

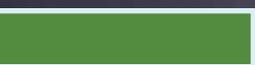
ANNUAL REPORT 2007

Space Science Institute · 4750 Walnut Street · Suite 205 · Boulder, Colorado 80301 · 720.974.5888 · www.space-science.org

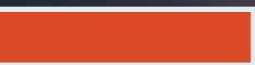


Our Vision

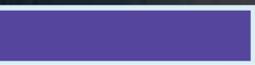
Expand humankind's understanding and appreciation of planet Earth, the Solar System, and the universe beyond.



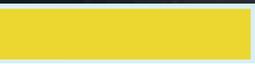
Research



Flight Operations



Education



Financial Report



Publications & Activities

Message from the Director

Excite. Explore. Discover. These words describe our efforts in both science research and education. In fact, they define the essence of our mission: to integrate world-class research with an innovative education program within a single institution. The SSI Board of Directors, with its experience and expertise in a range of business, science, and educational areas, provides guidance and vision to our enterprise. They – along with our senior management – have created an environment that continues to draw world-class scientists to the Institute and enables us to develop education and outreach programs that benefit millions of people worldwide. This past year SSI has grown from \$4.8M to over \$5.8M in grant and contract funding – an increase of more than 20% – most of which comes from NASA and the National Science Foundation (NSF).

SSI has a robust scientific Research Branch with scientists participating in robotic missions such as the Mars Exploration Rovers, in flight missions such as Cassini and the Spitzer and Hubble Space Telescopes, and in ground-based observation programs using facilities located all over the world. SSI researchers have been awarded numerous research and analysis grants, and also serve on a number of scientific boards and committees helping to plan future missions.

SSI's Flight Operations branch is home to the Cassini Imaging Central Laboratory for OperationS (CICLOPS). CICLOPS is the center for uplink and downlink operations for the imaging science experiment on the Cassini mission to Saturn. The Cassini mission continues to revise our view of the Saturn System. In 2007, Cassini images graced the pages of scores of magazines and websites around the globe. The mission continues to generate exciting science and exquisite imagery such as the data that provided conclusive evidence that the jets of Enceladus – which collectively create a towering plume of water ice particles and vapor over the moon – originate from the hottest parts of the linear fractures that score the moon's south polar region.

In 2007, SSI's Education branch conducted numerous workshops for formal and informal educators. The 5,000 square-foot *MarsQuest* and the 500 square-foot *Destination Mars* exhibits ended their national tours and were sold to the Museum of Discovery and Science in Florida and the Catawba Science Center in North Carolina, respectively. The 3,000 square-foot *Alien Earths* exhibition is still on tour. The 3,500 square-foot *Giant Worlds* traveling exhibition is nearing the end of its development and will begin its national tour in 2008. SSI continues to enhance its documentary film production capabilities (e.g. the *Radiation* and *Weightless Flights of Discovery* projects) and develop applications of internet and multimedia technologies to facilitate social learning experiences.

Our headquarters located in Boulder, Colorado enables us to maintain strong collaborations with a number of the major players in the research, education, and aerospace industries, including the University of Colorado, NOAA's Space Weather Predictions Center, the National Center for Atmospheric Research, Lockheed Martin, and Ball Aerospace. However, our impact goes far beyond Colorado. We seek and encourage strong ties to corporations, foundations, and institutions in Colorado and elsewhere.

The upcoming year is one of great promise. New scientific discoveries will be made and new education programs will be launched that engage the public and excite their imaginations about the wonder and beauty of the universe. Come join our voyage of discovery.

