

# Goddard View

## Goddard Symposium Recognizes Yesterday's Dreams as Today's Reality

Pg 3

## Goddard Wins Awards for Robotic Moon Mission

Pg 4

## Resident Engineers Mentored by Apollo Veterans

Pg 8

## Countdown to GLAST Launch

By Rob Gutro

There are only 5 weeks to go! The *Gamma-ray Large Area Space Telescope* (GLAST) launches May 16 from Cape Canaveral Air Station, on Florida's east coast. GLAST will explore the most extreme environments in the universe, where nature harnesses energies far beyond anything possible on Earth!

GLAST is a collaborative mission with the U.S. Department of Energy; international partners from France, Germany, Italy, Japan, and Sweden; and numerous academic institutions from the U.S. and abroad. The spacecraft will answer questions about supermassive black hole systems, pulsars, and the origin of cosmic rays. It also will study the mystery of powerful explosions known as gamma-ray bursts.

Keep your eyes on this space for more updates and the latest countdown to GLAST launch. See the story on Page 10 to learn more about the GLAST team.

For more information, visit: <http://www.nasa.gov/glast>. ■



## Table of Contents

### Goddard Updates

- Countdown to GLAST Launch - 2
- Goddard Symposium Recognizes Yesterday's Dreams as Today's Reality - 3
- Goddard Wins Awards for Robotic Moon Mission - 4
- New N-PROP System Coming May 2008 - 5
- NASA Goddard Scientists Identify Smallest Known Black Hole - 6
- WAVES 2008 Field Campaign Concludes at Beltsville Research Facility - 7
- Resident Engineers Mentored by *Apollo* Veterans - 8
- Construction Update #3 on New Science Building - 9

### Goddard Family

- Meet the Faces at Goddard Behind GLAST:
  - Dr. David Thompson - 10
  - Dr. Xiaoli Sun Receives Prestigious Engineering Award - 11

### New Faces

- Bassey Udofot - 12
- James Klimchuk - 12

Cover caption: Dr. Frank Cepollina speaks at the 46th Annual Robert H. Goddard Memorial Symposium.

Photo Credit: Chris Gunn.

## 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.



## Goddard Symposium Recognizes Yesterday's Dreams As Today's Reality

By Dewayne Washington and Mike Calabrese

The 46th Annual Robert H. Goddard Memorial Symposium was held March 4–6, 2008 at the Greenbelt Marriott Hotel in Greenbelt, Md. This annual symposium is sponsored by the American Astronautical Society (AAS) and supported by NASA Goddard.

On the eve of NASA's 50th Anniversary, this year's symposium brought together leaders in government, industry, academia, and entrepreneurs to consider "Exploration to Commercialization: Going to Work in Space." Goddard Center Director Dr. Ed Weiler welcomed attendees on the first day and introduced the keynote speaker, NASA Administrator Dr. Michael Griffin. Opening keynote speaker for a third consecutive year, Griffin remembered Dr. Robert Goddard in his presentation with a focus on "The Reality of Tomorrow." He spoke of the evolving symposium themes over the past 46 years from, "...strictly technical subjects to the broader implications of spaceflight for human society."



Photo credit: Chris Guim

*Caption: Dr. Michael Griffin addresses attendees at the 46th Annual Robert H. Goddard Memorial Symposium.*

Griffin highlighted the achievements of commercial suborbital flight, and spoke of a need for NASA to develop strategies to engage the emerging commercial space sector as a way to advance NASA's goals. Griffin also recognized 2008 as one of the busiest years of space activity in Goddard's history. For the men and women of Goddard, going to work in space this year includes the launching of nearly a dozen science missions.

Other first-day presentations included William Gerstenmaier, NASA Associate Administrator for Space Exploration, speaking about humans working in space on the International Space Station and space shuttles. Tom Cremins, Deputy Associate Administrator for Exploration Systems, spoke about NASA's efforts to sustain a human presence in space. Lon Rains, Editor of *Space News*, talked about the international role in expanding human presence in space. Afternoon sessions included several panel discussions about the emerging space industry, spaceports, and commercial space launches.

Dr. John H. Marburger III, Science Advisor to the President, was the opening keynote speaker for the second day and recalled his remarks at the 44th Goddard Symposium, "Questions about the vision boil down to whether we want to incorporate the solar system in our economic sphere or not. Exploration by a few is not the grandest achievement. Occupation by many is grandeur. Not necessarily in the sense of permanent human occupation, but in the sense of routine access to resources."

Sessions on the second day included "Moon Science," by David Smith; "Investing in Technology to Enable Future Missions in Space," by Dr. Laurie Leshin; and a panel on "Faces for the Future," moderated by Ed Hoffman from NASA Headquarters. Lunch speaker, Admiral Conrad Lautenbacher, National Oceanic and Atmospheric Administration (NOAA) Administrator, has spearheaded an effort to encourage world science and policy leaders to work toward a common goal of building a sustained Global Earth Observation System of Systems (GEOSS).

