles

Just two months after the launch of NASA's Lunar Prospector, initial scientific data returned by the spacecraft indicates that there is a high probability that water ice exists at both the north and south poles of the Moon.

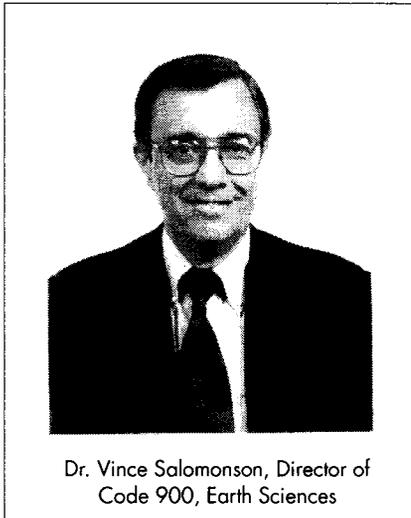
Graphs of data ratios from the spacecraft's neutron spectrometer instrument reveal distinctive 3.4 percent and 2.2 percent dips in the relative curves over the polar regions of the moon. This type of data signature is what scientists believe to be indicative of the presence of water ice on the moon.

Lunar Prospector, which has performed beyond all expectations, is scheduled to continue its current primary data gathering mission at an altitude of 62 miles for a period of ten months or more. In addition to this latest discovery, telemetry data from the spacecraft has been analyzed to produce a full gravity map of both the near and far side of the moon. For more information about the Lunar Prospector mission, go to: <http://lunar.arc.nasa.gov>

## EMPLOYEE ACHIEVEMENTS

### Code 900 Director Elected IEEE Fellow

Dr. Vince Salomonson, Director of Earth Sciences, Code 900, recently was elected a Fellow of the Institute of



Dr. Vince Salomonson, Director of Code 900, Earth Sciences

Electrical and Electronics Engineers, Inc.

Dr. Salomonson was selected for his "leadership and research in spaceborne technology and remote sensing."

THE IEEE is a worldwide technical professional society devoted to advancing the theory and application of elect-

ronics and computing, serving engineers, scientists, and other professionals in approximately 150 countries. Election to the IEEE is a very prestigious honor bestowed upon a very limited number of members who have made outstanding contributions to the art and science of electrical, electronics and computer engineering and related disciplines. Congratulations to Dr. Salomonson on his election.

### Displacements of the Earth's Surface Due to Rotation

By Lynn Chandler, Office of Public Affairs

Goddard geodetic scientists and modern geodetic techniques are providing ever increasing details about the motion of the Earth and how that motion is affecting, or is affected by, the surface of the Earth. Networks of Very Long Baseline Interferometry (VLBI) and Global Positioning System (GPS) instruments now have the precision to identify many of the smaller amplitude motions and can frequently allow investigators to determine the cause of these motions. For example, changes in the pole of rotation lead to average crustal deformations of about 20 mm and changes in the rate of rotation lead to average deformations of about 0.5 mm. Oceanic tides, man-made water catchment basins and other factors also affect the rotation of the Earth. There is another indirect effect of the oceans. Because of the density difference between the oceans and the continents, the oceans put a load on the continental land mass, like the way a cushion might be deflected near the position where a person sits. One must calculate how the centripetal force on the ocean due to Earth rotation modifies the loading on the continents. This modification amounts to only about 4 mm and is reported in a paper entitled "Site displacement due to variation in Earth rotation" by *John M. Gipson* and *Chopo Ma* soon to be published in the Journal of Geophysical Research.

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### Don't Miss Goddard's Technology Showcase



NASA's Goddard Space Flight Center is a leader and national resource in the development and utilization of today's cutting-edge technology. As the 21st century approaches, NASA not only must share its technologies, facilities and expertise with the Nation, but must continue to search for innovative approaches to the Nation's challenges. Collaborative partnerships could provide such solutions.

On March 25 and 26, 1998, in conjunction with the on-site American Institute of Aeronautics and Astronautics National Capital Section (AIAA NCS) Small Satellite Missions Symposium, Goddard will host its second technology showcase. As in 1996, Goddard will be exhibiting the technology initiatives and partnering opportunities developed in support of the Center's Earth and space science missions. These exhibits will be on display in buildings 8, 28 and 32.

We invite our academic, industrial and government associates to explore the Technology Showcase '98. You may be surprised at what you discover!

If you would like to attend, please register online:

<http://tco.gsfc.nasa.gov/98showcase.html> (Please note that the URL has changed ) A registration fee is not required.

### Goddard Days at JASON

For the past 5 years, NASA has supported the JASON Project for students ages 9 through 16. The project involves teacher training in the curriculum, engaging students in their classrooms and a telepresence to culminate the project. The telepresence involves teachers, students and scientists working together on the comparison sites. This year the JASON IX Project is called Oceans of Earth and Beyond and will be live from Monterey Bay and Bermuda.

Goddard sets aside two broadcast times for employees and their families view the live broadcasts. Those days are Thursday March 19 at 4:00 p.m. and Saturday March 21 at 11:30 am. at the Howard B. Owen's Science Center Planetarium on Greenbelt Road. Any questions regarding the JASON project, call Elaine Lewis in GSFC Education Office x 6-7356.

NASA Headquarters has developed this logo for use on NASA material to commemorate the agency's 40th anniversary. The logo is available in several formats via FTP, from [ftp.hq.nasa.gov](ftp://ftp.hq.nasa.gov) in the /pub/pao/images directory.



Fortieth Anniversary  
Pioneering the Future

There are guidelines, in a read me file, for use of the logo.

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## Goddard Instruments on Mars Global Surveyor Solve Some of Red Planet's Mysteries

By Bill Steigerwald, Office of Public Affairs

A team of researchers using data from NASA's Mars Global Surveyor (MGS) spacecraft has announced that Mars lacks a global magnetic field, despite the presence of strongly magnetized regions in the Martian crust. The team, led by **Dr. Mario Acuna** of Goddard, used the Magnetometer/Electron Reflectometer (MAG/ER) instrument on board MGS. The magnetized regions can illuminate the geologic history of Mars at a period when the dynamo that powered the global magnetic field was active.

