



National Aeronautics and  
Space Administration  
Goddard Space Flight Center

# Goddard News

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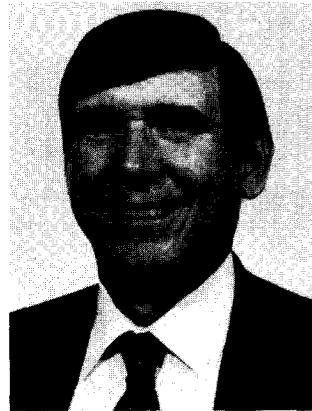
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## Goddard's deputy director retires

Pete Burr, Goddard's deputy director, retired June 24 after more than three decades of untiring and dedicated service. His contributions radiate through the Center including flight projects such as Orbiting Geophysical Observatory, Test and Training Satellite, Synchronous Meteorological Satellite, Solar Maximum Mission and Upper Atmosphere Research Satellite. As the Center's Deputy Director, Burr played a significant role in such successful missions as the Hubble Servicing Mission, Tracking and Data Relay Satellite System, GOES, and Extreme Ultraviolet Explorer. Not only has Burr left his trademark of meeting schedules and budgets, but also lead several significant institutional endeavors. He was the executive secretary for the Center's first formal strategic planning activity and chaired the Center's Equal Opportunity Council.

Known as a project managers' manager, Burr came up the ranks from being a Project Manager, to Director of



Pete Burr

Flight Projects Directorate to become one of the Center's two top guns. Burr can be proud of his many accomplishments. His personal style and leadership, however, will be remembered the most. According to his colleagues, Burr managed to touch those he worked with in a special way. He believes in the commitments he makes with you. A hand shake later, with his smiling eyes, throaty, quick laugh, you fast give him trust and confidence; and he gives you his best. Jim Elliott, Office of Public Affairs, offers this anecdote: "Burr was the first project manager I worked with. At the time, we were faced with a more than difficult challenge to win attention for the Solar Maximum Mission. With Pete holding the reins and Ken Frost, the Project Scientist riding shotgun, we won a lot of national as well as international media coverage.

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## HST proves "black hole" exists

by Jim Elliott

Astronomers using NASA's Hubble Space Telescope (HST) have confirmed for the first time the existence of a supermassive black hole.

The discovery, described by NASA officials as the greatest so far by HST, ended a long search for definitive proof of the astronomical phenomenon and validated the existence of gravitationally collapsed objects predicted by Albert Einstein 80 years ago.

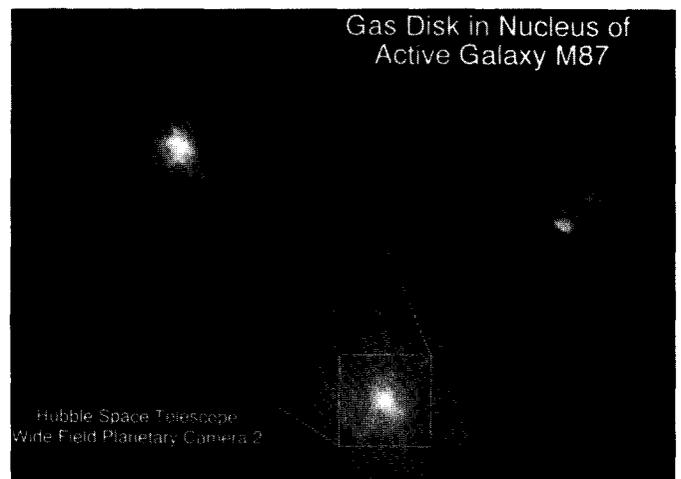
The concept of a black hole is based on mathematical calculations and theory. The theory held that a massive collapsing object such as a star or group of stars would become so dense as to form a gravitational pull so strong that nothing could escape its clutches, not even light.

The black hole confirmation, using HST's Faint Object Spectrograph (FOS), was made possible by corrective mirrors installed in the observatory by the STS-61 crew of astronauts last December. Shortly after it was launched in 1990, astronomers discovered the observatory's primary mirror suffered from a spherical aberration, and the corrective mirrors pro-

vided the prescription that allows three of the instruments on HST to perform up to its specifications.

With the prescription lenses installed, astronomers were able to peer in great detail into the heart of a giant elliptical galaxy known as M87 more than 50 million light-years away in the Constellation Virgo. A

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Black hole images from HST.

