

National Aeronautics and Space Administration  
www.nasa.gov  
Volume 4, Issue 22  
January 2009



# Goodard View

## 2008 Year in Review



## From the Director



As we reflect on the successes we have shared in 2008, we are inspired to face the challenges of the coming year with renewed commitment to Goddard's mission and values. I'd like to thank each member of the Goddard community for their hard work and dedication over the past year. Together, we have achieved and exceeded many of the extraordinary goals we set for ourselves. From scientific discovery to technological developments, from human spaceflight support to fiscal stewardship, we have consistently delivered beyond expectations.

Fifty years ago, Goddard was created as NASA's first space flight Center to pioneer technologies that would open this new frontier to scientific study and exploration. Today, Goddard leads the way in many disciplines: Earth science, astrophysics, heliophysics, exploration, space operations, communications, and planetary science. We provide critical support to manned missions and develop technology that improves everyday life. Our reputation precedes us throughout the world. As we measure our performance in 2008, it is clear that each accomplishment, success, and breakthrough can be attributed to Goddard's highly competent and diverse team.

In these first few weeks of 2009, I encourage you to reflect on your many achievements, and perhaps a few of the disappointments, using your experiences to build what will be another commendable year. As the new year dawns, it brings with it Goddard's 50th year of excellence. Throughout 2009, special events will mark this significant moment in history. The year 2009 will be one of our most exciting and rewarding years to date. Do not miss the opportunity to celebrate Goddard with your colleagues during this momentous occasion.

Thank you for your dedication to NASA and Goddard's mission in 2008 and continued commitment in 2009.

Rob Strain  
Director, Goddard Space Flight Center

## Table of Contents

### Goddard Updates

From the Director – 2

LaunchFest Rewind – 3

A 2008 Photo Gallery – 4

2008 Mission Review – 6

Goddard Shines in 2008 Events – 8

2008 Accomplishments for the Innovative Partnerships Program – 10

Goddard Makes Case for Bigger Trophy Case – 11

### Goddard Family

In Memoriam – 12

Cover caption: Visitors and Goddard employees alike enjoy LaunchFest.

Photo credit: Debora McCallum.

## 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:** John Putman

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

# LaunchFest Rewind

Photos by Bill Hrybyk, Pat Izzo, and Debora McCallum



## A 2008 Photo Gallery

Photos by Bill Hrybyk, Pat Izzo, and Debora McCallum



# A 2008 Photo Gallery

Continued from Page 4



## 2008 Mission Review

Edited by Trusilla Steele

### GLAST Blasts into Space, Now As Fermi, Gives Fabulous Findings



Photo credit: NASA

*Caption: GLAST, now the Fermi Gamma-ray Space Telescope, lifts off aboard a Delta II Heavy rocket.*

The first successful 2008 Goddard launch was NASA's *Gamma-ray Large Area Space Telescope*, or GLAST, on June 11. Twelve minutes after separating from the launch vehicle, both GLAST solar arrays were deployed and immediately began producing power necessary to maintain the satellite and instruments. Orbital checks were passed and the mission began two months after launch.

GLAST's mission is to collect data that will enable scientists to answer persistent questions across a broad range of topics, including supermassive black-hole systems, pulsars, the origin of cosmic rays, and signals of new physics.

A press teleconference was held on August 26, 2008 that unveiled an image of the full-sky showing the glowing gas of the Milky Way, blinking pulsars, and a flaring galaxy billions of light-years away. The map combines 95 hours of the instrument's "first light" observations. The image could be compared to images taken in previous years from the Energetic Gamma Ray Experiment Telescope (EGRET) instrument on the *Compton Gamma-ray Observatory*.

The teleconference concluded with an announcement of the new name for the observatory, the *Fermi Gamma-ray Space Telescope*—dedicated to Italian physicist, Enrico Fermi.

NASA's *Fermi Gamma-ray Space Telescope* has recently discovered 12 new gamma-ray-only pulsars and has detected gamma-ray pulses from 18 others. The finds are transforming our understanding of how these stellar cinders work.