Frank Slazer, AAS President, presented F. Landis Markley with the 2007 AAS Fellow Award, and James V. Zimmerman with the 2008 Award for the Advancement of International Cooperation.

The afternoon sessions included a presentation by Dr. Frank Cepollina about the upcoming *Hubble* Servicing Mission later this year. He emphasized the importance of modularity and tools in the architecture and design to enable repair and refurbishment of past, present, and future satellites and observatories. Louis Lanzerotti from the New Jersey Institute of Technology spoke about the importance of a space weather predictive capability to protect our astronauts and space assets. Dr. Jim Garvin presented a summarized understanding of Mars and reflected on the results from recent satellite observations and rover data. Dr. Mario Livio, Head of the Office of Public Outreach for the Space Telescope Science Institute, talked about Astrophysics Beyond 2020 and the pursuit of improved understanding directed at the big questions facing us in astrophysics.

"From all we have heard, I believe this to be one of our most successful symposiums to date," said James Kirkpatrick, Executive Director of AAS. "There was a good variety of topics, presenters, national and international presentations, and focus. We also had our largest attendance of Goddard employees as well. I am very proud of the hard work from each Planning Committee member, and I would like to thank each for a job well done." ■

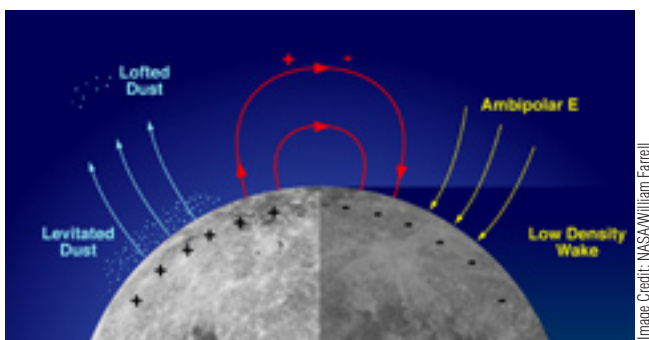
## Goddard Wins Awards for Robotic Moon Mission

By Nancy Neal-Jones and Bill Steigerwald, with Trudy Bell

NASA has selected two proposals from researchers at NASA's Goddard Space Flight Center in Greenbelt, Md., to assist with measurements to be made by the Agency's *Lunar Reconnaissance Orbiter* (LRO). The orbiter is being built and managed by Goddard and is scheduled for launch later this year. LRO represents NASA's first step in its plans to return humans to the Moon by 2020.

The orbiter will conduct a one-year primary mission exploring the Moon, taking measurements to identify future robotic and human landing sites. In addition, it will study lunar resources and how the Moon's environment will affect humans. The launch of LRO will also involve a second spacecraft called the Lunar Crater Observation and Sensing Satellite (LCROSS). LCROSS will impact a permanently shadowed crater near a lunar pole to search for evidence of polar water ice.

One of the Goddard proposals will investigate whether electrically charged dust is propelled across the Moon by electric fields on the lunar surface. The other proposal will aid in the search for hydrogen and water ice deposits in the permanently-shadowed craters of the lunar poles. The dust investigation, "Mapping Lunar Surface Electric Fields and Characterizing the Exospheric Dust Environment," is led by Dr. Timothy Stubbs, a researcher with the University of Maryland, Baltimore County, who is contracted to Goddard. The water ice investigation, "Enhancement of Lunar Exploration Neutron Detector Mission Operations and Science Return," is led by Dr. Timothy McClanahan of NASA Goddard.



Caption: Diagram showing how positively charged dust on the Moon's daylit side is transported across the horizon to the negatively charged night side.

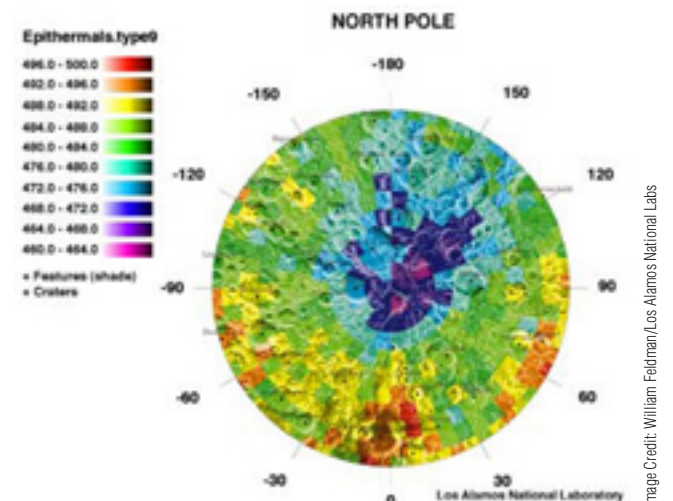
"From the experiences of the astronauts during the Apollo program, lunar dust is recognized to be a significant nuisance, and potential hazard, to robotic and human exploration," said Stubbs. "These dust problems were likely exacerbated by electrostatic processes, so it is important to understand lunar surface and dust charging to develop effective mitigation strategies."