NASA



# Director's Dialogue

**Q:** Shortly after the installation of the traffic light at the Soil Conservation Road entrance to the Center, a letter to the Director's Dialogue questioned the lack of a left turn signal on the light. The need for a left turn signal onto the Center only has become greater in the past couple of years, especially at morning and lunch peak traffic times. At those times, traffic turning left into the Center backs up significantly, occasionally past the gate entrance that used to lead to the Recreation Center. In addition,

many employees turn right into the motor pool parking lot, make a U-turn and exit at the light, crossing Soil Conservation Road into the Center to avoid the need to turn left.

When will the Center do something to correct this lack of foresight and planning in the original installation of the light?

**A:** The Center is aware of this problem and is taking steps to alleviate it. An FY94 Construction of Facilities (CoF) project includes a turn signal directing traffic from

northbound Soil Conservation Service Road. The project will address this intersection in coordination with a proposed new traffic light at the entrance to EOSDIS and the Visitor's Center; these lights will be timed together. The improvements to this traffic signal are scheduled for completion by August 1, 1994.

**Sherry Foster, Director,  
Management Operations  
Directorate, Code 200**

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## NASA strategic management

by Gary Steinberg  
and Chris Williams

In March 1993, President Bill Clinton asked Vice President Al Gore to conduct a six-month study of the federal government. The purpose of the study, known as the National Performance Review (NPR), was to create a new vision for government that would move us from a government of red tape and bureaucracy to an entrepreneurial government that works better and costs less.

The NPR summary report, "From Red Tape to Results, Creating a Government that Works Better and Cost Less," was published in September 1993. The report identified 384 recommendations and 1,222 actions designed to begin this journey of change. Seventy percent of those recommendations and actions already are being implemented across the federal government.

The goal of the NPR, according to the report, is "not simply to weed the federal garden; it is to create a regime that will keep the garden free of weeds. It's not simply to trim the pieces of government, but to reinvent the way the government does everything." The review, which involved federal employees as well as outside experts, studied examples of successful state and local governments.

The NPR report's conclusions are captured in four major themes:

**Cut red tape.** To create an entrepreneurial government, we need to shift from a system where people are accountable for following rules to

one in which they are accountable for achieving results. To this end, the NPR recommended streamlining systems and stripping away layers of unnecessary regulations that stifle innovation. In place of rules and regulations, we need guiding principles and a system that empowers employees to perform their missions and holds them accountable for results.

**Put customers first.** The NPR report states that "effective entrepreneurial governments insist on customer satisfaction." The NPR focuses on the need to listen to our customers and restructure our operations to meet their needs. The report also recommends using market dynamics to put customers first.

**Empower employees to get results.** In successful governments, authority is decentralized. They use the strength, ideas, energy and creativity of all employees, not just a select few at the top. To reach this end, front-line employees and supervisors need to be trained and empowered to make decisions and solve problems.

**Cut back to basics:** Produce better government for less. An entrepreneurial government is constantly reevaluating itself and finding new ways to work better and cost less. To do this, we need to abandon the obsolete, eliminate duplication, embrace new technologies, engage in quality management, cut costs and increase productivity.

In addition to the NPR summary

report, 38 additional reports that provide background and guidance on the recommendations. The agency-specific reports provide detailed recommendations intended to support the reinvention of federal agencies. Other reports on cross-cutting systems cover issues that affect every agency, such as personnel and procurement.

Everyone ultimately has the opportunity and responsibility to contribute to the reinvention of NASA. Given budget constraints, everyone must find new ways to make the agency work better and cost less. Over the next several months, all NASA employees will receive basic training on quality management principles and how they relate to the government's reinvention efforts. This training has been mandated by the vice president and developed by the Federal Quality Institute.

Directing NASA's reinvention efforts is the Quality Steering Team (QST), chaired by Acting Deputy Administrator John Dailey. The Office of Continual Improvement (Code T) supports the QST and is responsible for coordinating the implementation of NPR recommendations and tracking the agency's progress.

For more information on NPR activities, NASA's reinvention or how to contribute, employees should contact their code's continual improvement focal point.

# New Center deputy director named

by Jim Elliott

Goddard Center Director Dr. John M. Klineberg, appointed Thomas E. Huber, formerly director of Engineering Directorate, Code 700, the new deputy center director. The appointment was effective as of June 26. Huber succeeds Peter Burr who retired on June 24. (see story on page 1.) Huber had been director of Engineering since February 1990.