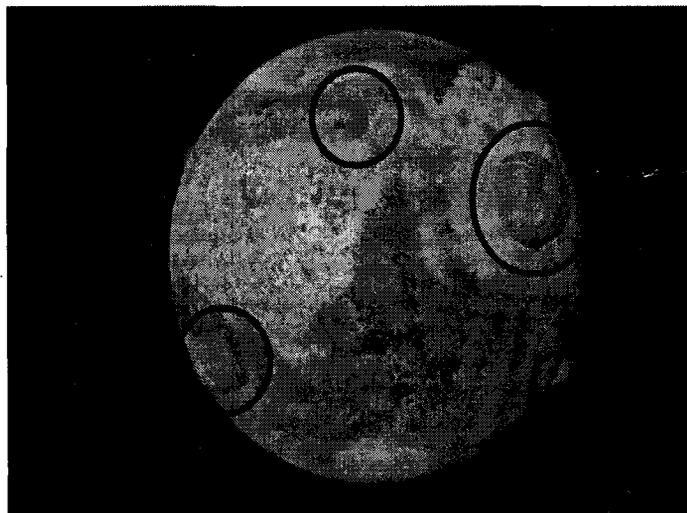
"These locally magnetized areas on Mars could not form without the presence of an overall global magnetic field," said Acuna. "Since the internal dynamo that powered the global field is extinct, these local magnetic fields act as fossils, preserving a record of the geologic history and thermal evolution of Mars." Magnetic fields are created by the movement of electrically conducting fluids, and a planet can generate a global magnetic field if its interior consists of molten metal hot enough to undergo convective motion, similar

precision of the MOLA laser altimeter has given scientists insight into the physical characteristics of the largely featureless northern plains of Mars. In some cases, MOLA observed such regions of Mars to be extraordinarily mundane at scales approaching those of Earth's continents. This new information will allow scientists to test hypotheses for the formation of younger, topographically benign surfaces on Mars. MOLA's first glimpse of Mars has provided over 200,000 high precision observations of the surface relief, and offers incredible promise for what is soon to come. The MOLA scientists are now poised to capture the topography of the northern polar ice cap over the next several months and potentially to estimate the amount of water involved.

Another team of researchers using the MGS spacecraft has announced their first detailed, global observations of Martian weather patterns, including the birth, evolution and death of a major dust storm, the formation of a jet stream around the north pole and measurement of its wind velocity, and the detection of very high altitude water ice clouds in the northern hemisphere. The team, led by Dr. Philip Christensen of Arizona State University, made the observations with the Thermal Emission Spectrometer (TES) instrument on board MGS. The observations will be used to gain insight into the extreme variability of Martian weather.

"With the TES instrument, we can use MGS as a Martian weather satellite," said **Dr. John Pearl** of Goddard, a member of the MGS TES team. "We observed the development of a major dust storm in the southern hemisphere. It grew very rapidly - to over 1000 miles across in less than two days, and lasted about a month before dissipating around Christmas of last year. Dust storms like this have been seen before, but their causes are poorly understood. What's new with TES is the fact that we were able to make detailed measurements of the atmospheric temperature, wind speed, and amount of dust in the air, and we were able to make the measurements over large areas. We have not had a chance yet to do an in-depth analysis of our data, but since we have good measurements over the entire birth and decay phase, we should be able to piece together the physical conditions that led to the storm and its decay."

Some clues provided by TES are observations that the atmospheric temperature rose before the beginning of the storm and continued to rise during the early phase of its development before gradually falling as the storm weakened. Measurements of the dust distribution revealed that the storm avoided low lying areas on the Martian surface. Also, the rapid growth of the storm suggests that it did not grow simply by wind spreading it from its place of origin. Rather, it appeared that the atmosphere became unstable over a large area, so that a number of substorms occurred to make up the whole.



The circled areas above show the magnetized regions on the Martian surface. To view a quick-time movie of this image go to <http://pao.gsfc.nasa.gov/gsf/weekly/weekly.htm>

to the churning motion seen in boiling water.

"At some point in its past, the Martian dynamo died, and the global magnetic field vanished. We know that the Earth's global field diverts the solar wind, preventing the solar wind from scavenging particles from the upper atmosphere. We also have evidence that the Martian atmosphere was once much thicker than it is now. This tells us to start looking at a possible connection between the disappearance of the Martian global magnetic field and the loss of volatiles (gasses and water) from the Martian atmosphere," said Acuna.

A second Goddard instrument flying on MGS, the Mars Orbiter Laser Altimeter (MOLA), led by **Dr. David E. Smith**, principal scientist, has provided the first human-scale traces of the topography of Mars. The MOLA results come from one month's worth of observations collected in Fall of 1997. Initial findings include the first measurements of the edge of the North polar ice cap of Mars, the shape of gigantic canyons and shield volcanoes, and well over 100 transects of a tremendous diversity of impact landforms. MOLA has measured the previously unmeasurable relief of the landscapes of Mars, from the mundane "featureless plains" to canyons over four miles deep.

Perhaps most striking however, is MOLA's view of the extremes of Martian topography. For the first time, the unprecedented vertical

## News Tidbits

- **TRACE Launch** - The TRACE launch has been rescheduled for April 2.
- **SNOE Update** - Three science instruments launched on the SNOE satellite February 26 have been turned on and are returning data. For more details, visit the SNOE Homepage at <http://lasp.colorado.edu/snoe/>
- **Landsat-7** - The Landsat-7 Earth science spacecraft will not be launched in July 1998 as planned, due to necessary changes in the design of the electrical power supply hardware for the spacecraft's main instrument. A new target launch date will be set by NASA officials after completion of instrument thermal vacuum tests scheduled for this July.

To read about other exciting news stories, visit the Goddard Homepage at <http://www.gsfc.nasa.gov> and choose **FLASH**



## Goddard Visitor Center Gears Up for Spring Community Day

By Steve Moore, Office of Public Affairs

Are you ready for Spring? Goddard's Visitor Center is holding a Spring Community Day on April 26 from 9:00 a.m. - 4:00 p.m. and everyone is invited!