The dust investigation will determine how much lunar dust is electrostatically transported above the Moon's surface and create maps of electric fields on the lunar surface to help predict when and where this dust transport is likely to be most active.

The investigation will characterize the high altitude lunar dust "atmosphere" using dust strikes detected by LRO's Cosmic Ray Telescope for the Effects of Radiation instrument. The investigation also will evaluate the amount of lunar dust above the surface of the Moon by using the Lunar Reconnaissance Orbiter Camera (LROC) and Lyman-Alpha Mapping Project (LAMP) imagers to view a glow on the lunar horizon that is thought to be caused by sunlight scattered by dust particles. It will map the lunar surface electric fields using surface charging models, together with topographic and shadowing data from LROC and the spacecraft's Lunar Orbiter Laser Altimeter instrument.

The hydrogen and water ice investigation is similar to a treasure hunt. "It costs tens of thousands of dollars per pound to put materials into space," said McClanahan. "That makes ordinary water on the Moon more precious than gold. To make lunar exploration affordable, we need to use the resources of the Moon as much as possible, so we can avoid the cost of bringing them up from Earth."

With almost no atmosphere, most of the Moon is drier than the driest terrestrial desert. However, there may be concentrations of hydrogen, a component of water, and even some water ice at the bottom of craters in the lunar poles. The depths of some craters in the polar regions are in permanent shadow. These places are very cold and are never exposed to direct sunlight. In these conditions, hydrogen and possibly water ice is thought to have accumulated over billions of years.



Caption: Map of potential hydrogen deposits on the north pole of the Moon made using the Neutron Spectrometer instrument on the Lunar Prospector mission. Blue areas are where low numbers of neutrons were detected, marking regions with potential hydrogen or water ice deposits. Note the concentrations near the pole.

Some scientists believe water vapor from past comet impacts has migrated across the lunar surface to the poles to become embedded in the soil at the bottom of these dark craters. Others believe hydrogen, a primary component of the solar wind, has become embedded in the lunar soil in these polar cold traps over time.

Continued on Page 5

## Goddard Wins Awards for Robotic Moon Mission

Continued from Page 4

If water ice exists in the eternal shadows of the lunar poles, and it is practical to extract it from the soil, the water could be broken down into hydrogen and oxygen for use as rocket fuel and breathable air. Even sufficient concentrations of hydrogen by itself would be valuable because the hydrogen could be used as fuel or combined with oxygen from the soil to make water.

The investigation will use the presence of hydrogen as a sign of potential ice deposits. The Moon is constantly being hit by cosmic rays, particles moving at almost the speed of light that come from explosions on the Sun and in space. These particles hit the lunar soil and create a shower of other particles. Neutrons, a component of the nucleus of atoms, are among these particles, and some fly back out into space.

These neutrons can be detected by LRO's Lunar Exploration Neutron Detector (LEND). The neutrons have a wide range of speeds. If the neutrons hit hydrogen atoms in the lunar soil before being ejected into space, the impact will slow them down. As LRO scans the lunar surface, LEND counts the neutrons moving at speeds in the middle of the range.

If LEND detects a decrease in the amount of neutrons moving at mid-range speeds, it means the neutrons are being slowed by impacts with hydrogen, so there is probably a concentration of hydrogen or even water ice in that particular area.

"The Lunar Prospector mission created rough maps of hydrogen concentrations based on this decrease in neutron speed," said McClanahan. "LRO will create maps with much greater detail, which is needed to make the search for hydrogen deposits practical."

McClanahan's investigation will help LRO scientists interpret what they are seeing from the LEND instrument by creating computer models of how the data will appear based on different temperatures, soil compositions, and levels of cosmic radiation.

NASA received a total of 55 proposals in response to a NASA Research Announcement released in 2007. A peer review panel and NASA Planetary Science Division Research and Analysis Program scientists evaluated the proposals, from which 24 investigations were selected. Selection criteria included intrinsic merit, relevance, responsiveness to planetary science goals and objectives, as well as cost.

Scientists will be fully or partially funded depending on their research work and scope of activities. Both Goddard proposals are fully funded by NASA.

For a complete list of the selected scientists and their investigations, visit: [http://www.nasa.gov/pdf/216482main\\_LRO\\_Participating\\_Scientists.pdf](http://www.nasa.gov/pdf/216482main_LRO_Participating_Scientists.pdf).



## New N-PROP System Coming May 2008

By Candi Waller

In an effort to better track and manage assets Agency-wide, NASA will introduce N-PROP, a new Web-based property management solution for all NASA employees (civil servants and contractors).

N-PROP, which stands for NASA Property, is primarily targeted for property custodians and property owners to support the acceptance, tracking, and management of NASA's controlled equipment. It will, however, be available to all employees to search for active and excess property within their Center and across the Agency.

At Goddard, N-PROP will replace both the current NASA Equipment Management System (NEMS) and the Goddard Computer Hardware Inventory and Repair Processing System (CHIRPS).

This new tool is scheduled to go live Agency-wide on May 19, 2008. The Center will be hosting a briefing on April 22 from 9:30 to 10:30 a.m. in the Building 3 auditorium. The briefing will provide employees an overview of N-PROP and its capabilities.