In making the announcement, Dr. Klineberg said, "We are fortunate to have a man of such widely-respected knowledge of engineering and with such a broad knowledge of the center and its activities assume this important position. I have worked closely with him for several years and look forward to this even closer relationship."

In addition to his work in Code 700, Huber demonstrates a strong interest in education. In recent years, he has initiated a highly-popular and innovative program with local high schools in which students work directly with Goddard personnel during actual space missions. The students work side-by-side with engineers and technicians during the mission, primarily in monitoring the health of the particular spacecraft involved.

Huber began his career at Goddard as a controls engineer of the Orbiting Astronomical Observatory (OAO) satellite in 1964. Huber received a B.S. degree in Electrical



**Thomas E. Huber**

Engineering from Carnegie Mellon University, Pittsburgh, Pa., in 1955. He was the recipient of the NASA Exceptional Performance Award in 1973 and the NASA Outstanding Leadership Award in 1986.

## Building 98 destroyed

Goddard's Safety and Health Branch, Code 205.2, recently provided the Prince George's County Fire Department with a unique two-day training opportunity. Building 98, (the collapsed building), already was designated for destruction. By having the county fire department participate in its destruction, Goddard gave fire-fighters a chance to conduct a drill in which they practiced locating potential victims. The fol-

lowing day, safety officials ignited the building, giving the fire department an additional training opportunity.

Building 98 was designed as a temporary structure when Goddard's earliest facilities were being constructed. The brittle, wooden building was 34 years old and had been called



Photo by Ron Moltzer

"antiquated" by Goddard's safety officers. This exercise helped demonstrate Goddard's excellent working relationship with the Prince George's County Fire Department.

## What's Up?

June 1994

### International Ultraviolet Explorer (IUE)

*Days in orbit: 6,001*

During May IUE intensively observed the nucleus of the active galaxy PKS 2155-304. The bright nucleus of this galaxy is believed to be the result of energy released from material falling into a massive black hole at its center. Astronomers believe this material probably forms an orbiting disk as it falls inward, and that irregular lumps and instabilities in this disk might explain the

irregular brightness variations they have observed.

IUE also is observing Jupiter in anticipation of the expected impact of the fragments of comet Shoemaker-Levy 9 in July. Observations from May and June will be compared to observations taken during and after the comet's impact.

### Hubble Space Telescope (HST)

*Days in orbit: 1,406*

HST operations during the month included a full schedule of scientific

observations with all science instruments and spacecraft subsystems operating nominally. Operations personnel successfully handled the management of the onboard systems during several passes through the Moon's shadow during the solar eclipse of May 10 with no interruptions to the observing programs. HST users will be involved in observing Jupiter before, during and after the impact of the comet Shoemaker-Levy 9 in July.

# Goddard recognizes Asian American Awareness Month

by Tammy Jones

The Goddard Advisory Committee on Asian and Pacific American Employees (ACAPAE) sponsored two workshops in May, in recognition of Asian American Awareness Month.

Toy-Ping Taira of Potomac Change Management conducted a workshop on "Communication in the Age of Change." Taira discussed how Asian Americans communicate on the job, how managers view communication and stereotypes, communication techniques to use to be appreciated for leadership qualities, and personal communication styles and skills.

Taira, a proprietor of and consultant for Potomac Change Management in Potomac, Md., also is an adjunct faculty member at Johns Hopkins University and a deputy director at the Food and Drug Administration. She has held high level management and evaluation positions in both the executive and legislative branches of the federal government.

Dr. Bob H. Suzuki, president of

California State Polytechnic University at Pomona, spoke about shattering both the Asian "model minority" stereotype and the "glass ceiling." Suzuki, a nationally recognized authority on multicultural/international education, said diversification in the workforce makes economic sense.

"Diversification provides role models for others, motivates employees, and increases retention of the best employees," he said. Suzuki said the post-industrial age will need very different leaders that can manage a diverse workforce.

"There is a need for managers who are comfortable in a global marketplace working with different people," said Suzuki.

Edward Fung, Code 733.3, an analyst at Goddard and president of the ACAPAE, said the workshops were designed to help Asian Americans recognize the dynamics of communicating in a culture unlike their own, and to encourage them to prepare for leadership positions.