Here is your chance to look behind the scenes at one of NASA's leading centers for Earth and Space Science research. See Mission Operations, the control center for the Hubble Space Telescope, the world's largest Cleanroom and much more! Explore the Visitor Center's exciting new Earth Science Gallery! Meet and greet NASA Space Shuttle Astronaut Ron Parise and NASA scientist Marshall Shepherd!!

Join us in our new Activities Tent and sign-up for hands-on craft and science activities for kids of all ages. Youngsters will enjoy a space-themed puppet show and scavenger hunt, and everyone will have fun with demonstrations featuring control-line model airplanes and model rocketry. Also new this year is the inaugural "Space Technology Benefits US All" school science fair. See the hard work and dedication of the area's best and brightest science students.

The Community Day event is free, open to all and no reservations are required. For further information on this event as well as information on other Visitor Center activities call the Goddard Visitor Center at 301-286-8981 or visit the following URL:

<http://pao.gsfc.nasa.gov/vc/vc.htm>

There's so much new to see and do, so join us for a day of out of this world fun!

## Status of Center Buyout

The Center will continue to accept buyout applications through March 20, 1998. A total of 71 employees separated during the first window buyout activity. In order for the Center to achieve its 175 buyout target, an additional 104 employees may still separate. All employees who wish to take advantage of this buyout opportunity are encouraged to apply before the March 20 deadline. Details about the separation incentive and how to apply are contained in the GSFC Announcement 98-07 which may be viewed on the Office of Human Resources Homepage at

<http://ohr.gsfc.nasa.gov>

Any questions concerning the buyout should be directed to your servicing Human Resources Management Specialist or Bill Ingerski at x-68052.

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## Hey Kids, Try This At Home . . .



Al Byers from Goddard and students from DuVal High School

Goddard scientists and engineers recently teamed up with representatives from DuVal High School, the Howard B. Owens Science Center and the Goddard Education Office to demonstrate some neat, hand-on space-related activities for kids. Above, Al Byers, one of Goddard's Aerospace Education Specialists, works with students to build a rocket car. The rocket car, which is constructed from styrofoam, coathangers, straws, coffee cups and balloons, tests Sir Issac Newton's laws of motion. The balloon is inflated and attached to the car via a straw which directs the thrust exiting the inflated balloon to propel the car in the opposite direction of the thrust. Students designed, tested, measured, evaluated, and redesigned their cars to increase the distance of travel, and by doing so, practiced the following science process skills: observing, communicating; collecting data; inferring; making models; making graphs; interpreting data; controlling variables; defining operationality; and investigating. Many other activities were demonstrated, including Venn in space, where students used Venn diagrams to classify the planets by various aspects, properties, and relationships with one another; and Bouncing data Around the world where students demonstrated the communications path between a distant planet and an observer on Earth, with data transmitted via HST, communications satellite and ground stations.

## American Astronautical Society Symposium

The 36th Annual Goddard Memorial American Astronautical Symposium will be held this year on March 18-19, at the Greenbelt Marriott Hotel. The theme for the symposium is "Earth System Science, Remote Sensing and Applications." Goddard employees are invited to attend all of the sessions free of charge, however, lunch and reception costs are not covered. A shuttle bus will be provided to transport employees to and from the hotel for the morning and afternoon sessions. The shuttle will be leaving Goddard from the front entrance Building 8. Symposium programs are available in the Office of Public Affairs, Building 8, Room 150. The shuttle departure schedule is as follows:

Departure from GSFC, March 18 - 7:00 a.m. & 1:30 p.m.  
 Departure from Marriott, March 18 - 12:30 p.m. & 5:00 p.m.  
 Departure from GSFC, March 19 - 7:00 a.m. & 1:00 p.m.  
 Departure from Marriott, March 19 - 12:00 p.m. & 6:00 p.m.

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## Goddard Mourns The Loss of Dr. Robert D. Price

### BOB

"Bob was an outstanding leader and a wonderful friend. I treasure the 7 1/2 years I worked for him; he is irreplaceable. I miss him very much and he will never be forgotten."

-----Nita

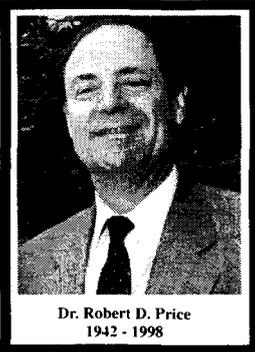
Dr. Robert D. Price, Associate Director of Goddard for Earth Science, Code 100, died suddenly on March 13 at his home in Harwood, MD.

Dr. Price began his career at NASA in 1967 as an Aero-Space Technologist in Astrophysical Studies in what is now Goddard's Laboratory for High Energy Astrophysics. For 7 years he performed original and independent research in the field of high energy cosmic radiation. In 1974, he accepted a position as the Landsat Investigations Program Results Manager in the Missions Utilization Office of the new Applications Directorate, focusing on the utilization of Earth observations to map and monitor Earth resources.

After serving at NASA HQ in the Career Development Program 1977-78, he returned to Goddard, joining the Information Processing Division of the Mission Operations and Data

Systems Directorate, where he managed the Goddard portion of the NASA End-to-End Data System Program.

In 1980, Dr. Price returned to the field of Earth sciences, attaining the position of Assistant Chief of the Laboratory for Terrestrial Physics where he concentrated on the operations and management of the Lab's computing and data facilities. He moved to the Space Data and Computing Division in 1986 as Associate Chief of the division, to function as Head of its Science Information Systems Center.



Dr. Robert D. Price  
1942 - 1998

Dr. Price was appointed Deputy Director of the Earth Sciences Directorate of Goddard in 1990. In this position, he assisted the Director in the full range of management oversight responsibilities of the Directorate. He served in this position until April 1993 when he was appointed as Director of the Goddard Mission to Planet Earth Office.

On Nov. 12, 1995, Dr. Price was appointed as Associate Director of the Center for Mission to Planet Earth (now the Earth Science Systems Program Office). This position made Dr. Price the senior (Continued on Pg. 2)

### MESSAGE FROM AL DIAZ

I'm sure by now, most of you have heard of the untimely death of Bob Price. I know that over the next several days and weeks there will be many occasions at which many people including some of us at Goddard will have an opportunity to reflect on Bob's contributions to NASA and to his country as a leader in the NASA Earth Sciences program.