For further information about N-PROP or the planned briefing, please contact Felicia White at [felicia.white@nasa.gov](mailto:felicia.white@nasa.gov) or 301-286-8857. ■



## NASA Goddard Scientists Identify Smallest Known Black Hole

By Robert Naeye and Rob Gutro

Using a new technique, two Goddard scientists have identified the smallest known black hole. With a mass only about 3.8 times greater than our Sun and a diameter of only 15 miles, the black hole lies very close to the minimum size predicted for black holes that originate from dying stars.

“This black hole is really pushing the limits. For many years, astronomers have wanted to know the smallest possible size of a black hole, and this little guy is a big step toward answering that question,” says lead author Nikolai Shaposhnikov of NASA’s Goddard Space Flight Center in Greenbelt, Md.

Shaposhnikov and his Goddard colleague Lev Titarchuk presented their results on March 31, at the American Astronomical Society High-Energy Astrophysics Division meeting in Los Angeles, Calif. Titarchuk also works at George Mason University in Fairfax, Va., and the U.S. Naval Research Laboratory in Washington, DC. They described their results in more detail in a media teleconference on April 1.

The tiny black hole resides in a Milky Way galaxy binary system known as XTE J1650-500, named for its sky coordinates in the southern constellation Ara. NASA’s *Rossi X-ray Timing Explorer* (RXTE) satellite discovered the system in 2001. Astronomers realized soon after J1650’s discovery that it harbors a normal star and a relatively lightweight black hole. The black hole’s mass had never been measured to high precision.

The method used by Shaposhnikov and Titarchuk has been described in several papers in the *Astrophysical Journal*. It uses a relationship between black holes and the inner part of their surrounding disks, where gas spirals inward before making the fatal plunge. When the feeding frenzy reaches a moderate rate, hot gas piles up near the black hole and radiates a torrent of x-rays. The x-ray intensity varies in a pattern that repeats itself over a nearly regular interval. This signal is called a Quasi-Periodic Oscillation, or QPO.

Astronomers have long suspected that a QPO’s frequency depends on the black hole’s mass. In 1998, Titarchuk realized that the congestion zone lies close in for small black holes, so the QPO clock ticks quickly. As black holes increase in mass, the congestion zone is pushed farther out, so the QPO clock ticks slower and slower. To measure the black hole masses, Shaposhnikov and Titarchuk use archival data from RXTE, which has made extremely precise measurements of QPO frequencies in at least 15 black holes.

Last year, Shaposhnikov and Titarchuk applied their QPO method to three black holes whose masses had been measured by other techniques. In their new paper, they extend their result to seven other black holes, three of which have well-determined masses. “In every case, our measurement agrees with the other methods,” says Titarchuk. “We know our technique works because it has passed every test with flying colors.”



Photo Credit: NASA

Caption: Rossi X-ray Timing Explorer satellite, shown here prior to launch.

When Shaposhnikov and Titarchuk applied their method to XTE J1650-500, they calculated a mass of 3.8 Suns, with a margin of uncertainty of only half a Sun. This value is well below the previous black hole record holder with a reliable mass measurement, GRO 1655-40, which tips the scales at about 6.3 Suns.

Below some unknown critical threshold, a dying star should produce a neutron star instead of a black hole. Astronomers think the boundary between black holes and neutron stars lies somewhere between 1.7 and 2.7 solar masses. Knowing this dividing line is important for fundamental physics, because it will tell scientists about the behavior of matter when it is scrunched into conditions of extraordinarily high density.

Despite the diminutive size of this new record holder, future space travelers had better beware. Smaller black holes, like the one in J1650, exert stronger tidal forces than the much larger black holes found in the centers of galaxies, which make the little ones more dangerous to approach. “If you ventured too close to J1650’s black hole, its gravity would tidally stretch your body into a strand of spaghetti,” says Shaposhnikov.

Shaposhnikov adds that RXTE is the only instrument that can make the high-precision timing observations necessary for this line of research. “RXTE is absolutely crucial for these black hole mass measurements,” he says. ■

## WAVES 2008 Field Campaign Concludes at Beltsville Research Facility

By Philip Kurian

WAVES 2008, a two-month field campaign led by Goddard's Dave Whiteman of the Mesoscale Atmospheric Processes Branch, Code 613.1, concluded this past March. WAVES 2008 (WATER Vapor Validation Experiments Satellite and Sondes) brought together a diverse group of researchers from Goddard Space Flight Center, Howard University, University of Maryland—Baltimore County (UMBC), University of Maryland—College Park (UMCP), National Center for Atmospheric Research, National Weather Service—Sterling, Jet Propulsion Laboratory, and the private companies Ecotronics and SSAI.



Photo Credit: David Whiteman

*Caption: Prepping the radiosonde package.*

While acquiring atmospheric light detection and ranging (lidar) measurements for *Aura/Aqua* satellite overpasses, the team also performed instrument accuracy assessments to measure atmospheric water vapor for climate change studies.