With warmest regards,

Paul B. Dusenbery, Ph.D.
Executive Director

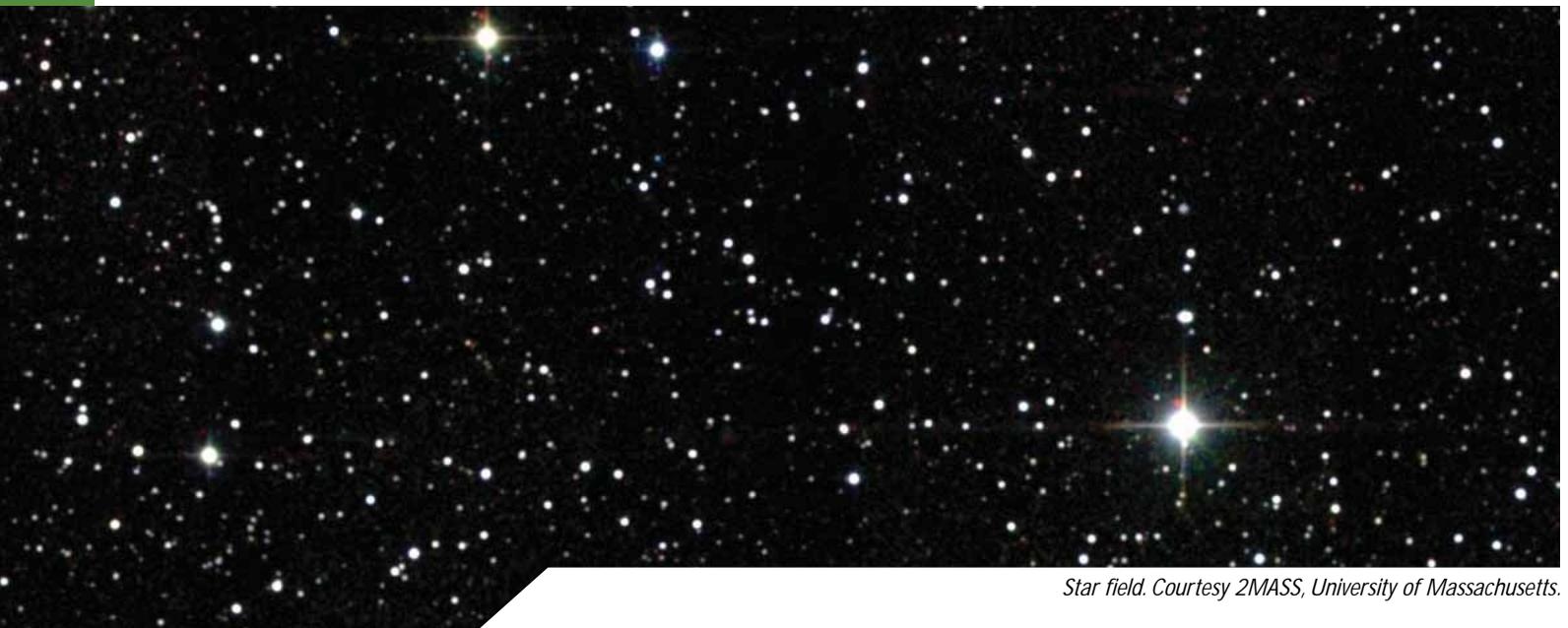
Research

SSI's Research Branch scientists participate in a broad array of space science activities. Our research program (both on-site and off-site) includes earth science, planetary science, and astrophysics. Our research team's expertise continues to expand, and now includes investigations of phenomenon on the Earth, in atmospheres and on surfaces of other bodies in our Solar System, in our galaxy – including the early stages of the life cycles of stars and nascent planetary systems around other stars – and beyond: quasars and other distant galaxies.

SSI researchers are closely connected to the operations of current space facilities such as the Spitzer and Hubble Space Telescopes, and are deeply engaged in future space science projects including the James Webb Space Telescope. SSI is also home to the central laboratory for imaging science for the Cassini mission to Saturn – the current flagship planetary mission for both the American and European planetary exploration programs.

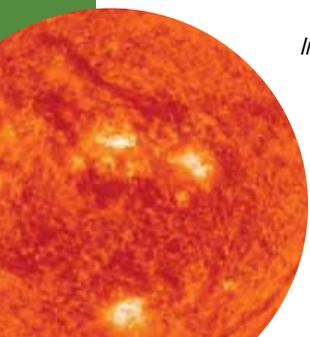