I would like to share with you a few of my feelings about Bob as a person and as a member of our Goddard family. I didn't know Bob as well as many of you who have worked with him over the past thirty years, but I think my brief interaction with him over the past several years has shown me what a terrific person he was. He was a man who cared a lot about his work but not to the exclusion of his family and friends. He was a man of integrity who respected every individual he worked with. He was nurturing with his staff who clearly meant a lot to him. He appeared to me never to be judgmental, having only kind and considerate things to say about every individual he worked with. In short, Bob was the kind of person and leader I think we all enjoy working with. Bob was also full of energy and enthusiasm. He always bounced into meetings like a new

(Continued on Pg. 2)

## El Niño: Yesterday a Novelty, Today, A Common Household Name

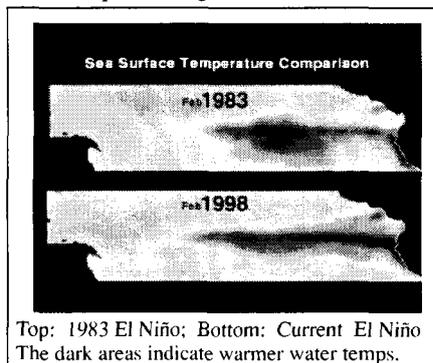
By Lynn Chandler, Office of Public Affairs

Two years ago, most of us had never heard of El Niño, but today it is a household word. El Niño is the name given to the occasional development of warm ocean surface waters along the coast of Ecuador and Peru. Due to this warming, the usual upwelling of cold, nutrient rich deep ocean water is cut off, causing the food chain essential to marine life to die. Originally, the name El Niño, Spanish for the Christ Child, arose because the warming generally occurs shortly after Christmas and lasts usually for a few weeks to a few months. Today El Niño refers to the anomalous appearance of warm waters in the region every three to seven years. The current El Niño began early in 1997 and Goddard scientists predict it will last through late spring into early summer.

**Dr. Antonio Busalacchi**, Director of Goddard's Hydrospheric Processes Lab is leading advanced studies of El Niño through information obtained from satellites in space and instruments in the oceans. The joint U.S./French TOPEX/Poseidon satellite measures sea surface height; Goddard's Sea-Viewing Wide Field-of-View Sensor (SeaWiFs) measures ocean color and Goddard's Tropical Rainfall Measuring Mission (TRMM) measures precipitation.

El Niño directly affects rainfall on the West Coast. San Francisco has received 750 mm in 3-4 months, 150 mm over their annual total of

600 mm. This significant increase in rainfall has unleashed savage mud slides causing houses to slide off the side of mountains and has claimed more than 150 lives. While the West Coast is experiencing relentless rain, the East



Top: 1983 El Niño; Bottom: Current El Niño  
The dark areas indicate warmer water temps.

Coast is experiencing its mildest winter on record.

But El Niño does not show favoritism. The entire country is feeling its effects. The southeast is experiencing more rain. Florida was devastated by a series of tornadoes. It is much colder than normal in the South as evidenced by the snow storm in Mexico. It has been much milder in the northern tier of the U.S. with the average temperature this winter upwards of 5°F warmer than normal. The Northern tier was even robbed of their white Christmas this year.

On a global scale, El Niño is causing

droughts in northeast Brazil, southeast Asia, and parts of South Africa and Australia. Malaysia and Indonesia have been ravaged by forest fires. El Niño intensified Indonesia's worst drought in 50 years, contributing to a famine that killed more than 400 people in a remote province. In addition, El Niño is to blame for the flooding in western and southeastern United States.

The last major El Niño event was in 1982. The global economic impacts of that El Niño have been assessed at upwards of \$12 billion and claiming 2,000 lives. At that time, scientists ability to monitor an El Niño was very limited, and it wasn't until the event had been underway for several months that scientists had realized what had taken place.

In stark contrast, scientists now have a comprehensive network providing a real-time perspective of the evolution of the current El Niño event. Today's technology can even aid the community in preparing for El Niño. For example, in Peru, a forecast issued each November is used by farmers and government officials to decide which crops to plant. If wet El Niño conditions are expected, farmers plant water tolerant rice; if dry weather is predicted, they plant more cotton. Thanks to NASA technology, we are better prepared to monitor and predict the next El Niño. For more information on El Niño visit

<http://nsipp.gsfc.nasa.gov/enso/>

*(Dr. Robert Price - Continued from Front Page)*

GSFC official responsible for developing and implementing an Earth Observing System. In addition to his new duties as Associate Director, Dr. Price continued to serve as Director for the MTPE Program Office.

Dr. Price received the NASA Exceptional Service Medal in 1990, the NASA Exceptional Achievement Medal in 1996; and the NASA Meritorious Rank Award in 1997.

Born in Essex, MD., Dr. Price graduated from Kenwood Senior High school in 1960. He then attended Western Maryland College, where he received a bachelor of science degree in physics and mathematics in 1964; and Catholic University, where he received master of science and doctorate of Philosophy degrees in space science in 1967 and 1974, respectively.

Services were held Wednesday, March 18 at the Kalas Funeral Home, Edgewater, MD. Several NASA friends eulogized Dr. Price including Al Diaz, Center Director, Bill Townsend, Deputy Center Director, and John Hrastar, Deputy, Code 170, to name just a few.

Dr. Price was an avid tennis player who enjoyed water-skiing, snow skiing, gardening and landscaping. In 1978 he married Rosalee Price who passed away in August 1997. Surviving are a son, Shane Millburn, a daughter Camille Barrett, a sister, Linda Jacob, his parents, Wilbur and Ruth Price and four grandchildren.

Anyone wishing to make a contribution in memory of Dr. Price may do so to the American Heart Association, 177 Defense Highway, Annapolis, MD 21401; The American Cancer Society, 1041 Route 3, North Gambrills, MD 21054; or U.S. Tennis Association National Junior Program, 2230 George C. Marshall Drive, Falls Church, VA 22043.