NASA's *Fermi Gamma-ray Space Telescope* mission is an astrophysics and particle physics partnership, developed in collaboration with the U.S. Department of Energy, along with important contributions from academic institutions and partners in France, Germany, Italy, Japan, Sweden, and the U.S.

For more on *Fermi's* latest discovery, visit: <http://www.nasa.gov/fermi>.

### Mars Science Laboratory Rescheduled for 2011

On December 4, 2008, NASA Headquarters announced 2011 as the new launch year for the Mars Science Laboratory (MSL). The delay will address testing and hardware challenges to ensure mission success. The relative positions of Earth and Mars are favorable for flights to Mars only a few weeks every two years. The next launch opportunity after 2009 is in 2011.

"We will not lessen our standards for testing the mission's complex flight systems, so we are choosing the more responsible option of changing the launch date," said Doug McCuistion, Director of the Mars Exploration Program at NASA Headquarters in Washington. "Up to this point, efforts have focused on launching next year, both to begin the exciting science and because the delay will increase taxpayers' investment in the mission. However, we've reached the point where we can not condense the schedule further without compromising vital testing."

Goddard's contribution to MSL is the Sample Analysis at Mars (SAM), a suite of instruments that will be onboard MSL. SAM will provide insight to fundamental questions about the ability of Mars to support life—past, present, and future. On November 5, Goddard employees got the chance to learn about SAM. Members of the SAM team introduced fellow Goddard employees to SAM's mission and scientific goals through a 45-minute tour in Building 33.

NASA's Jet Propulsion Laboratory manages the Mars Science Laboratory project for the Science Mission Directorate. For more information on SAM, visit: <http://ael.gsfc.nasa.gov/marsSAM.shtml>.

### CINDI Launches Successfully to Study Cosmic Bubbles

The Coupled Ion Neutral Dynamic Investigation (CINDI) instrument, aboard the U.S. Air Force *Communication/Navigation Outage Forecast System* (C/NOFS) satellite, successfully launched April 16, 2008. The mission is a unique investigation that will study how cosmic gas bubbles form, which can



Image credit: U.S. Air Force

*Caption: An image of a scale model of the C/NOFS probe. NASA's CINDI instrument is installed on C/NOFS.*

Continued on Page 7

## 2008 Mission Review

Continued from Page 6

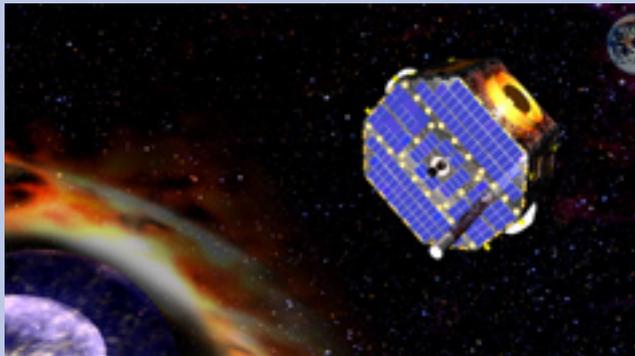
disrupt crucial radio communication and navigation signals, like the Global Positioning System (GPS).

CINDI will simultaneously explore the motions of the charged and neutral gases for the first time and will discover the differences in their behavior when plasma bubbles form and when they do not. This information will help explain the fundamental relationships between charged and neutral particles, allowing scientists to build a better forecast model for plasma bubbles for use in the Earth's environment and in other planetary environments.

CINDI is a critical part of the science objectives of C/NOFS undertaken by the Air Force Research Laboratory and the Space and Missile Command Test and Evaluation Directorate. CINDI consists of two instruments onboard the satellite, the Ion Velocity Meter and the Neutral Wind Meter, which separately measure the ionized (electrically charged) and neutral particles that exist in the ionosphere.