Lidar is an optical remote sensing technology that measures properties of scattered laser light to find information about a distant target. Lidar technology has been applied to research in archaeology, geography, seismology, and remote sensing, although it has been used most extensively for atmospheric research and meteorology.

WAVES 2008 was designed to acquire data during the winter-spring transition to augment the satellite validation data acquired during WAVES 2006 and 2007. Particular emphasis was placed on characterizing the upper tropospheric (UT) water vapor measurement capability of ground-based Raman lidars from Goddard, Howard, and UMBC.

"Water vapor is difficult to measure due to its high time and space variability," said Dr. Whiteman. "Careful field campaigns are needed to measure it with sufficient accuracy to address the science requirements of monitoring climate change and for validating satellite measurements."

WAVES provides important information about the validity and relative accuracy of different methods to study the troposphere, where weather occurs. Molecules in the upper troposphere and lower stratosphere can radiate more directly to space and thus, participate more strongly in the radiation balance of the planet.

Larry Twigg, who operates Goddard's Aerosol/Temperature Lidar (AT-Lidar), noted that WAVES 2008 gave scientists a better handle on how the Stratospheric Ozone Lidar Trailer Experiment (STROZ-LITE) and AT Lidar systems compare in temperature and water vapor profiles, as well as offering validation for the ozone profiles of STROZ.

"We are helping to confirm that all the various techniques for measuring certain atmospheric quantities are giving the same answer—always a comforting thought," Twigg said.

Howard University has been building a multi-agency, multi-university field observation research station at the Howard University Research site at Beltsville (HURB). The HURB facility is part of the National Oceanic and Atmospheric Administration (NOAA)-Howard University Center for Atmospheric Science. David Whiteman, Belay Demoz (formerly of 613.1, now at Howard University), and others from Goddard are assisting in mentoring students and advising on instrument acquisition for the site. One of the main instruments at the site is the Howard University Raman Lidar, built with heavy involvement from Code 613.1.

The HURB site was selected to host WAVES because of the extensive suite of atmospheric measurement instrumentation sited there through the support of NOAA and cooperative agreements with the Maryland Department of the Environment and WTTG FOX television.



Photo Credit: David Whiteman

*Caption: Loading the Atmospheric LIDAR for Validation, Interagency Collaboration, and Education (ALVICE) trailer next to the AT LIDAR.*

Scott Rabenhorst, a graduate student in UMCP's Atmospheric and Oceanic Science Department who has been working with Whiteman since 2004, is fascinated by the different technologies and how they measure the atmosphere differently. He emphasized that, "Good communication is critical in making a collaborative research effort like WAVES successful."

For further information, visit <http://ecotronics.com/lidar-misc/WAVES.htm>, or contact Dave Whiteman at [David.N.Whiteman@nasa.gov](mailto:David.N.Whiteman@nasa.gov). ■

## Resident Engineers Mentored by *Apollo* Veterans

By Jim Hodges

On the front row of the Pearl Young Theater at NASA Langley Research Center, Milt Silveira and Tom Modlin talk quietly while they await the start of a meeting at which they will impart wisdom gleaned over the past four decades.

They are mentors, and behind them, scattered around the auditorium, are “resident” engineers who weren’t yet born when Silveira and Modlin were working on *Apollo*. Among these engineers are two from Goddard: Theodore “Theo” Muench (Greenbelt) and William “Jerry” Sterling (Wallops). They are part of NASA’s future, and they are supporting the Constellation Program to build the next generation of spacecraft for human exploration.

Department heads from Langley Research Center, Johnson Space Center, Glenn Research Center, Kennedy Space Center, and Goddard Space Flight Center chose the Resident Engineers to work and learn in a program that allows them to do something new and important. The Space Shuttle, first launched 26 years ago, is the last time NASA built a human space vehicle. “We’re building a new rocket and crew vehicle,” says Ralph Roe, Director of the NASA Engineering and Safety Center (NESC), and the person with overall responsibility for the Resident Engineer program. “I’ve never done it.”

Tim Wilson, NESC Deputy Director and the person directly in charge of the Resident Engineers says, “Most of us at NASA have had little opportunity to design new hardware.”

T.K. Mattingly, a former astronaut in the *Apollo* and Space Shuttle programs, and himself a mentor, is the father of the Resident Engineer program. “The only way to learn is by doing things,” he says.

Mattingly’s vision was to run the Resident Engineer program much as a hospital does its surgical residency: from the bottom up, adding responsibility until the resident is ready to operate under the eye of an experienced surgeon.

“My son went through a surgical residency,” Mattingly says, “so I had the vicarious opportunity to learn how they train surgeons. They’re not taking chances with anybody’s life, but failure has to be an option, or you won’t ever learn.”

With that in mind, NASA Chief Engineer Mike Ryschkewitsch directed Roe and NESC to gather a group of people who are early in their careers to work on the Max Launch Abort System (MLAS). The primary launch abort system and the MLAS are designed to allow the crew of the Orion space vehicle to escape in the event of launch difficulties. The MLAS is a secondary system to provide risk mitigation.