Many SSI researchers continue to focus on Mars research, with participation in the Mars Reconnaissance Orbiter mission, which successfully entered Mars orbit in March 2006. Their work with the Mars Exploration Rover mission is ongoing, as Spirit and Opportunity continue their close-up examination of the Red Planet. Our researchers are also actively engaged in developing future Mars exploration missions.

SSI's off-site and on-site researchers form a network of entrepreneurial scientists who are supported by numerous grants. Our structure allows dynamic, collaborative efforts among fields of research that are typically separated in academic institutions. We continue to search out other new and creative opportunities to increase the health and vitality of our Research Branch.



Star field. Courtesy 2MASS, University of Massachusetts.

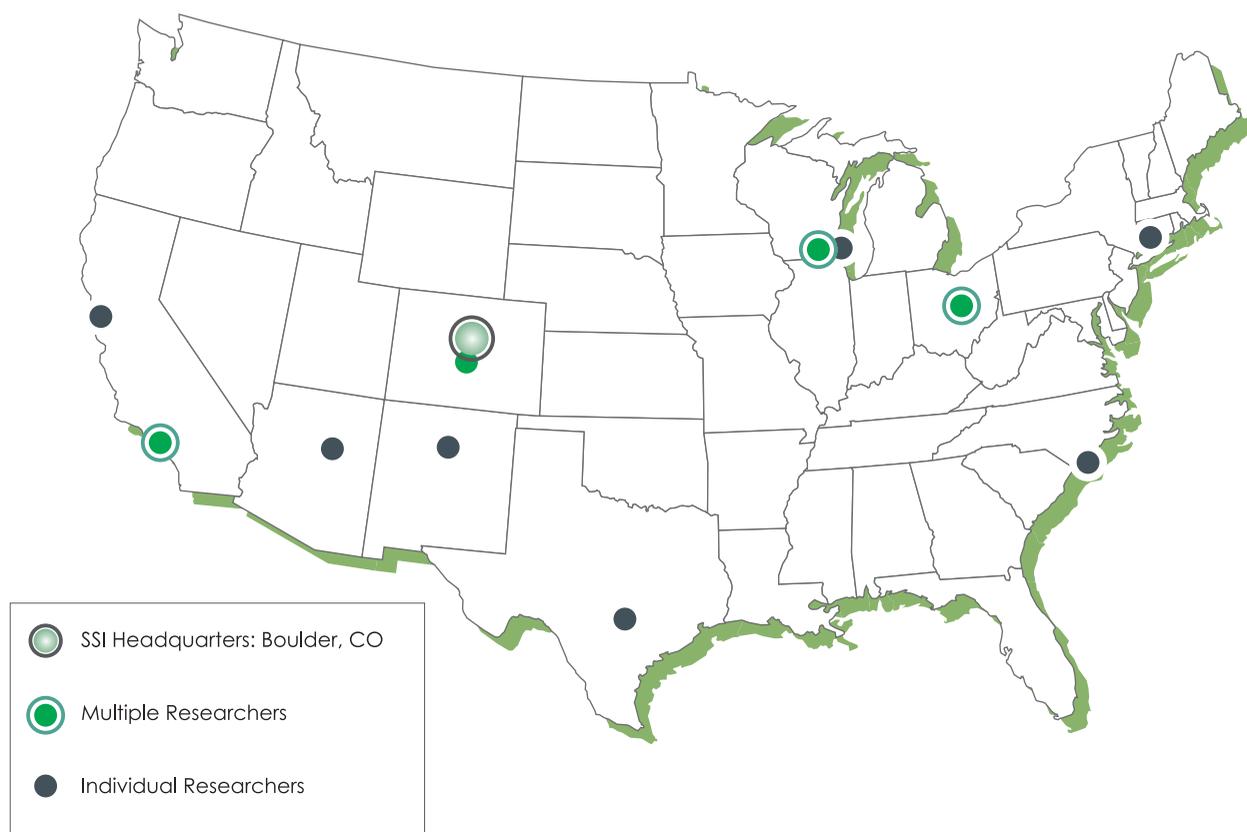
Cover: Jupiter, Saturn, Uranus, and Neptune (not to scale). Courtesy, NASA. Two Micron all Sky Survey. Courtesy University of Massachusetts. Inside Front Cover: Saturn imaged by the Cassini spacecraft. The Sun is behind the planet, putting Cassini in its shadow. Earth is the bright dot outside the main rings at the ten o'clock position. Courtesy NASA/JPL/Space Science Institute.