# TOMS-EP launch now scheduled for July

The Total Ozone Mapping Spectrometer (TOMS) originally scheduled to launch this month on an Earth Probe (EP) satellite from the Western Test Range at Vandenberg Air Force Base in Calif., has been rescheduled for July 15/16, 1994. The mission begins on July 15 with the lift off of an L-1011 jet aircraft, which will release the launch vehicle — a Pegasus rocket from 38,000 feet (11,582 meters). The actual launch of the Pegasus is scheduled for 3:42 a.m. EDT on July 16.

TOMS/EP will extend the high-resolution measurement of ozone from space that began with Goddard's Nimbus-7 satellite in 1978 and continues with the TOMS aboard a Russian Meteor-3 satellite.

## Deputy director retires

*Continued from page 1.*

Much of this credit belongs to Pete, because his leadership was tremendous, his cooperation with the public super and his effort was, plainly, simply, total."

Speaking with Burr, you come away with the impression of a person who cares about people and who values the employee team at Goddard for its contributions and efforts. He witnessed and was a part of many of the changes that have taken place on Center. "We always have done a lot of state of the art development here and that's what we ought to be doing. Our ability to continue to take on challenging work because of a combination of our superb senior experts and bright and innovative younger people who are relatively new to the Center, are contributing to our success," he said.

Burr has a positive outlook and high hopes for Goddard's future. "We have been the leader in NASA's Space and Earth science efforts since the Center opened in 1959. I would like to see that continue. I want the Center to retain its

unique capabilities. We have the scientists who conceive of missions, we have the ability to do the missions including development of instrumentation, spacecraft, ground systems and operations, and we archive, process and analyze the data. We have a very strong in-house capability that we need to maintain. I hope the Center, continues to be on the cutting-edge of technology; needed to accomplish our missions. That's a major part of Goddard's role and contribution," he said.

Burr is an avid golfer who plays regularly in the Goddard Pro-Duffer League. According to his golf partner, Bill Leavy, Burr is an outstanding golfer. "Pete always hits the ball where he aims. I don't understand though, why lately he's been aiming at so many trees. Maybe it's because even after hitting a tree his ball winds up in the middle of the fairway about 20 yards ahead of anyone else's ball," said Leavy.

Burr had some parting words for the Goddard 'family': "I obviously love this place and always have thought of it as a second home. I've been very fortunate to have worked on challenging programs and with wonderful people and good

friends. Most of all, I will miss the people. In every case along the way I had great bosses, and had extremely talented and dedicated people working for me. I know the Center will continue to attract highly motivated and can do personnel. I am extremely proud to have played a part in the exciting programs of Goddard."

For Burr, the Goddard experience appears to have been about people and relationships, as much as it was about accomplishment and success. The people who stay behind will miss Burr as much as he misses them. They say: "Pete gained a lot of respect for his leadership in Flight Projects and none of us who worked with him then, have anything but even higher respect for him now. He's done a tremendous job in everything he's handled."

Finally, Burr feels he is ending his career on an unqualified 'high'. He said, "I am grateful to have worked directly for Dr. John Klineberg. John is without a doubt one of the Center's outstanding Directors, and a true leader. I feel very fortunate to have been a part of his management team and to have served in partnership with him."

# Astronomers watch as comet speeds toward Jupiter

The collision of Comet Shoemaker/Levy with Jupiter next month has astronomers around the world preparing for what is the first event of its kind to have been predicted in advance. From July 16 through 22, more than 20 fragments of the comet are expected to crash into the giant planet, and observatories around the world will be watching.

Astronomers hope to gain more knowledge about the composition of comets and the makeup of Jupiter's atmosphere. Analysis of the new data may reveal more about the role of comets, meteors and other space objects in the disappearance of the dinosaurs more than 65 million years ago.

Measurements also may test theories of other mass extinctions on Earth, the behavior of high-energy shock waves and cloud formation in planetary atmospheres, the makeup of comets and even the origin of planets.

In the United States, NASA and the National Science Foundation have jointly funded a coordinated program to support research efforts for this event using ground-based observatories and spacecraft. The program includes listening for radio signals; visible and thermal imaging; modeling; theory; and data analysis.

At NASA, several scientific satellites will be tuned in, including the Goddard-managed Hubble Space Telescope (HST), Extreme Ultraviolet Explorer (EUVE) and International Ultraviolet Explorer (IUE).

Other agency spacecraft observing the collision are the planetary probes Voyager, Ulysses and Galileo, and the Kuiper Airborne Observatory.

In addition, ground-based telescopes across the globe will train their sights on what for comet experts and planetary specialists may be the most important event of their careers.