CINDI is a NASA-sponsored Mission of Opportunity conducted by the University of Texas at Dallas. NASA's Explorer Program at Goddard manages the CINDI mission. The Explorer's Program provides frequent flight opportunities for world-class scientific investigations from space within heliophysics and astrophysics. For more information, visit: <http://cindispace.utdallas.edu>.

### IBEX Launches to Map Outer Solar System



Caption: Artist's impression of the Interstellar Boundary Explorer (IBEX) exploring the edge of our solar system.

NASA's *Interstellar Boundary Explorer* (IBEX) successfully launched October 19, 2008 from the Kwajalein Atoll in the Pacific Ocean. IBEX will be the first spacecraft to image and map dynamic interactions taking place in the outer solar system.

IBEX will build an image of the outer boundary of the solar system from impacts on the spacecraft by high-speed particles called energetic neutral atoms. These particles are created in the boundary region when the 1-million miles per hour solar wind blows out in all directions from the Sun and plows into the gas of interstellar space. This region is important to

study because it shields many of the dangerous cosmic rays that would flood the space around Earth.

IBEX Principal Investigator Dave McComas explains the current status of the mission, "We are currently taking science data from both the IBEX-Hi and IBEX-Lo sensors and collecting the first swaths of our all-sky maps. Now the hard, and fun, work begins as we collect more orbits worth of data exposing adjacent swaths of the sky and sift through and remove the various backgrounds to unveil the underlying image from the edge of our solar system."

IBEX is the latest in NASA's series of low-cost, rapidly developed Small Explorers spacecraft. The Southwest Research Institute developed the IBEX mission with a team of national and international partners. Goddard manages the Explorers Program for the Science Mission Directorate in Washington.

For more information on IBEX, visit: <http://www.nasa.gov/ibex>.

### Work Continues in Preparation for Servicing Mission 4 to Hubble

Servicing Mission 4 (SM4) to *Hubble* was scheduled for launch in October 2008, but delays have postponed it until May 2009. The delay is due to an onboard computer anomaly involving *Hubble's* Science Instrument Control and Data Handling (SIC & DH) system, which transmits science data back to Earth, and the subsequent need to prep a spare SIC & DH for flight.

Unfortunately, not all of *Hubble's* onboard instruments restarted after the team intentionally placed them in safe mode in order to update *Hubble's* main computer. The team has been unable to restart the Near Infrared Camera and Multi-Object Spectrometer Cooling System, but efforts continue with the hope of restarting it prior to SM4. Meanwhile, observations using the Wide Field Planetary Camera 2 and a Fine Guidance Sensor have resumed.

Servicing Mission 4 is an 11-day mission featuring five spacewalks. Astronauts will extend *Hubble's* mission life well into the next decade and significantly enhance its scientific ability, bringing it to the apex of its capabilities.

During this last Shuttle mission to *Hubble*, astronauts will attempt the first on-orbit repairs of two existing instruments—the Advanced Camera for Surveys and the Space Telescope Imaging Spectrograph. Astronauts will also install two new instruments—the Wide Field Camera 3 and Cosmic Origins Spectrograph—and upgrade the telescope with new batteries, gyroscopes, and other components.

For detailed information about the *Hubble* mission, visit: [www.nasa.gov/hubble](http://www.nasa.gov/hubble). ■

## Goddard Shines in 2008 Events

Edited by John Putman

### Goddard Space Flight Center Featured on WETA

In February of 2008, WETA aired a half-hour television program that featured an exclusive, behind the scenes tour of our Center. The program highlighted our major achievements in space flight, explored the ins and outs of a space mission, and showcased the extensive and impressive team behind it all.

### Yuri's Night

To celebrate the anniversary of mankind's first foray into space and the first Space Shuttle flight, Goddard teamed with the Space Generation Advisory Council to host a world space party on April 12.

Throughout the evening, more than 750 patrons joined the celebration at the Goddard Visitor Center between 7 p.m. and 1 a.m. The event commemorated major milestones in space history, and the current and future accomplishments of NASA.