SSI's Off-Site Research Option

SSI has been a pioneer in remote employment, a mode that is both family – and environmentally – friendly. The long-distance nature of most scientific collaborative research is conducive to remote employment, since interactions can be readily accomplished via the internet and phone, and supplemented by occasional travel. Access to fast computers no longer requires large institutional support, and most journals are fully accessible over the internet, mitigating the need for institutional libraries. Instrument development, which does require large institutional support, can be done in collaboration with existing facilities such as those at Lockheed Martin and Ball Aerospace. The map below shows where SSI's researchers are located in the United States.

Space Science Institute

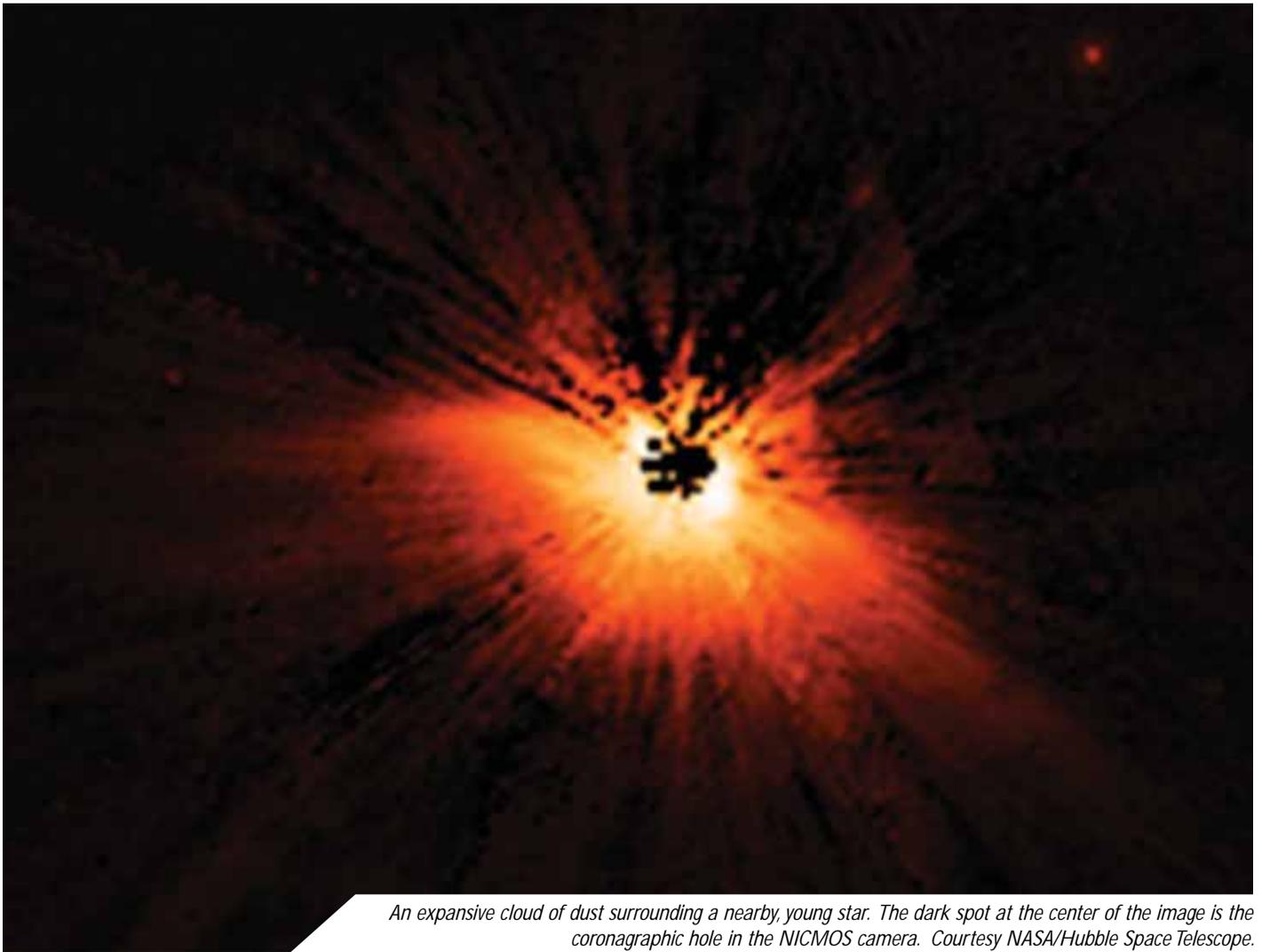


SSI's off-site option continues to be one of our fastest-growing areas. SSI management is aware of the potential challenges of rapid growth. We continue to develop our administrative support in ways that will enable our institution and our researchers to grow and thrive.

2007 Research Highlights

On the Delicate Wings of a Dusty Cloud

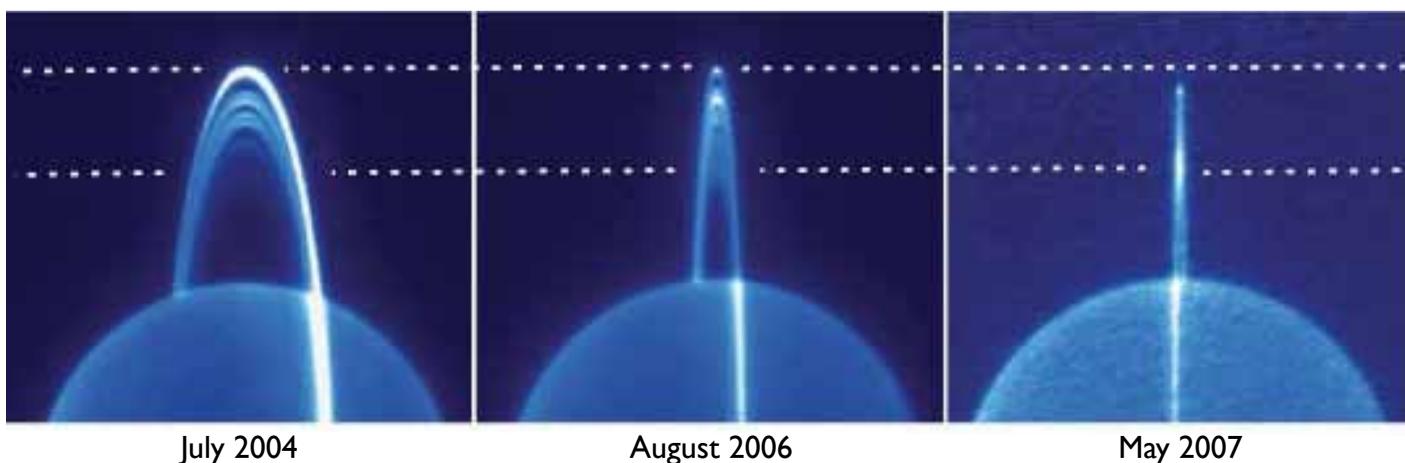
SSI Senior Research Scientist Dean C. Hines (New Mexico Office) and colleagues have spotted a moth-like structure with a 22-billion-mile wingspan hovering out in space. But no need for a galactic-sized can of Raid®. This giant is actually a cloud of dust surrounding a nearby, young star. Such circumstellar disks typically look like a flattened round oval. An image of “HD 61005” (now dubbed the “Moth” by astronomers) – taken using the Hubble Space Telescope – illustrates that such dust “disks” can take on unexpectedly unusual shapes. HD 61005 appears to be plowing through a local patch of higher-density gas in the interstellar medium, causing material within HD 61005’s disk to be swept behind the star. Starlight scattering off the dust illuminates the wing-like shape. While it is uncertain what effect such a collision might have on a nascent planetary system forming around HD 61005, it is interesting that our own Solar System has experienced similar collisions in the past.



An expansive cloud of dust surrounding a nearby, young star. The dark spot at the center of the image is the coronagraphic hole in the NICMOS camera. Courtesy NASA/Hubble Space Telescope.

The Dark Side of the Rings of Uranus

SSI Senior Research Scientist Heidi B. Hammel (Connecticut Office) and her colleagues have obtained Keck images of Uranus in the past few years showing an unusual side view of its rings. Due to some very special viewing geometry in May 2007, the team captured an even rarer glimpse of the dark (not illuminated) side of the rings. In this unusual alignment, optically-thick rings disappear due to inter-particle shadowing, but optically-thin rings brighten as sunlight filters through the rings to emerge on the dark side. Detailed analyses of the Keck images show dust permeating the ring system, but the dust is not associated with any known narrow rings nor with embedded dust belts imaged by the Voyager spacecraft in 1986. These results suggest variations occur on much larger scales and more rapidly than previously expected. Such Uranus ring-plane crossings occur every 42 years; the last – in 1965 – was prior to the rings' 1977 discovery, and the next will not occur until 2049.