*(Al Diaz - Continued From Front Page)*

tennis ball with the most positive attitudes and was always ready to take on new challenges. He was especially excited by the new approaches that his program was looking forward to in the future. He loved to talk about "new paradigms" so much that we would remind each other of the joke about paradigms being partial change for a quarter. We would laugh about how quickly we seemed to be able to get things done today as if we were all competing in a new TV game show like "Name That Tune"  $\Sigma\Sigma$ . you know  $\Sigma\Sigma$  "I can get that spacecraft designed, built and launched in 24 $\Sigma$  no make that 18 $\Sigma$ . no make that 12 months!!!!" He was really proud of what he was doing and he made a difference.

I know that many are struggling to recover from the shock of the loss of Bob. But we should concentrate on remembering his life. We should spend this time remembering and celebrating his distinguished career. We should also spend this time reflecting on the importance of the ones we love in our lives like our spouses and our children and make sure that we take the time to share in their lives. Here at work, some of you may simply want to share your thoughts in your individual work groups. Some may want to write something down and share it with others. If you feel you need to speak with someone, the Center will make this resource available to you and you should access it through the Health Unit. For my part, it's helped me to share these few thoughts with you. If you just want to share your thoughts with me, feel free to do so.

*A. V. Diaz*

## Two Studies Will Refine and Expand Solar Monitoring Task

NASA's Office of Earth Science has selected the Naval Research Laboratory, Washington, DC, and the University of Colorado's Laboratory for Atmospheric and Space Physics in Boulder to conduct parallel six-month definition studies of a new small satellite to monitor variations in the amount of radiant solar energy that reaches Earth.

The Total Solar Irradiance Mission (TSIM), part of NASA's Earth Observing System, will obtain precise measurements to help scientists better understand the relationship between the Sun's variable energy output and its effects on Earth's climate. The six-month feasibility studies will focus on the development of a preliminary system design and operations concept for the cost-capped \$23 million mission. Goddard will provide program management for TSIM.

NASA's current sensor for measuring the total radiative output of the Sun from space is the Active Cavity Radiometer Irradiance Monitor (ACRIM). NASA has flown two ACRIM instruments, including the ACRIM-II instrument onboard NASA's Upper Atmosphere Research Satellite. A third ACRIM instrument is scheduled for launch aboard a dedicated small satellite in October 1999.

TSIM will extend the broad data set gathered by the ACRIM series while exploring a new capability to measure solar irradiance in two discreet spectral bands. Once proven, this operationally oriented capability is a candidate for flight aboard future National Polar Orbiting Environmental Satellite System missions being planned by a tri-agency partnership among NASA, the Department of Defense and the National Oceanic and Atmospheric Administration.

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## DuVal High School Give Presentation on TRACE Mission at the Visitor Center

*By Nancy Neal, Office of Public Affairs*

Students from DuVal High School in Greenbelt, MD recently visited Goddard's Visitor Center and gave a presentation on the TRACE mission, specifically on the overall objectives and the mechanics of the TRACE spacecraft. TRACE is scheduled to launch during the week of March 30.

The students are part of the Cooperative Satellite Learning Project (CSLP). CSLP is a business, government and educational partnership sponsored by NASA at Goddard and Allied Signal Technical Services Corporation. Students at participating high schools learn all aspects of how NASA satellites work. In this particular case, they learned about TRACE.

As part of the CSLP curriculum, these students participate in activities designed to increase awareness of the community on NASA space missions, as well as provide opportunities for the students to learn public speaking and communication skills.

During their presentation, the students built a TRACE 1/8 scale mockup. Using this scale model of the spacecraft, they demonstrated to the Visitor Center tourists how the TRACE spacecraft works. This scale model was built in one of the school's award winning technology education classes. DuVal received the 1997 High School Technology Program Excellence Award. Cited in the award were DuVal's participation in CSLP and Goddard's Get Away Special programs.

For more information, visit the TRACE Homepage at <http://sunland.gsfc.nasa.gov/SMEX/TRACE>

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National Aeronautics and  
Space Administration  
Goddard Space Flight Center

# GODDARD news

Greenbelt, Maryland/Wallops Island, Virginia

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## Getting to Know Bill Townsend, Goddard's New Deputy Director

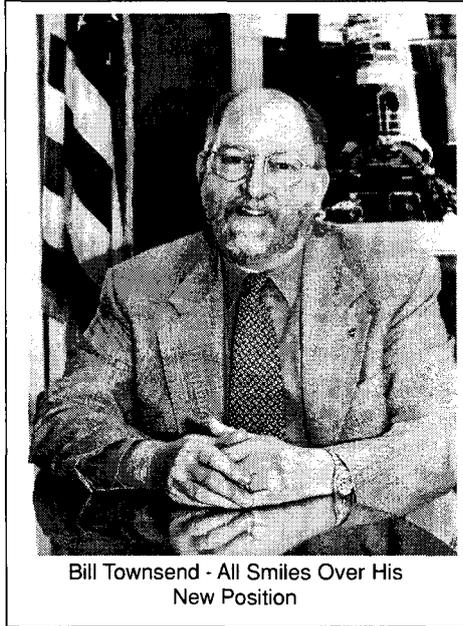
By Deanna Adams, Office of Public Affairs

Having been on the job as Deputy Director of Goddard for only a few days, Bill Townsend hasn't yet had the opportunity to become extensively involved in any of the functions associated with his new position, but there's one thing he's already very certain of: "Goddard is going to be a terrific place to work."

"Everyone has been so friendly. I'm really thankful for the tremendous welcome I have gotten. I've run into so many people either in the elevator or the hallway and they all have stopped to say hello and welcome me aboard. I have received a very warm welcome, indeed," Townsend said.

Besides being impressed with the workforce, Townsend also expressed his pleasure at being a part of the Goddard mission. "I'm really pleased to be here and am looking forward to the challenge of the job. It's been a long time since I've been at a field center and I'm glad to have the opportunity to be more directly involved in the execution of the programs."