*Caption: The Cassettes perform at Yuri's Night.*

Photo Credit: Bill Hrybyk

### Folklife Festival

The 42nd Annual Smithsonian Folklife Festival was held June 25–July 6 on the National Mall in Washington, D.C. The Goddard community and its mission were represented in a positive, enlightening, and engaging way to over one million festival attendees.



*Caption: Emilie Drobnes welcomes a visitor to the world of astronomy.*

Photo Credit: NASA

In addition to providing over 150 scientists, engineers, and education and public outreach professionals to work the event for the entire 10-day duration, Goddard was also heavily involved with managing several logistical requirements for this event.

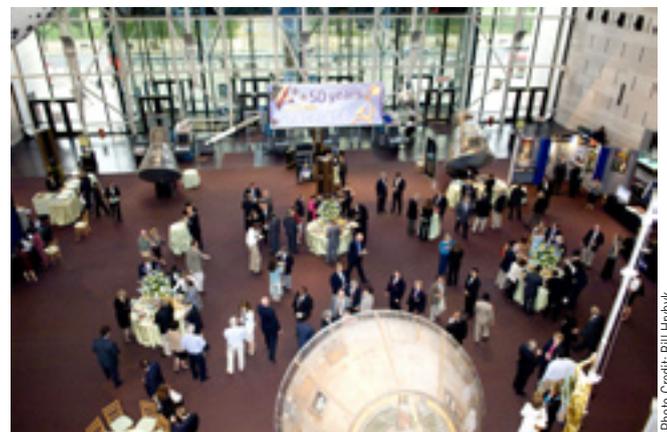
### Goddard Gets on iTunes

Short videos that showcase Goddard's exciting research, discovery, and innovation in science and technology are now accessible on the Web through sites like YouTube and applications like Apple iTunes. "NASA Goddard Shorts" covers a wide array of topics that feature the diversity of the Center's programs and projects. In 2008 alone, millions of people have viewed and downloaded the videos. One record-breaking video about Antarctic research on Pine Island Glacier Ice Shelf garnered 1.7 million downloads. Goddard's top YouTube hit, "Noctilucent Clouds," has received over 332,000 views. After only one year of producing shorts for the Web, Goddard's multimedia team boasts 58 new videos, all freely available to download and share.

### National Air and Space Museum

This year's ninth annual National Air and Space Museum reception, sponsored by the Maryland Space Business Roundtable, took place on June 19, 2008. "Expanding Our Universe" was the theme for the evening. More than 600 distinguished guests from Government, academia, industry, and the political arena attended the event to celebrate Goddard's 2008/2009 launches.

Guests interacted with scientists and engineers who had science stations assembled throughout the museum. Guests also enjoyed a Goddard film festival featuring "3D Sun," the story of NASA's Solar Extraterrestrial Relations Observatory (STEREO) mission.



*Caption: Visitors mingle at the National Air and Space Museum.*

Photo Credit: Bill Hrybyk

### LaunchFest

Thousands converged on Goddard on September 13, 2008 to celebrate LaunchFest. The predicted rain held off, encouraging approximately 11,000 people to visit the Center.

Beyond food, music, and entertainment on the Mall, the day was filled with exhibits and demonstrations from Goddard's many current and future

[Continued on Page 9](#)

## Goddard Shines in 2008 Events

Continued from Page 8

missions. Kids of all ages were filled with wonder at the dozens of interactive activities that filled the many buildings open to the public.



Photo Credit: Debora McCallum

### Discovery Education 3M Young Scientist Challenge

Goddard hosted the Discovery Education 3M Young Scientist Challenge competition finals on October 5 and 6 in the Building 8 auditorium and the 7-10-29 Building complex. A documentary of the event aired on the Discovery Channel in early 2009.



Photo Credit: Debora McCallum

*Caption: Young Scientist Challenge winner Melissa Rey stands with runners-up Shyamal Buch (left) and Peter Ku.*

The competition was hosted at Goddard as part of a NASA-Discovery Space Act Agreement to celebrate NASA's 50 years of discovery. Goddard scientists, engineers, and Goddard's resident astronaut Paul Richards assisted in challenging each participant on their knowledge of space-related themes and activities.