The rings of Uranus during equinox. Courtesy Keck Observatory.

Martian Chronicles

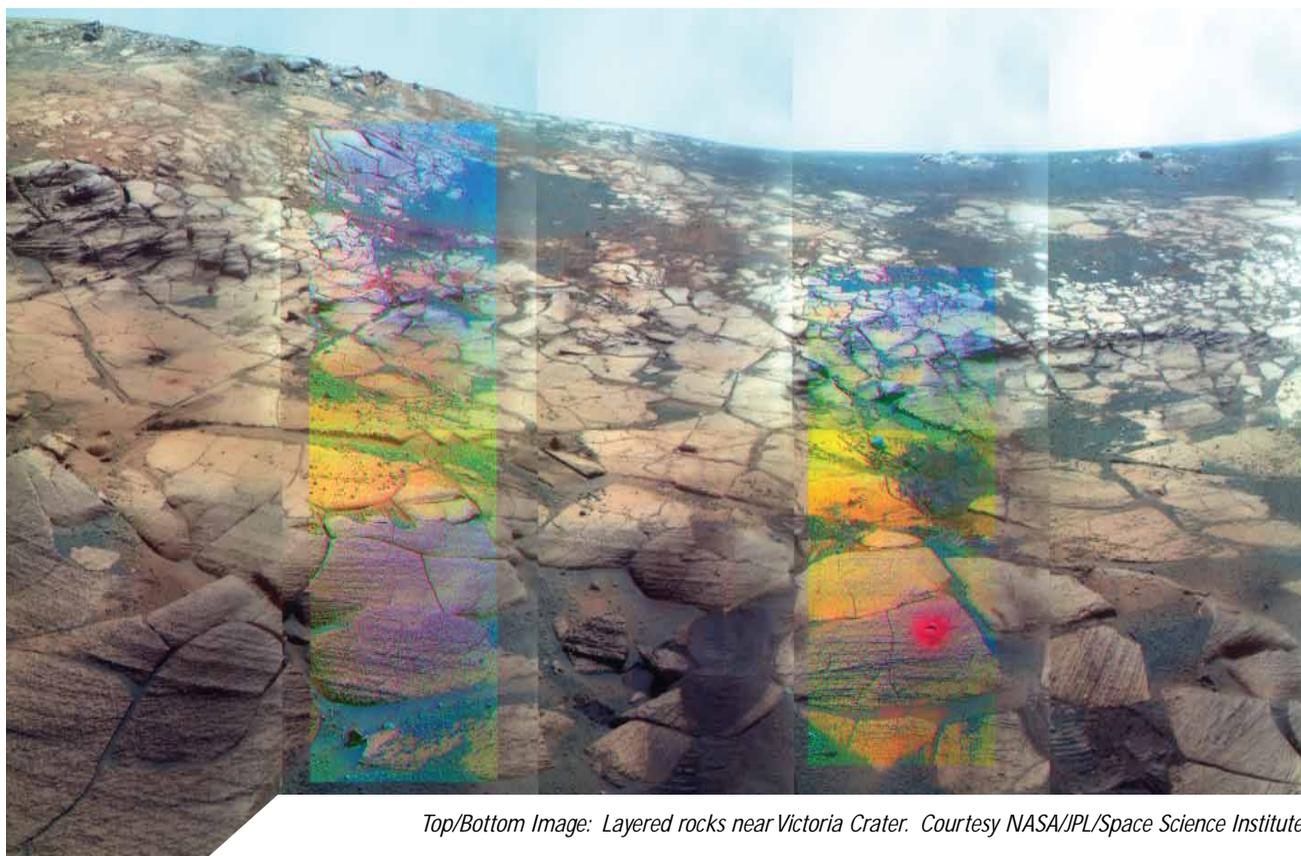
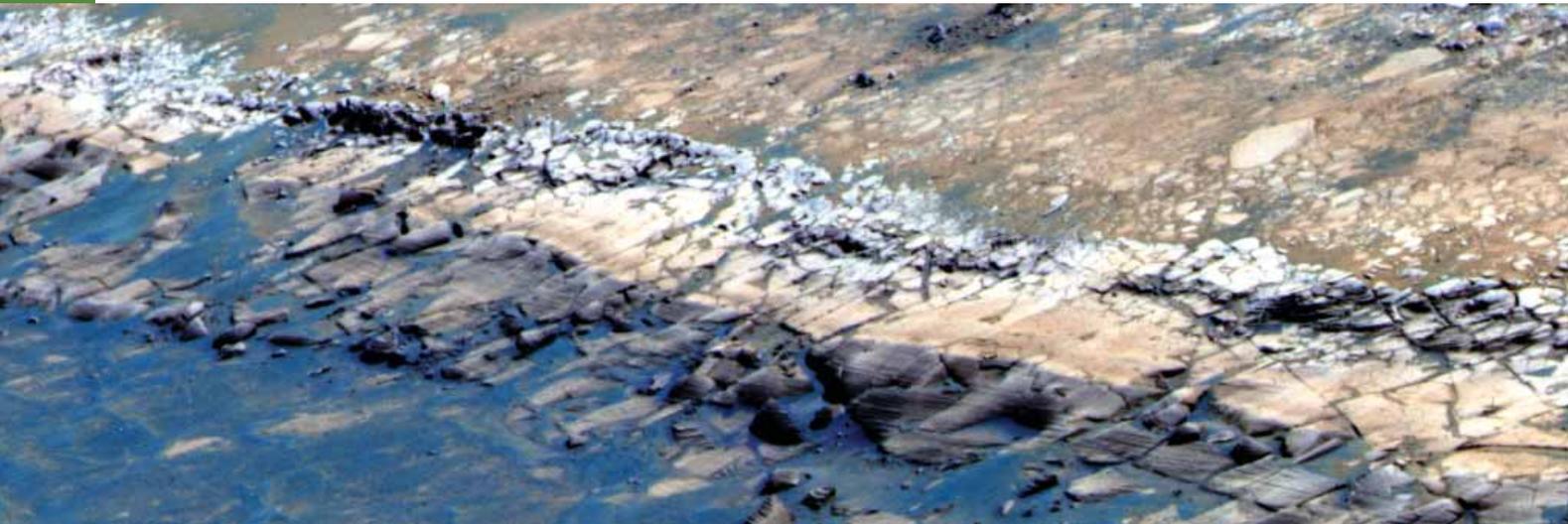
Both Opportunity and Spirit survived a severe global Martian dust storm in the past year. SSI Senior Scientist Mike Wolff (Wisconsin Office) worked with the rovers' atmospheric sciences group to help characterize the Martian atmosphere and provide updates on storm activity. This work contributed to the planning that kept the rovers alive through this perilous period.