Astronomers predict that the comet's fragments will hit Jupiter's dark side, hidden from the view of Earth-orbiting or ground-based observatories. Some observers plan to view the impacts and expected explosions through

observations from spacecraft or by studying the after-effects on Jupiter's atmosphere. Others hope to view the phenomenon indirectly in light reflected from Jupiter's inner moon or off ring particles.

## What will happen?

Scientists predict that as the fragments near Jupiter, their dust comas will be bombarded by charged particles in the planet's magnetosphere. Gas and dust ejected from the fragments may be swept up by Jupiter's magnetic field, possibly causing large changes in the density and composition of the planet's aurora. The comet fragments will plunge into Jupiter one by one, and their explosions with the planet's atmosphere may inject



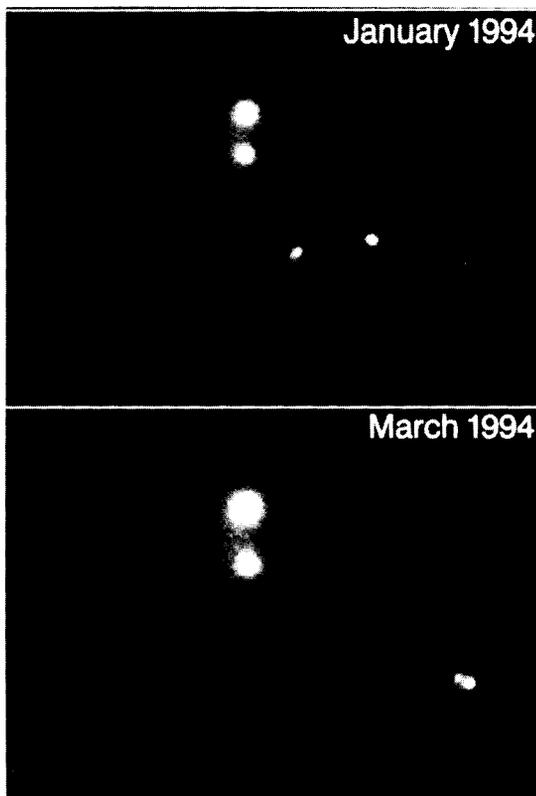
This artist's concept, courtesy of NASA's Jet Propulsion Laboratory, Pasadena, Calif., shows the comet's approach as it would be seen from the Galileo spacecraft. Galileo will observe the impact point directly.

atmospheric ingredients into the magnetosphere, altering Jovian radio emissions.

As the fragments enter Jupiter's stratosphere, where they will be heated and lose some mass and energy by aerodynamic forces. Because they are fragile, they may break up after penetrating several hundred miles into the atmosphere. The largest and strongest fragments will descend farther, release most of their kinetic energy in a spectacular explosion in little more than a second. This explosion may create a fireball, like a nuclear burst, that could rise above Jupiter's cloud tops in a matter of minutes.

This shock wave from the burst may blow through the planet's atmosphere, carrying the gases far above Jupiter's clouds. This deeper gas contains volatile materials that ultimately will condense high in the atmosphere. The gas may form unusual clouds that could last a long time if the comet's ice particles are small. The impacts could create a thermal anomaly or a tremendous storm similar to Jupiter's Red Spot, but not as big. This new turbulence, or spot, might be visible through the most powerful Earth-based telescopes.

When these comet fragments dissipate in the atmosphere, they would be very bright, possibly more so than Jupiter. The light from the impact of the largest fragments could brighten a well-placed inner moon of Jupiter enough to be detected by powerful ground-based telescopes.



These two images of Comet Shoemaker-Levy by the Hubble Space Telescopes, show several of the comet fragments two months apart. Note that in the bottom image, one of the fragments nearly disappeared from view. Another fragment clearly has split in two.

# A pipeline to the future

by Karen Davis

Antony "Tony" Liu, Code 971, an oceanographer in Goddard's Oceans and Ice Branch, Laboratory for Hydrospheric Processes, has traveled a long way from his birthplace of Taipei, Taiwan. Liu, majored in mechanics and received a doctorate from Johns Hopkins University, Baltimore. After graduation, Liu spent 10 years with Dynamics Technology, Inc., Torrance, Calif., as a research scientist, group manager, and later a section head of the company's ocean technology division.

Liu joined the Goddard team eight years ago.

"I needed a change and took the opportunity to join Goddard's world of first-class scientists. My initial interest was the challenge of using satellite data for ocean applications," said Liu.