### Sunday Experiment

The Sunday Experiment, held the third Sunday of each month from September through May, features activities for elementary school students and their families that showcase Goddard's world-renowned science and engineering research and technological developments. Families leave inspired by the hands-on activities, wowed by the scientists and engineers, and excited about Goddard's revolutionary research and technology.



Photo Credit: Pal Izzo

*Caption: A family enjoys a balloon experiment at the Sunday Experiment.*

### Wallops Recognized as Part of Virginia History

A Virginia historical marker recognizing the contributions of NASA's Wallops Flight Facility to aerospace research was unveiled November 22, 2008 at the entrance to the Wallops Visitor Center. The marker includes a history of Wallops and the contributions of the facility to Virginia and the surrounding community. ■



Photo credit: Jacob Owen

*Caption: Participating in the unveiling were (left to right) Bill Schultz, Chairman of the Virginia Aeronautical History Society Historical Marker Committee; Randall Burdette, Director of the Virginia Department of Aviation; Dr. John Campbell, Wallops Director; Ron Wolff, Chairperson of the Accomack County Board of Supervisors; and Joanna Wilson, Virginia Department of Historic Resources.*

## 2008 Accomplishments for the Innovative Partnerships Program

Courtesy of Goddard's Innovative Partnerships Program Office

Tasked with championing innovation, Goddard's Innovative Partnerships Program Office (IPPO) is always adapting its approaches to bringing technology into, and transferring it out of, NASA. The year 2008 saw several new developments and achievements for IPPO.

### Groundbreaking Approach to Commercializing NASA Technologies

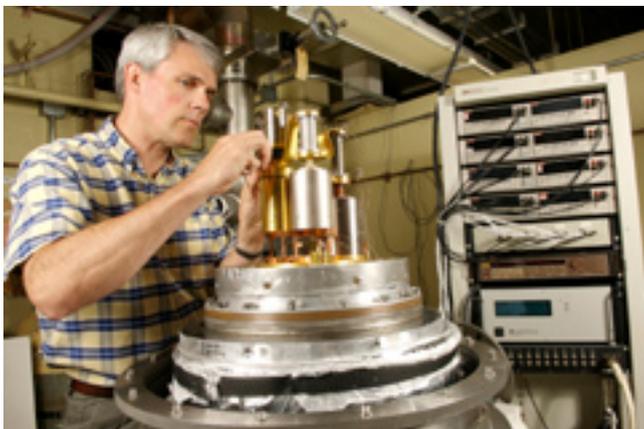
Goddard took part in Ocean Tomo, LLC's live intellectual property (IP) auction in Chicago, Ill. on October 30. Out-licensing Government-owned patents through a live IP auction is a remarkably novel approach to partnering, and Goddard is the first Federal laboratory to have participated in such an event.

### Addressing Mission Needs

The selection this past year by several Constellation projects of Integrated Lunar Information Architecture for Decision Support (ILIADS) for critical data consolidation and analysis functions dramatically illustrated the value of IPPO's strategic guidance to Goddard innovators. IPPO has supported ILIADS since 2006, by helping establish a partnership with United Space Alliance, as well as secure funding and support from Exploration Systems Mission Directorate (ESMD) leaders.

### Supporting Innovators from Small Wins to Big Windfalls

In 2008, two Explorer Program Mission of Opportunity investigations selected a Goddard adiabatic demagnetization refrigerator (ADR) technology, providing funding totaling more than \$44 million. This was the result of years of collaborative efforts. "Over the last 10 years, through the efforts of our research team and the folks in IPPO, we've been able to get incremental amounts of funding that have kept our work going and helped us establish a worldwide reputation as the leader in ADR technologies," said ADR inventor Peter Shirron. "That is really what has helped us arrive at this success."



Caption: Peter Shirron and the adiabatic demagnetization refrigerator (ADR).