Roe and Wilson outlined the criteria used in identifying people who would benefit from the mentor program. “We deliberately targeted folks who had 5–10 years of experience, because we wanted to let them have hands-on

experience in designing something,” Wilson says. “At the same time, we wanted to get their outside, fresh look at things.”

After selecting at least two candidates from each of the five centers involved, Roe and Wilson determined what the residents would do and assigned them to MLAS subleads. The young engineers also formed their own team to determine the test article’s instrumentation and a timeline for MLAS, which is due to be tested in September at Wallops Island, Va.



*Caption: Resident Engineer team is flanked by (top row, left) mentors Tom Modlin and (far right) Milt Silveira, among others. NESC head Ralph Roe (third from left) is in overall charge of the program.*

“We wanted to give them tasks that were really important,” Wilson says. “They are too valuable a resource for us to bring them here and have them make photocopies. It’s an important piece of work, and we’re taking a hands-off approach: ‘You guys go and do it.’”

The knowledge and experience the residents are getting isn’t available anywhere else. “It’s amazing and almost surreal,” says Gary Dittmore, a shuttle flight controller at Johnson Space Center and the Resident Engineer team leader. “We’re working with the people who wrote the books (engineers study in college). It’s come full circle.”

One of the goals of the program is to combat the perception of a “brain drain” at NASA, that time is taking away the people who pioneered the Nation’s space exploration. Another goal is to give the residents a perspective of work done throughout the Agency at all centers. “I was at Kennedy for the first 16 years of my career and didn’t know anything other than what I did at Kennedy,” Roe says. “Being exposed to something like this across the Agency would, I think, be a great thing.”

The resident engineers agree. “If you only work at one center, on one program, you don’t really understand everything else that’s going on out there,” says Sarah Quach, who works in launch services at Kennedy Space Center, and has been assigned to the avionics and instrumentation team with MLAS. “It helps give you a better sense of what NASA’s all about.”

Continued on Page 9



## Resident Engineers Mentored by *Apollo* Veterans

Continued from Page 8

Adds Wilson: "It gives them a network of people, of contacts at other centers. The network itself is worth its weight in gold."

The newness of the work impresses the residents. "It's exciting, switching from a research project to a project in which we're going to build something and actually test it," says Omar Torres, who works at NASA Langley's Electromagnetics and Sensors Branch, and is applying his sensor knowledge to MLAS's instrumentation package. "And I think the excitement is going to build up as the actual test subject takes shape."

The mentors are impressed with their charges. "The young engineers in the program are a lot smarter than we were, a lot better trained," says Silveira, pointing around the room to Resident Engineers, most with laptops open, checking data or e-mail. "They have a lot better capability."



Photo Credit: Sean Smith

*Caption: Sarah Quach works at a computer while Resident Engineer Lead Gary Dittimore, Omar Torres, and mentors Tom Modlin and Milt Silveira look on.*

The engineers are cognizant of the technology gap between the *Apollo* and Constellation programs. "When we did an analysis, it took a long time," Silveira says. "We didn't have computers to use or programs already written for us."

Adds Modlin, "They're good with the tools they've got, [but] they seem to overlook the fundamentals. They trust the computer too much. Sometimes I'll take out a pad of paper and rough out a problem and show them where they might have missed something."

The residents aren't the only ones learning. There are two bridges across two generation gaps, spanning the divide from NASA then, to NASA now, to NASA future. "These guys kind of keep us out of a ditch, based on lessons learned," Roe says of the *Apollo*-era engineers. "We've got guys like me with 25 years of experience working with guys with 40 years of experience. And we've got these guys with 5-10 years of experience working with both groups."

"What we're trying to remember is what we did 40 years ago and why," Silveira says. "And what we're trying to do with the young engineers is to keep them from making the same mistakes we made." ■

## Construction Update #3 on New Science Building

By Rob Gutro

*This is the third in a recurring series of articles chronicling the construction of Goddard's Exploration Sciences Building (ESB).*

Recent activity on NASA Goddard's new science building included the installation of underground electrical conduits and roofing formwork.

David Larsen, Exploration Sciences Building Project Manager at Goddard, explained, "To construct a concrete slab, the wooden formwork is put in place on the underside of the future concrete slab by a team of carpenters. The reinforcing steel is then installed over the wooden formwork. After all of the steel is installed, the concrete is pumped into the formwork. Once the concrete hardens, the formwork is removed and the exposed concrete slab supported with wooden 4-by-4 posts called reshores."

The Manhattan Construction Company of Fairfax, Va., is constructing the building.



Photo Credit: Debra McCullum

*Caption: Installation of underground electrical conduits in the ESB main electrical room. Once installed, the concrete slab will be placed to finish the 1st floor.*



Photo Credit: Debra McCullum

*Caption: Installation of roofing formwork for upcoming concrete pour.*

For more information about NASA's Green Building, please visit the Web site: [http://www.nasa.gov/centers/goddard/news/green\\_building.html](http://www.nasa.gov/centers/goddard/news/green_building.html). ■

## Meet the Faces at Goddard Behind GLAST: Dr. David Thompson

By Rob Gutro



*Caption: Dr. David Thompson.*

NASA's *Gamma-ray Large Area Space Telescope* (GLAST) is scheduled to launch from Cape Canaveral on May 16. There are many people on the GLAST team, and one familiar face is that of Dr. David Thompson.