He was promoted to his current position, senior scientist, 1½ years ago. Liu sees his department as one integrated system, where each scientist uses satellite data to focus on a different area, such as ocean temperature, or interaction between oceans, ice and atmosphere to see how they affect the Earth's weather and climate.

"We all have expertise in different areas of study, but we all are part of the bigger system, Earth Observing System," Liu said.

Even though his job keeps him extremely busy, Liu finds time to serve as a visiting professor at Ocean University in Qingdao, China, and as a visiting scientist for the National Taiwan University. He served as chairman of the GSFC Asian American Advisory Committee from 1991-92, and as a member of GSFC's Multi-Culture Education Program Advisory Group from 1992-93.

He also was past president of Goddard's Chinese American Club. "The advisory

committee was started about five years ago as a social club for Goddard's Asian American employees. It now serves as a bridge between upper management levels and Asian Americans to discuss their needs and concerns, as well as opportunities for improvement," Liu said.

Liu says his job includes basic research involving publishing scientific papers that are based on data applications, project development that allows for the use new technology to demonstrate new applications for satellite instruments and community service to promote NASA projects to the community.

"People at Goddard are really interested in scientific research and the challenges of new technology. Goddard's research is a big treasure chest, where one can choose an area of interest to explore and enjoy the riches of it," Liu said.

Liu is interested in management opportunities and would like to participate in mainstream NASA projects.

"I would like to be involved in scientific committees, project scientist offices, and program management. I also would like to promote the contributions Asian American's have made to Goddard and establish a pipeline for minority newcomers. My ultimate goal is to see a multicultural workforce at all levels in Goddard," said Liu.

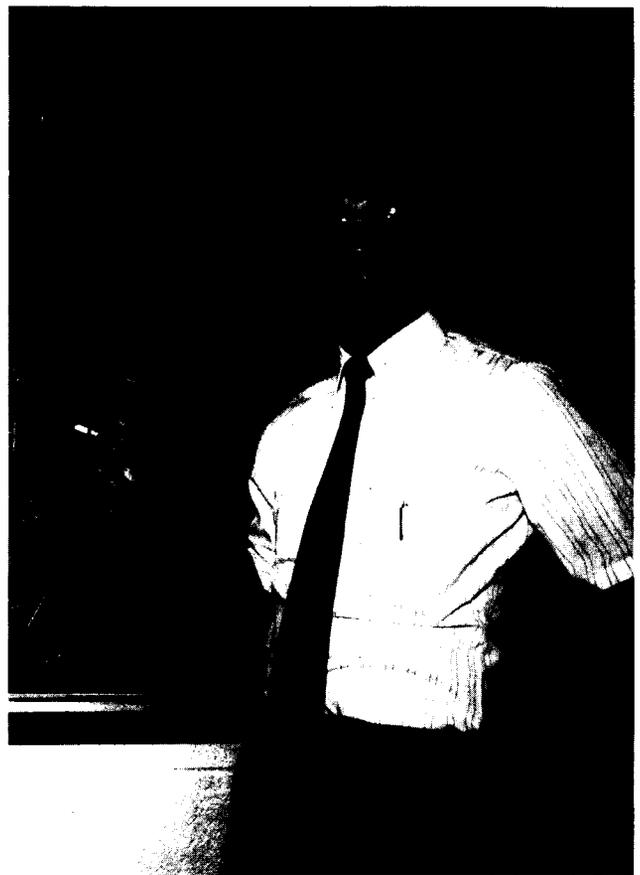


Photo by Debbie McCallum

## Antony "Tony" Liu

As a first-generation Chinese American, Liu stressed the importance of having mentors to open the door for the next generation.

"There are so many areas to explore besides scientific research. I feel that most Asian Americans are conservative and have limited networking outside of their individual fields due to a lack of communication and mentors. I want to show the next generation the diverse possibilities that exist in administration and management. I am proud and honored to be a part of Goddard, and as a scientist and minority, I am impressed by the improvements in advancement opportunities for Asian Americans in the last several years. I want to contribute and do all I can for a better, stronger Goddard."

## "black hole" exists

*Continued from page 1.*

light-year is approximately 5.8 trillion miles(metric).

The discovery was made by Dr. Holland Ford, of the Space Telescope Science Institute and John Hopkins University in Baltimore, Md., and Dr. Richard Harms, of Applied Research Corp. in Landover, Md.