Opportunity continued its exploration of Victoria Crater, finding layered rocks within the crater's inner rim that provided a window into past Martian history. SSI Research Scientist Bill Farrand (Colorado Office) worked with multispectral data from Opportunity to explore color variations in these layered rocks. Color differences exposed in the walls of Victoria crater have been linked to the water alteration history of rocks in this region. Another focus of Mars research at SSI has been the compositional mapping of ancient Martian terrains. Dr. Farrand characterized the Mawrth Vallis region of Mars (one of the possible Mars Science Laboratory landing sites) using data from the Compact Reconnaissance Imaging Spectrometer for



Mars – the red planet. Courtesy NASA.

Mars (CRISM) on the Mars Reconnaissance Orbiter, as well as other orbital instruments. The data will be used to build a better picture of the Martian climate in the past, particularly whether it might have been conducive to the development of life. Dr. Wolff and SSI Senior Scientist Todd Clancy (North Carolina Office) also worked with CRISM data to characterize the Martian atmosphere, to help with efforts to understand the past and present climate of Mars, as well as efforts to mitigate atmospheric effects on surface remote sensing.

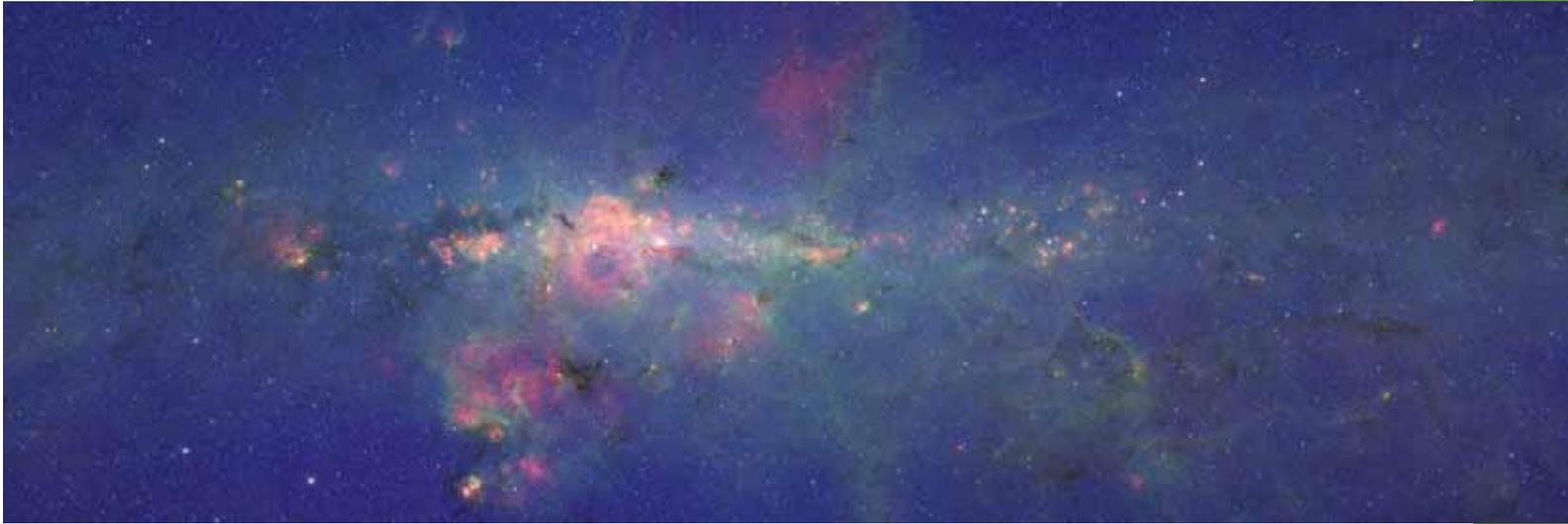


Top/Bottom Image: Layered rocks near Victoria Crater. Courtesy NASA/JPL/Space Science Institute.