David Thompson is one of three Deputy Project Scientists on the GLAST mission. The others are Dr. Julie McEnery and Dr. Neil Gehrels, also both at NASA Goddard.

Dr. Thompson serves as the Multi-wavelength Coordinator for the Large Area Telescope (LAT) instrument on GLAST. LAT is one of two instruments on GLAST. The other is the GLAST Burst Monitor (GBM).

In his position, Dave helps plan cooperative observations with many other telescopes in order to maximize the scientific return from GLAST. He has worked in the Astrophysics Science Division here at Goddard since 1973. He is the leader of the team that built the Anticoincidence Detector for GLAST's LAT instrument. He was also one of the leaders of the balloon flight of the LAT prototype. Getting that flight off was one of the key milestones for the GLAST Project.

Whenever he talks to the general public about the topics he loves, he generates enthusiasm like a powerful gamma ray.

Recently, Dave promoted the GLAST mission to state officials during Goddard Day at the Maryland capitol in Annapolis. His next stop is the Maryland Science Center in Baltimore, Md., on Saturday, May 3rd for Space Day. During a "GLAST Media Day" here at Goddard back in September 2007, he explained what GLAST will do, and showed the media a simulation of how GLAST would see space. During the simulation, he asked reporters to "look at the sky with gamma ray vision." The reporters, like all others who hear Dave talk about GLAST and astrophysics, were captivated.

Dave's research spans all areas of astrophysics related to high-energy gamma rays. Before coming to Goddard, he was a research associate at the University of Maryland studying gamma rays produced by cosmic ray interactions in the Earth's upper atmosphere. He also helped in the building and flying of a balloon prototype of the Energetic Gamma-Ray Experiment Telescope (EGRET).

He studied cosmic sources of high-energy gamma rays, especially diffuse galactic radiation and gamma-ray pulsars. He has been involved in high-energy studies of pulsars, blazars, gamma-ray bursts, diffuse radiation, and unidentified sources.

Thompson received his B.A. in physics from Johns Hopkins University, Baltimore, Md. in 1967, and his Ph.D. in physics from the University of Maryland in 1973.

He is a member of the Goddard Speakers' Bureau, chairs the Goddard Scientific Colloquium Committee, and has been organizing the Friday afternoon scientific colloquia here at Goddard for ten years.

For more information about GLAST, visit: <http://www.nasa.gov/glast>. ■

## Dr. Xiaoli Sun Receives Prestigious Engineering Award

By Nancy Neal-Jones

Dr. Xiaoli Sun, Code 694, was presented with the 2007 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.

Dr. Sun has always been fascinated by how things work. As a child, he liked to take things apart and put them back together again. So it is not surprising that he entered a profession where he could design, analyze, and calibrate space-based instruments for state-of-the-art scientific measurements.

"I like to predict instrument performance and I really enjoy it when the analysis agrees with the data," said Dr. Sun. "It's a sweet feeling to see an instrument working in orbit, and then I refine the calibration to get even more out of an already very good instrument."

Dr. Sun spends half of his time on the job in analysis, writing reports, and in developing new instrument concepts. The other half, he spends in the labs and other facilities testing and calibrating the various instruments and components.

He has been involved in every flight lidar project team at Goddard, including Mars Observer Laser Altimeter (MOLA), Geoscience Laser Altimeter System (GLAS), Mercury Laser Altimeter (MLA), Lunar Orbiter Laser Altimeter (LOLA), and LOLA-Laser Ranging (LR). He has also been involved in the Shuttle Laser Altimeter. Not shy about his pride in the work that his comrades do here on Center, he says "Goddard is the best in the world in space laser altimeters."

Dr. Sun's work on MOLA was critical to predicting receiver performance. His work led to a new understanding of Mars global topography. The modeling and characterization of the receiver performance led to unprecedented, submeter accuracy on Mars.

As lead scientist for the GLAS detectors, he and his team developed flight detectors that have the highest sensitivity of any detectors flown at the 1064 and 532 nanometer level. These detectors were critical in the ability of GLAS to measure surface elevations and atmospheric backscatter profiles.

Dr. Sun is the Instrument Scientist and Detector Lead for the MLA instrument aboard the *Messenger* spacecraft. In this role, he defines, develops, and documents the performance of the altimeter receiver. He has calibrated the instrument performance, both before launch and in space.

Dr. Sun is one of the Co-Investigators of LOLA. He worked as the instrument scientist early in the project. Later, he moved on to the laser ranging system design and to receiver performance analysis.

Dr. Sun has been at Goddard since 1993. He has authored 19 peer-reviewed journal articles and many conference papers in his field. He is considered a world leader in photon counting detectors for lidars.