Word of the black hole followed by

only a few days the announcement that HST also had discovered a mysterious pair of rings of glowing gas encircling the site of the stellar explosion know as Supernova 1987A. The rings were reported by Dr. Chris Burrows, a European Space Agency scientist at the Space Telescope Science Institute in Baltimore, Md.

The spectacular and unexpected rings represent something Burrows described as never having been seen before. One possibility is that the two rings are "painted" by a high-energy beam of radiation or parti-

cles, like a spinning light-show laser beam tracing circles on a screen. The source of the radiation might be a previously unknown stellar remnant that is a binary companion that exploded in 1987, he explained.

The observation was made with the Wide Field Planetary Camera 2 (WFPC 2), which was built by the Jet Propulsion Laboratory in Pasadena, Calif., and installed during the servicing mission as a replacement for the original camera.

# New Goddard senior fellows named

by Fred A. Brown

Five members of the Center's workforce have been designated Senior Fellows. The Goddard Senior Fellows Program was established in 1988 to recognize Goddard's most distinguished research workers for their outstanding accomplishments and contributions to the Nation's space program.

The Senior Fellows are responsible for giving recommendations to the Center Director concerning the allocation of the Director's Discretionary Fund, and monitoring the progress of its various activities. The Fellows also must advise the Center Director on issues related to research policy and the improvement of the research and development environment.

James Heaney, Code 717.1; Sara Heap, Code 681; John Mather, Code 685; Peter Serlemitsos, Code 666; and Jacob Trombka, Code 691; are the new Goddard Senior Fellows. They join Joanne Simpson, Code 900; Carl Fichtel, Code 660; Compton Tucker, Code 923; Leonard Burlaga, Code 692; Mario Acuna, Code 695; S. Harvey Moseley, Code 685; Henry Hoffman, Code 710; William Lau, Code 913; Barney Conrath, Code 693.2; Elihu Boldt, Code 666; Murzy Jhabvala, Code 718; and Inez Fung, Code 940.

According to the 1988 Center announcement establishing the program, the Senior Fellow designation represents the highest level of achievement for scientists and engineers in the research and development portion of NASA's dual-career ladder. These positions allow Fellows greater freedom for pursuing research programs.

The Senior Fellows are a special resource serving as Center consultants in their research of engineering specialties, collectively giving advice to senior Center management on issues related to research policy, and improving the research and development environment at Goddard.

Because the program is intended for senior employees on the research side of the dual-career ladder, fellowships are limited to employees below the division-head level. Fellows must be Goddard employees engaged in some phase of space-related research and development. The Fellow must have a distinguished

and sustained record of technical achievement and a strong potential for continuing contributions to the nation's space program.

Fellows are appointed by the Center Director on the basis of annual recommendations of an ad hoc committee established by the Director. The committee consists of representatives from senior management, current Fellows and appropriate outside members. The normal tenure is five years, with an option for one extension of an additional five-year term but not beyond.

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## Blood drive exceeds goal

On April 6, the Bloodmobile was held in the Building 8 auditorium. The number of pints collected was 163. The goal of the blood drive was exceeded by two percent. Following is a list of employees who reached the gallon mark:

<i>Name</i>	<i>Code</i>	<i>Number of Gallons</i>
Robert Barnes	690	10
Wyatt Rinker	750.5	8
Stephen Jung	235.1	4
Jacquelyn Ferguson	562.7	2
Gary Veum	520.9	2
Lori Keehan	511.2	2
Stacy George	520.9	1
Joyce Milasuk-Ross	519.7	1
Stephen Steenrod	916	1
Michael Molinet		1
Steven Graham	718.2	1
Clifford Dickey	284.1	1

Watch DATELINE for details on the next Bloodmobile.

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## Goddard dependents receive college scholarships

by Randee Exler

Six children of Goddard employees received 1994 scholarships from the NASA College Scholarship Fund, Inc. Applications were restricted to dependents of NASA employees who are planning to major in science or engineering fields. All NASA Centers were represented with 170 applications received. Twenty-nine recipients were chosen.

Congratulations to the following Goddard recipients: Eileen Liu, daughter of Antony A. K. Liu, Code 971; Elaine J. Thomas, daughter of Roger J. Thomas,

Code 682; Clare L. Deming, daughter of Drake Deming, Code 693.1; Katherine A. Douglas and Michael R. Douglass, daughter and son of Anne R. Douglass, Code 916; and Jennifer M. Park, daughter of Hongwoo Park, Code 721.2

Teresa R. Sullivan, the president of the fund, wrote in a memo announcing the winners that "NASA, and indeed America, can be proud of all these young people. All had exceedingly high grade point averages; all scored well on the SAT; and all were actively involved in

their community, making the final selection very difficult."