But Bill Townsend is no stranger to Goddard. He began his NASA career more than 30 years ago at the Wallops Flight Facility where he was involved in the development of remote sensing instruments for flight on aircraft and satellites. Through the years, he's worked in various areas of the Earth science program. In his most recent position as Acting Associate Administrator for Earth Sciences at NASA Headquarters,



Bill Townsend - All Smiles Over His New Position

he was responsible for the overall management and direction of the Earth science enterprise. Prior to that, he was the Deputy Associate Administrator for all Earth science programs. As a result, Goddard, as the Agency's lead center for this enterprise, has been a part of Townsend's daily worklife for quite some time.

Meanwhile, Center employees are as pleased to have Bill here as he is to be here. His experience and knowledge in Earth science issues will definitely be an asset to the missions Goddard has responsibility for.

Even so, Bill knows there's still a lot to learn. For the next several weeks he'll be busy learning what, besides Earth science, is going on here at the Center: space science, technology, and institutional functions. "There's so many exciting things happening at Goddard. It's definitely going to take a while to come up to speed," he said with a smile.

Bill Townsend was born in Nassawadox, Virginia in 1946 and grew up in nearby Parksley. In 1970, he received an electrical engineering degree with honors from Virginia Tech., Blackburg, Virginia. In 1976, he received the NASA Exceptional Service Medal for his pioneering work in radar altimetry. In 1993, he received the NASA Medal for Outstanding Leadership and in 1994, both the French Space Agency's Bronze Medal and the Presidential Rank Award of Meritorious Service. Also, in 1995, he received the NASA Distinguished Service Medal.

In his spare time, Bill enjoys spending time with his wife, Carolyn, and their children. They have a son, Jason, age 14, and a daughter, Tiffany, age 10, both who are very active in and out of school. His principal hobby is sailing and he has passed that passion onto the rest of his family who look forward to weekend outings on the family sailboat. The Townsends reside in Annapolis.

## news

- The TRACE Spacecraft is scheduled to launch on April 1 at 9:40 p.m. EST.
- NASA has issued the first release of its agency-wide search engine, which will allow Internet users to search across hundreds of Web sites at all NASA Centers. The URL is <http://www.nasa.gov/search/index.html>
- Astronaut Andy Thomas's mission aboard Mir has given the United States two years of continuous space flight, starting with Shannon Lucid's flight on Mir 21. In that time scientists have learned much about the way humans react to low-gravity environments. Visit <http://shuttle-mir.nasa.gov/> for more information.
- The Credit Union located in Bldg. 21 is undergoing renovations. During construction, this branch's hours will be Monday - Friday 7:30 a.m. - 2:30 p.m. The ATM will remain open, however, the FastLane depository will be closed until the new branch is complete. For credit union services during construction, employees may use the ATM in building 1 or may visit the new branch on Greenbelt Road in the Aerospace Building. Check the internal page at <http://internal.gsfc.nasa.gov> for links to the credit union.

## Goddard Instrument Detects Longer Days

Nearly every weather condition that has occurred this past winter has been blamed on El Niño, but is this weather phenomenon also responsible for longer days? The answer is "yes," says **Dr. John Gipson** of Goddard's Laboratory for Terrestrial Physics. Thanks to the Very Long Baseline Interferometry (VLBI) network, a global array of radio telescopes, NASA scientists have detected miniscule changes in day length that have occurred due to El Niño.

The longer days are attributed to the rotation of the Earth. The atmosphere speeds up during El Niño so the Earth's rotational energy, which is fixed, must slow down to conserve the combined angular momentum. Once El Niño dissipates, the atmosphere will slow down and Earth will speed up again, making the day shorter.

The longer day lengths, summed up over the entire current El Niño period, add up to approximately 1/10 of a second, about the same amount of time it takes to blink an eye. The peak in day length, occurring around February 5, 1998, was about 0.6 milliseconds (6/10,000 of a second) and required extraordinarily sensitive measurements to be detected.

"When you fire a .22 caliber rifle, the bullet gets about halfway down the barrel in 0.6 milliseconds, so we are talking about an extremely short period of time. It is a tribute to the accuracy of VLBI that we are able to notice such a small change in day length," said Gipson.

Other weather phenomenon such as hurricanes also can change the length of days, although on a much shorter scale than El Niño.

## Artwork and the Cosmos

by Susan Hendrix, Office of Public Affairs

As we discovered last year in a Goddard News article, **Alan Binstock's** talents extend beyond his architectural projects at Goddard. Some might say his artwork is out of this world.

Binstock, who is an architect and project manager for the Facilities Management Division, creates futuristic sculptures that leave much to the imagination. But if you look closely, some of his pieces have an uncanny resemblance to Goddard's recent space science discoveries.

"When my sculptures begin to suggest supernovas and background radiation images of the Cosmos, it becomes readily apparent that the spirit of NASA has permeated my life experience," said Binstock.

Binstock's creative sculptures of steel and stone have been displayed in various art galleries around the Washington Metropolitan area, including the Federal courthouse in Greenbelt, Md.

The public was able to view the sculptures at Gallery 10, Ltd. in Washington, D.C. through March 28. Binstock's artwork will also be on display at Brookside Gardens in Wheaton, Md. during May and at The Elaine Benson Gallery in Bridge Hampton, N.Y. from May through September.

## Reminder for Goddard Employees

Don't forget to bookmark the internal homepage at <http://internal.gsfc.nasa.gov>. That way, you have all the latest information from dateline to upcoming events at your fingertips.