An Extraordinary Survey of our Own Galaxy

SSI Senior Research Scientist Barb Whitney (Wisconsin Office) continues to work extensively with the GLIMPSE data. GLIMPSE (Galactic Legacy Infrared Midplane Survey Extraordinaire) is a survey of our own inner Milky Way Galaxy. It spans 130° in longitude (65° on either side of the center), and $2\text{-}4^\circ$ in latitude.



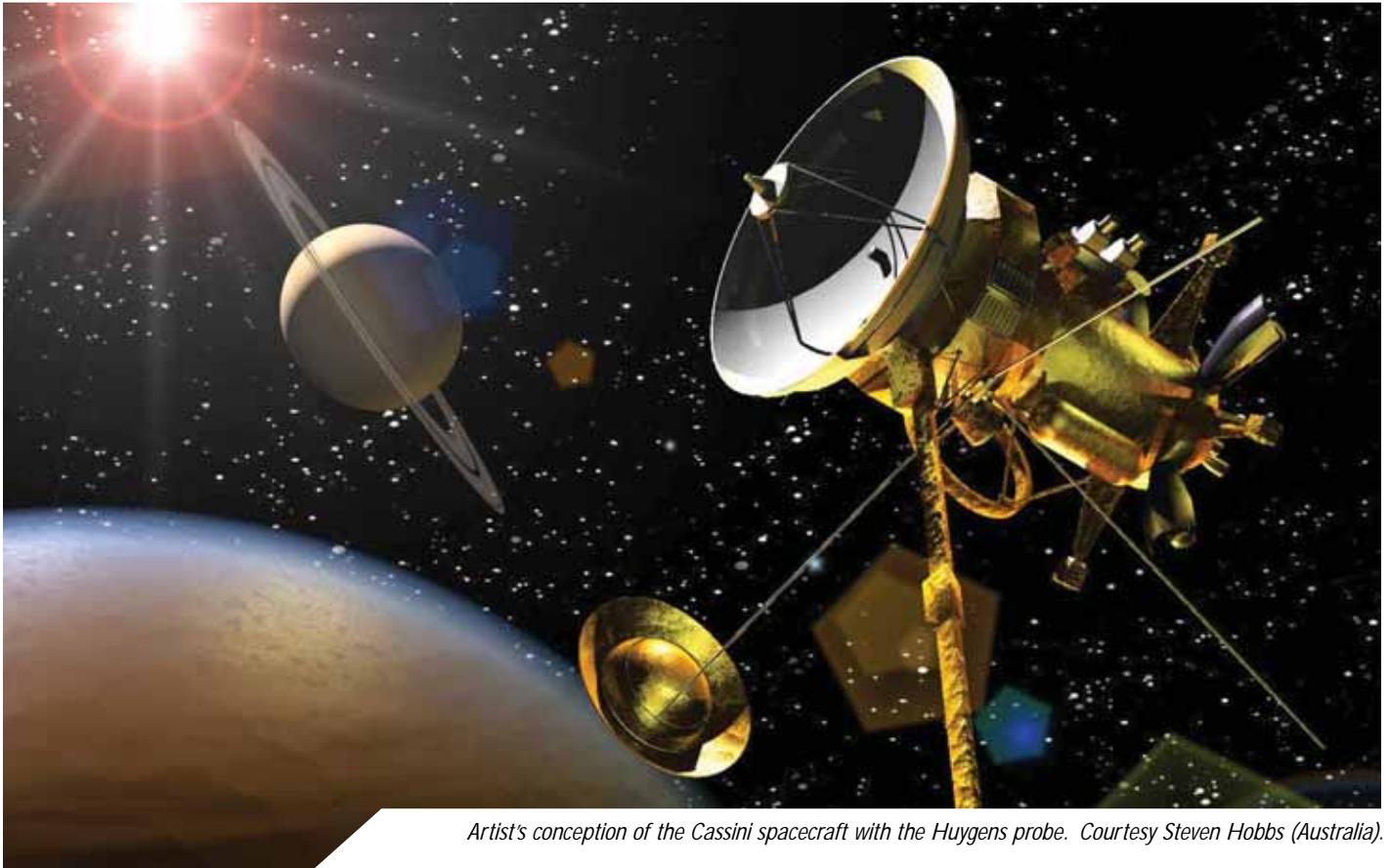
A GLIMPSE of our Milky Way Galaxy. Courtesy NASA/Spitzer Space Telescope/Space Science Institute.

The survey encompasses a large fraction of the volume of our galaxy. The GLIMPSE image was taken using the Spitzer Space Telescope. The telescope was pointed at 111,000 different positions in the sky and snapshots were taken in four different infrared wavelengths (3.6, 4.5, 5.8, and 8 microns), creating a total of 444,000 images. GLIMPSE was followed up by another survey (MIPSGAL) with approximately 400,000 images at 24, 70 and 160 microns. These surveys have 100 times the sensitivity and over 10 times the resolution of previous surveys, allowing us to see stars and dusty objects throughout most of the Galaxy for the first time.