### Increasing IPP Seed Funding

The IPP at Headquarters provided supplemental seed funding in 2008 that totaled nearly \$700K to two Goddard proposals. Added to the five proposals granted IPP seed funding in late 2007, this brought Goddard's total seed fund awards to \$1.4 million, clear evidence of the wealth of innovative work

happening at Goddard. IPPO led the proposal preparation for the two projects—the Autonomous Flight Safety System and the Advanced Microwave System Architecture Demonstration.

### Winning Another R&D 100 Award

IPPO was pleased to announce in 2008 that its nominee—Goddard's Sensor Web 2.0—won an R&D 100 Award, marking the third consecutive year that Goddard technology has received such recognition. Sensor Web 2.0 gathers and assimilates data from a network of sensors, enabling them to operate cohesively for applications such as wildfire management. For more information, visit: <http://ipp.gsfc.nasa.gov/ft-tech-SensorWeb.html>



Caption: Innovation team members (from left to right): Pat Cappelaere, Dan Mandl, and Stu Frye

### Measuring the Immeasurable

Throughout 2008, the IPPO continued to develop partnerships aimed at yielding innovations of direct benefit to NASA missions. A prime example was the agreement between Goddard and Northrop Grumman, where researchers will jointly develop advanced civil radar system architectures. This collaboration will foster new, space-based remote sensing instruments with revolutionary performance characteristics. ■



Caption: Dr. Laurie Leshin and Joseph Ensor sign the Space Act Agreement.

## Goddard Makes Case for Bigger Trophy Case

Edited by John Putman

In January, Dr. Peter Hildebrand, acting Chief of the Hydrospheric and Biospheric Laboratory and Deputy Director of the Sciences and Exploration Directorate, was named a Fellow of the American Meteorological Society.

In February, Virginia Governor Timothy M. Kaine and Science Museum of Virginia Director Richard Conti named Dr. James Russell one of four of the state's Outstanding Scientists and Industrialists of 2008. The honorees were introduced to the General Assembly on Thursday, February 14. Dr. Russell is the Principal Investigator for the Aeronomy of Ice in the Mesosphere (AIM) mission.

The National Academy of Sciences awarded the 2008 Arctowski Medal to Dr. Leonard Burlaga, an astrophysicist at Goddard. The Arctowski Medal is presented to honor outstanding contributions to the study of solar physics and solar-terrestrial relationships. The award cites Burlaga, "...for pioneering studies of the magnetized solar wind plasma from 0.3 to 102 AU, including the recent crossings of the *Voyagers* of the heliospheric termination shock and their entry in the heliosheath."

Dan Powell, Lead Nanotechnologist for Goddard and Andrew "Drew" Jones, a Mechanical Engineer at Goddard, were awarded an Ames Honor Award for their part in developing a new class of space flight technology called the Nano Chemsensor Unit (NCSU).

Dr. Xiaoli Sun, Code 694, was presented with the Moe I. Schneebaum Award for Engineering for his contributions in advancing laser altimetry, lidar, and ranging receivers on all space lidar instruments developed at Goddard.

In May 2008, Astrophysicist Dr. Neil Gehrels of Goddard was elected as a Fellow of the American Academy of Arts and Sciences. Founded in 1780 by John Adams, the American Academy honors distinguished scientists and leaders in public affairs, business, administration, and the arts.

Goddard's Christa Peters-Lidard was awarded the Arthur S. Flemming Award in the category of Applied Science, Engineering, and Mathematics. Established by the Downtown Jaycees in 1948, the Flemming Awards honor outstanding Federal employees.

Dr. John G. Baker and Dr. Joan M. Centrella received the 2008 John C. Lindsay Memorial Award for Space Science. Centrella and Baker received their awards on May 30 for their groundbreaking computer simulations, which show what happens when two supermassive black holes collide and merge. Centrella serves as Director of Goddard's Gravitational Astrophysics Laboratory. Baker is an astrophysicist with the Numerical Relativistic Astrophysics Group.