### ENGINEERING COLLOQUIUM Spring '98 Series Mondays 3:30 PM, Building 3 Auditorium

Date/Topic	Speaker
March 30 From FORTRAN to Java and Beyond!	Tim Korson Senior Partner, Software Architects
April 6 Longitude	Dava Sorbel Science Reporter, N. Y. Times
April 13 The Politics of Space Science Funding	Brenda Forman Lockheed/Martin Corp.
April 20 Breakthrough Discoveries from Hubble	Bob Williams Space Telescope Institute
April 27 The Machine in America: A Social History of Technology	Carroll Pursell Case Western University
May 4 An Astronaut's View of the Planet Earth	Mary L. Cleave GSFC, Former Astronaut
May 11 Hybrid Electric Vehicles	Victor Wouk U.S. Tech Advisor to the IEC
May 18 Collapsing Bubbles, Blinding Light	Dr. Prosperetti Johns Hopkins University
May 25	No Colloquium (Holiday)
June 1 Science and the Future of Cities	James Trefil George Mason University
June 8 - Bldg. 8 Auditorium	(Topic & Speaker TBD)

Abstracts/Bio's can be found at <http://groucho.gsfc.nasa.gov/ecollog>

## Get Ready to Celebrate Goddard's Earth Day

The Center is preparing for its Earth Day celebration to be held on Wednesday, April 29 from 11:00 a.m. - 2:00 p.m. The theme for this year's event is: The Chesapeake Bay: How Do We Fit in This Puzzle?

Earth Day is an annual celebration at Goddard devoted to educating our employees about conservation efforts and how they fit into the overall picture, both at Goddard and at home. Watch Goddard News for more information.

### Tidbits on the Chesapeake

1. The Chesapeake Bay is the largest estuary in the United States. Its watershed encompasses parts of five states and a population of over 16 million people.
2. Changes in land use are the biggest problem for the Bay because this causes soil erosion and pollution runoff (plus increased wastewater generation).

## Black History Club Presents Award to Coppin State Student

By Nancy Neal, Office of Public Affairs

Goddard's Black History Club (BHC) recently presented an academic achievement award to Andrew C. Bain, a sophomore at



From L to R: Francine Johnson, Sheila Ritter, Dillard Menchen, Andrew Baine, Calvin Burnett, Edward Sommerfeldt

Coppin State College in Baltimore, Md. The award ceremony took place on March 19 at the Parren J. Mitchell Room on the Coppin State campus.

Sheila Ritter, the BHC president, presented Bain with a \$3,000 check for continuation of his academic studies. The BHC raised the money through various annual activities such as a fish fry and crab feast.

Criteria for selecting nominees for the scholarship were left to the school, although the BHC did stress a science, engineering or mathematical background. The school selected nominees based on academic performance and potential, as well as financial needs.

Bain was selected for his outstanding GPA and his commitment to higher education. He will attend graduate school after completing his bachelor of science in computer science. Currently, Bain is working on redesigning Coppin State College's web page and interning at Bell Atlantic in Baltimore where he is designing the internal web page for the company.

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National Aeronautics and  
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## Goddard Bids Farewell to Associate Director

By Deanna Adams, Office of Public Affairs

Mr. Arthur Fuchs, Goddard's Associate Director, retired on April 3, after a 35-year career working for NASA and Goddard.

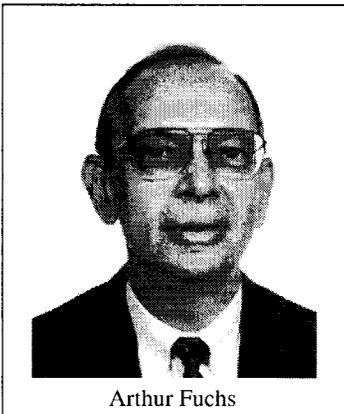
Expressing his sentiments on leaving, Fuchs said, "I feel so fortunate to have been able to spend my 35 year federal career working on the U.S. space program at NASA and Goddard. The programs that I have worked, on starting with Mercury, Gemini, Apollo, ERTS (Landsat), the Explorers, and the Great Observatories, have been truly exciting and challenging. But most importantly, I was very fortunate that the people I worked with throughout my career have been fabulous. It is the people and the teamwork of the space program (government, industry, science community) that I will miss the most."

Mr. Fuchs began his career with NASA in 1963 at Goddard Space Flight Center. In the early 80's, he transferred to NASA Headquarters to work on the Hubble Space Telescope development program. Later he served as Deputy Director of the Astrophysics Division in the Office of Space Science at HQ.

In 1995, Fuchs returned to Goddard as the Director of the Missions Operations

and Data Systems Directorate. In April 1997, he was appointed as Associate Director for the Center.

Fuchs earned his B.S. degree in mathematics from Queens College of the City University of New York in 1962 and his MS degree in Aerospace Engineering from the Catholic University of America in 1968. He also attended the University of Michigan, Flight Dynamics Institute, and the Pennsylvania State University Executive Training Institute for scientists and engineers.



Arthur Fuchs

Throughout his career, Mr. Fuchs has received numerous awards, including a GSFC Cost Reduction Award, a GSFC Exceptional Performance Award and NASA Exceptional Performance Award, and the NASA Outstanding Leadership Medal.

In the near future, Fuchs, who is married, and has two children, plans on doing some traveling and working on some home projects (at a leisurely pace) as well as visiting some museums. In June, he will begin a new chapter in his career, working for Computer Sciences Corporation (CSC).

## TRACE Launches Successfully

The picture below shows the April 1 launch of the Transition Region and Coronal Explorer (TRACE) spacecraft. TRACE launched successfully at approximately 9:40 p.m. EST from a Pegasus XL Rocket which was dropped from an L-1011 plane.



The L-1011 Plane drops the Pegasus XL Rocket containing the TRACE Spacecraft

Early status reports indicate that the spacecraft is operating well. TRACE made its first successful pass at the Poker Flat Research Center in Alaska less than two hours after its launch. Activities for day one included initial acquisition and confirmation of the satellite's health and safety, as well as turning on the gyros and reaction wheels. On day two, scientists put the attitude control system into science mode and turned on the instrument.

For more information, visit the TRACE Homepage at <http://sunland.gsfc.nasa.gov/smex/trace/index.html>

## CURRENT news

- NASA has selected Raytheon STX Corp., Lanham, MD, (formerly Hughes STX) for award of a \$148.3 million contract to provide federal information processing services at NASA's Ames Research Center, Moffett Field, CA.
- STS-90 is set to launch on April 16. The 16-day Shuttle mission is dedicated to the study of the human nervous system, the most complex and least understood part of the body.
- After flying 60 million miles and 20 missions, the space shuttle Atlantis is receiving a \$70 million make-over at the Boeing Orbiter Major Modification Facility in Palmdale. Atlantis is undergoing a comprehensive inspection and more than 100 modifications designed to cut maintenance costs, improve shuttle safety and increase its ability to support construction of the International Space Station. Crews will also search for possible fatigue, corrosion, and broken rivets or welds on the 12 year old ship. Atlantis is scheduled to return to Kennedy Space Center in August.