The Schneebaum Memorial Award is granted annually to an individual who has made a significant contribution toward advancing or extending space flight technology. ■

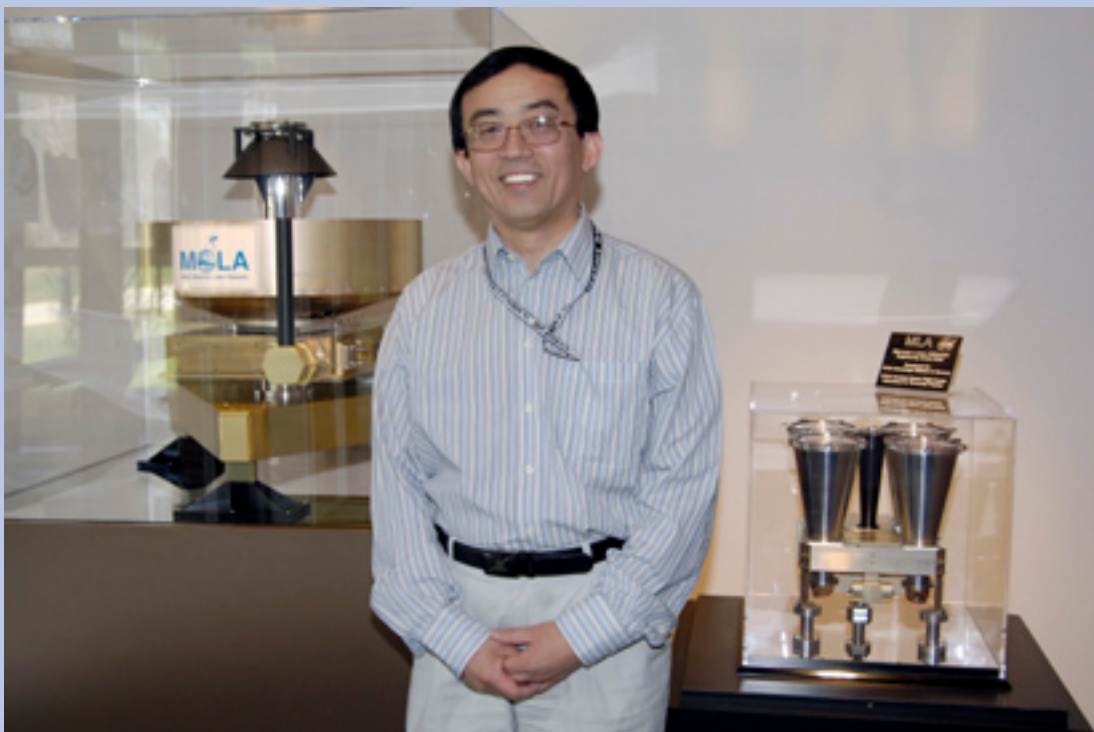


Photo Credit: Debora McCallum

*Caption: Dr. Sun stands next to mock-ups of the Mars Observer Laser Altimeter (MOLA) on the left and the Messenger Laser Altimeter (MLA) on the right.*



## New Faces:

A monthly feature spotlighting new members of the Goddard community.

By John Putman



*Caption: Bassey Udofot*

Bassey Udofot is a lead aerospace engineer in Code 547. His specialties include metallurgical engineering of materials, superconducting, ceramic insulating, and semiconducting materials.

He pursued his Ph.D. at the University of Tennessee at Knoxville, with work on the nanocrystalline structure of Ni and Fe-Ni alloy films. He earned a postgraduate degree in materials engineering from the University of Birmingham at Edgbaston, Birmingham, England. His work there earned him patents in both England and the United States.

Bassey is originally from Colorado Springs, Colo., where he taught at Pikes Peak Community College. Bassey is excited to work here at Goddard. He is looking forward to working with others who share his high standards. "I always work with quality and am deeply interested in materials interfacial reactions," he says.

As with his impressive career, Bassey is also very proud of his children. Two of them are studying medicine, his son at Emory University and one of his daughters at the University of North Carolina at Chapel Hill. Another daughter is an All-American in track and field at East Tennessee University, and yet another is an All-American basketball player at the Webb School of Knoxville, Tenn.

Outside of work, Bassey spends his time reading up on advances in new technologies, and helping and mentoring others. He is involved with community activities through his church, and he also enjoys bowling and travel. ■



*Caption: James Klimchuk*

Jim Klimchuk is an astrophysicist in the Solar Physics Lab, Heliophysics Science Division, Code 671. Although new to Goddard, Jim's been intrigued by space science and physics for most of his life.

Part of what brought Jim to Goddard was, "the opportunity to perform cutting edge research and influence the future direction of my discipline."

He especially appreciates, "The excellent colleagues and supportive work environment."

Jim enjoys many sports, including skiing, tennis, and golf. In fact he takes two big ski trips every year. One with his grown son and one with a Washington, D.C. area ski club. His passion, however, is volleyball. In the colder months, he plays 6-person indoor volleyball, and in the summer it's time for doubles beach volleyball with his wife. ■