On July 1, members of the *Hubble* Servicing Mission 4 crew presented their personal award, the Silver Snoopy award, to Goddard employees Clay Fulcher, Thomas Griffin, Jackie Johnson, and Victoria Stewart. Each individual was honored for his or her exceptional support of NASA's human spaceflight program.

In September, Goddard's Orlando Figueroa, Director of Applied Engineering and Technology (Code 500), was awarded the Smithsonian Latino Center's Legacy Award for his contributions to the advancement of science.

Goddard racked up a "three-peat" with the announcement that its Sensor Web 2.0 won an R&D 100 Award for 2008. This marks the third consecutive year that Goddard technology has been lauded at the ceremony that the *Chicago Tribune* dubbed the "Oscars of Invention." Each year, *R&D Magazine* selects 100 of the most innovative technologies that have the potential to further scientific discovery and affect human life.

Nona Cheeks, Chief of Goddard's Technology Commercialization Office, and Donya Douglas, the Associate Branch Head for Systems Engineering for the Instrument Systems Branch (556) and the instrument systems engineer for the Space Technology 8 Project Thermal Loop Technology, were recognized by the National Women of Color (WOC) as 2008 WOC All-Stars of Technology. They were honored during the 13th annual WOC Science, Technology, Engineering, and Math Conference on October 23–25 in Dallas, Texas.

Each year, the President of the United States honors a select group of career members from the Senior Executive Service (SES), Senior Level (SL), and Scientific and Technical (ST) corps for their outstanding leadership accomplishments and service in some of the Nation's most critical positions in the Federal Government. For the FY08 performance period, Mr. Arthur F. Obenschain was the Goddard recipient bestowed the highest honor of Distinguished Senior Professional as a member of the SES corps. Dr. John C. Mather was the Goddard recipient bestowed the highest honor of Distinguished Senior Professional as a member of the ST corps. In addition, Mr. Dennis J. Andrucyk, Ms. Valorie A. Burr, and Mr. Nicholas G. Chrisotimos were recognized with the Meritorious Presidential Rank Award.

In November, Goddard scientist Dr. Wei-Kuo Tao was awarded the 2008 William Nordberg Memorial Award. The award was given at an award and lecture scientific colloquium in the Goett Auditorium in Building 3. Dr. Tao was recognized for his scientific contributions over the past three decades. His work has increased the fundamental understanding of how cloud systems work, spanning the full spectrum of physical processes and types of systems. ■

## In Memoriam: Goddard Feels the Loss of Fallen Colleagues

Edited by John Putman

### Bill O'Leary—January 14

Bill O'Leary, head of Goddard's Public Affairs Office from 1962–1985, died on January 14th of congestive heart failure.



Photo credit: Jay O'Leary

### Thomas Weber Jr.—July 17

Thomas Weber died suddenly Thursday, July 17 at his home in Columbia, Md. Tom worked in the Science Data Systems Branch in the Software Engineering Division.



Photo Credit: Debora McCallum



Photo Credit: NASA/GISS

### Robert Jastrow—February 8

Dr. Robert Jastrow, the founding director of the Goddard Institute for Space Studies (GISS), and its head until 1981, passed away on February 8.



Photo provided by Boldt family

### Elihu Boldt—September 12

Elihu Boldt, Goddard astrophysicist, died after an apparent heart attack on Sept. 12 at Doctors Community Hospital in Lanham, Md. .

### Norman "Junior" Rembert—June 29

Norman "Junior" Rembert died on June 29th at Georgetown University Hospital in Washington, D.C. Norman started at Goddard as an electrician and was ultimately promoted to Power Plant Supervisor. He served in that position for approximately 15 years.



Photo provided by Randy Dembrowicz

### Beth Brown—October 5

Dr. Beth Brown, 39, astrophysicist and Assistant Director for Science Communication and Higher Education for the Science and Exploration Directorate at Goddard, died suddenly October 5 at Doctor's Community Hospital in Lanham, Md. ■



Photo Credit: NASA