For information on exciting news stories, visit the Goddard Homepage at <http://www.gsfc.nasa.gov> and choose **FLASH**

## Nighttime Lights Track Spread of Population

By Lynn Chandler, Office of Public Affairs

Since 1992, the Defense Meteorological Satellite Program (DMSP) has recorded visible lights on the darkened hemisphere of the Earth. Although this was originally done to observe nighttime clouds, it also records lightning and man-made lights.

The National Geophysical Data Center had formatted and archived this data so it can be used for scientific research. Algorithms have been developed to strip out all night light signals except those due to man. The remaining data clearly shows the extent of city areas. In papers published in 1997, Goddard's *Marc Imhoff* and colleagues have shown that the light distribution agrees with U. S. census figures for urban population distribution.

By using other remote sensing imagery, they have shown that the spread of city populations is accompanied by a loss of valuable agricultural land. Thus, they have illustrated a powerful methodology which can be used in most places in the world to track the spread of cities and accompanying loss of valuable agricultural land.

## achievements

### Goddard Scientist Awarded Marc Aaronson Award



Dr. John Mather

Dr. John Mather has recently been awarded the Marc Aaronson Award. The Marc Aaronson Memorial Lectureship was established by the Steward Observatory of the University of Arizona, and the National Optical Astronomy Observatories to promote and recognize

excellence in observational astronomy. Award recipients present a scholarly evening public lecture on the campus of the University of Arizona, to describe the significance of the recipient's research within a broad context of astronomical endeavor. Dr. Mather gave his presentation on NASA's Origins Program and the Next Generation Space Telescope (NGST).

### Goddard Scientist Elected Fellow SPIE

There is a corn plant in a field of corn plants, somewhere in the Midwest. It's not noticeably different from its neighbors, which stretch out next to it for hundreds of feet. One row over, in either direction, it looks just the same. The leaves, slightly yellowed, sway in the cool breeze blowing from the east-northeast. The Sun's mid-morning rays beat down on this plant from an angle overhead. How peaceful. How real.

Actually, this corn plant isn't in the Midwest at all, and it isn't in a field. Come to think of it, it isn't really even a corn plant. It's a bunch of numbers inside the computer of **Dr. James Smith** of the Laboratory for Terrestrial Physics. Like others in the Earth Sciences Directorate, Dr. Smith uses space technology to study the earth. Earth-orbiting satellites measure plant temperatures and other variables but to use these measurements, we often need computer models to interpret them and make corrections.

Dr. Smith is a specialist in developing such models and the International Society for Optical Engineering (SPIE) recently recognized his contributions to advancing our understanding and application of optical remote sensing by his election to the grade of Fellow within the Society. According to the Society's Bylaws, a Fellow, "shall be distinguished through his achievements and shall have made outstanding contributions in the field of electro-optics or in related scientific, technical, or engineering areas."

Goddard's Safety Awards Ceremony is scheduled for April 9, 1998, in the Building 3 Auditorium, at 2:00 p.m.

This ceremony allows the Center the opportunity to acknowledge the civil servants and contractors who have made special efforts to maintain and improve Goddard's safety standards. Also, it allows the Center a time to focus on the importance of safety on the job and at home.

Refreshments will be available following the ceremony for your enjoyment. Please mark your calendar to be there!

## Goddard Participates in the Jason Expedition

Students from 50 area elementary and middle schools recently participated in remote activities supporting the JASON project at the Howard B. Owens Science Center Planetarium in Greenbelt, Md. Goddard's Education Office and the Howard B. Owens Science Center are co-sponsors in the local area participation of the JASON project. This year's project, entitled JASON IX Oceans of Earth and Beyond, took place in Monterey Bay, Calif. and Bermuda.

Nearly 3,500 students participated in various educational activities at the Owens Science Center Planetarium. Using satellite transmissions, students and teachers observed what students and scientists did at the remote locations. The local students also had an opportunity to question the scientists about their findings. More information on the JASON project can be found at <http://www.jasonproject.org>

### Dan Goldin Speaks at 36th Goddard Memorial Symposium

The American Astronomical Society recently sponsored the 36th Goddard Memorial Symposium, held at the Greenbelt Marriott Hotel. The theme for the symposium was Earth Systems Science, Remote Sensing and Applications. Among those present were *Al Diaz, Bill Townsend* and Dan Goldin who gave a presentation on the "Deke" Slayton Award.



NASA Administrator, Dan Goldin

### Clip-n-Save Clip-n-Save Clip-n-Save Clip-n-Save

#### Colloquia Schedule for April

- **Scientific Colloquium** - James Gates (Bldg. 3 Aud) April 10  
"Superstrings: Why Einstein Would Love Spaghetti in Fundamental Physics" 3:30 p.m.
- **Engineering Colloquium** - Brenda Forman (Bldg. 3 Aud) April 13  
"The Politics of Space Science Funding" 3:30 p.m.
- **Scientific Colloquium** - Chuck McClain (Bldg. 3 Aud) April 17  
"New Results in Ocean Biology from SeaWiFS" 3:30 p.m.
- **Engineering Colloquium** - Bob Williams (Bldg. 3 Aud) April 20  
"Breakthrough Discoveries From Hubble" 3:30 p.m.
- **Center Director's Colloquium** - Dr. Bienenstock April 21  
"Federal Science Research & Development Initiatives and Challenges" (Bldg. 3 Aud) 10:00 a.m.
- **Scientific Colloquium** - Geoffrey West (Bldg. 3 Aud) April 24  
"The Origin of Universal Scaling Laws in Biology" 3:30 p.m.
- **Engineering Colloquium** - Carroll Pursell (Bldg. 3 Aud) April 27  
"The Machine in America: A Social History of Tech." 3:30 p.m.

Reminder: Full colloquia schedules are on your employee homepage at <http://internal.gsfc.nasa.gov> under announcements.

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