The NASA College Scholarship Fund, Inc. is eligible to receive support from the Combined Federal Campaign. In addition, the Johnson Space Center Chapter of the NASA Alumni League and the Freedom Forum contributed to the scholarships awarded this year. These contributions make it possible to increase both the number of scholarships and the value of each scholarship.

# Landsat 7 contract transferred to Goddard

by Randee Exler

NASA officials announced recently the transfer of the satellite-development contract for Landsat 7 from the Department of Defense (DOD) to NASA. The contract with Martin Marietta, Valley Forge, Pa., will now be managed by Goddard.

As a complement to the observations planned as part of NASA's Earth Observation System, also managed by Goddard, Landsat 7 will provide essential land remote-sensing data critical to understanding global change phenomena and will support a broad range of other important Earth science and Earth resource applications. The transfer of the space-development contract will allow NASA to fund the Landsat 7 development through existing appropriations and will not affect EOS launch dates or development.

Beginning in late 1993, the joint DOD and NASA Landsat 7 program was reevaluated due to severe budgetary constraints and the failure of the Department of Commerce's National Oceanic and Atmospheric Administration's (NOAA) Landsat 6 satellite to reach orbit in October of that year. This fact, coupled with the advanced age of Landsat satellites 4 and 5, resulted in a reassessment of the Landsat program by representatives of the National Science and Technology Council.

The Landsat program has provided

more than 20 years of calibrated data to a broad user community including resource managers, global change researchers, state and local governments, commercial users, and the military.

The outcome of the National Science and Technology Council's assessment is a new strategy designed to continue the Landsat program and extend the 20-year Landsat data set. The restructured program reduces the cost of Landsat 7 by \$125 million.

"Landsat has been and will continue to be an example of interagency cooperation," said Ken Dolan, Code 506, Landsat project manager.

Prior to the restructuring, DOD had primary responsibility for satellite development and launch, and NASA had primary responsibility for the ground system and data distribution. Under the new program, NASA will have primary responsibility for development and launch of the satellite. NOAA and Goddard will jointly develop the ground system, which NOAA will operate. The Earth Resource Observation Satellites (EROS) Data Center of the Department of Interior's U.S. Geological Survey (USGS) will continue to be responsible for maintaining the government's archive of Landsat and other related remotely sensed data.

Landsat 7 is expected to be at least the

functional equivalent of NOAA's Landsat 6. Landsat 6 carried an Enhanced Thematic Mapper (ETM), which would have provided images of the Earth's surface with resolution as good as approximately 50 feet (15 meters) in one band plus 100 feet (30 meters) resolution in six bands covering the visible, near and short-wave infrared regions. Landsat 7 will carry an ETM-Plus, under development by Hughes Santa Barbara Research Center, Calif., which will provide modest improvements over Landsat 6, primarily in instrument calibration and accuracy.

The Landsat 6 satellite was intended to replace the existing Landsat satellites 4 and 5. Landsat 4 and 5, launched in 1982 and 1984 respectively, are operating well beyond their three-year design lives, and represent the only source of a global calibrated high spatial resolution measurements of the Earth's surface that can be compared to previous data records.

The Landsat 7 and the Earth Observation System projects are managed by Goddard for NASA's Office of Mission to Planet Earth, Washington, D.C.

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## Students help with Fast

by Michael Finneran

Students from two high schools visited Goddard recently as part of a hands-on program designed to teach them about aerospace careers through participation in Small Explorer (SMEX) missions.

The students, from Laurel High School in Laurel, Md., and South Fayette Junior/Senior High School in South Fayette, Pa., are enrolled in the Cooperative Satellite Learning Project (CSLP) sponsored by Goddard and AlliedSignal Technical Services Corp.

The students are taking part in the second SMEX mission, the Fast Auroral Snapshot (FAST) Explorer, which is scheduled for launch Aug. 10 from Vandenberg Air Force Base in Lompoc, Calif.

During their April 21 and 22 visit, the students took part in a series of activities at Goddard, including hands-on experience in real-time mission simulations in the FAST Mission Operations Room and Mission Analysis Room.



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