The GLIMPSE and MIPSGAL images were stitched together into a large mosaic that spans about 180×2.75 feet at full resolution ($390,000 \times 6000$ pixels). The different colors in the mosaic highlight different physical processes, including emission from Polycyclic Aromatic Hydrocarbons (PAHs), which are small molecules excited by strong ultraviolet radiation from massive hot stars. In the GLIMPSE survey, the PAHs in these high-mass star formation regions light up like holiday tree lights, announcing their existence. We can also see ionized gas arising in high-mass star formation regions, as well as shocked emission both in supernovae remnants and in very young massive stars in their earliest stages of star formation. Thermal, (heat) emission arises mostly in dust of various temperatures (30-1600 K).

The GLIMPSE images are best viewed in a zoomable web browser (www.alienearts.org/glimpse) developed by SSI education software developers Dr. James Harold and Evaldas Vidugiris (both of the Colorado Office). In the images at that site, you can see galactic features at distance scales ranging from <1 light year up to 100,000 light years. The site will ultimately be made available in both Spanish and English for display in science centers and libraries.

Flight Operations



Artist's conception of the Cassini spacecraft with the Huygens probe. Courtesy Steven Hobbs (Australia).

The Cassini Imaging Central Laboratory for OperationS (CICLOPS) is located at SSI's Boulder, Colorado office. CICLOPS is the center for uplink and downlink operations for the imaging science experiment on the Cassini mission to Saturn. All images produced by the two powerful telescopic cameras onboard Cassini (the Imaging Science Subsystem) make their way across more than a billion and a half kilometers (1 billion miles) of space to be archived in databases at CICLOPS and made available to imaging team members across the globe.

The Cassini-Huygens mission continues to change our view of the Saturn System. Since arriving at Saturn in the summer of 2004, the intrepid spacecraft has completed numerous close flybys of Saturn's moons, providing new perspectives and a wealth of data about this unique collection of objects. Cassini has monitored powerful lightning-generated radio outbursts and cloud activity produced by giant storms on Saturn that dwarf those on Earth. The Huygens probe landing on haze-shrouded Titan and Cassini's continuing survey of this moon from space have provided tantalizing glimpses of a world that is at once remarkably earth-like yet also frigid and alien. The startling revelation that Saturn's small, icy moon Enceladus may possess underground reservoirs of liquid water has widened the range of environments that might be hospitable for life.



Images taken by Cassini are selected for release to the public at CICLOPS. Chosen images and movie sequences are processed to ensure quality, including the best possible color. The final products are posted to the CICLOPS website (<http://ciclops.org>) for distribution to the waiting world. Also posted on the CICLOPS site are imaging news stories, upcoming mission events, public discussions, Saturn-inspired artwork, and more.

Cassini's landmark exploration of the ringed planet, its mysterious moons, stunning rings, and complex magnetic environment will continue through at least July 2010, and perhaps beyond. CICLOPS and the Cassini mission scientists and engineers have been hard at work planning for the extended two-year tour (July 2008 - July 2010). Many discoveries – and many sights – remain to be seen. And discussion is now underway for a second extension that may last through northern summer solstice on Saturn around 2017.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency, and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's Science Mission Directorate, Washington, D.C.

Cassini / Saturn Research

Led by Cassini Imaging Team leader Dr. Carolyn Porco, CICLOPS came to SSI in August 2003. Fourteen scientists from the United States and Europe comprise the imaging team that uses Cassini's cameras to investigate many unique features of the Saturn system.

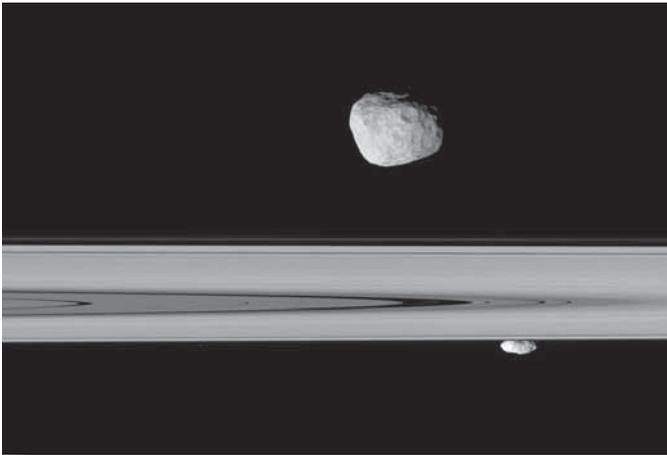
The Imaging Team continues to publish findings from their investigations, deepening our knowledge about Saturn and the processes by which planets – and whole planetary systems – form and develop with time.

In 2007, Cassini images graced the pages of scores of magazines and websites around the globe. The mission continues to generate exciting science and exquisite imagery from the Saturn frontier.



Courtesy Sky & Telescope.

2007 Cassini Highlights



Origins of the Ring Moons

Cassini images of the small, irregularly shaped moons that orbit near the outer rings of Saturn have led to a new understanding about how these bodies came to be. The moons have extremely low densities, and imaging scientists have shown that they may have begun as leftover shards from larger bodies that broke apart and filled out their “figures” with the debris that made the rings.



Enceladus Hotspots Pinpointed

Cassini imaging data provided conclusive evidence that the jets of Enceladus – which collectively create a towering plume of water ice particles and vapor over the moon – originate from the hottest parts of the linear fractures that score the moon’s south polar region.

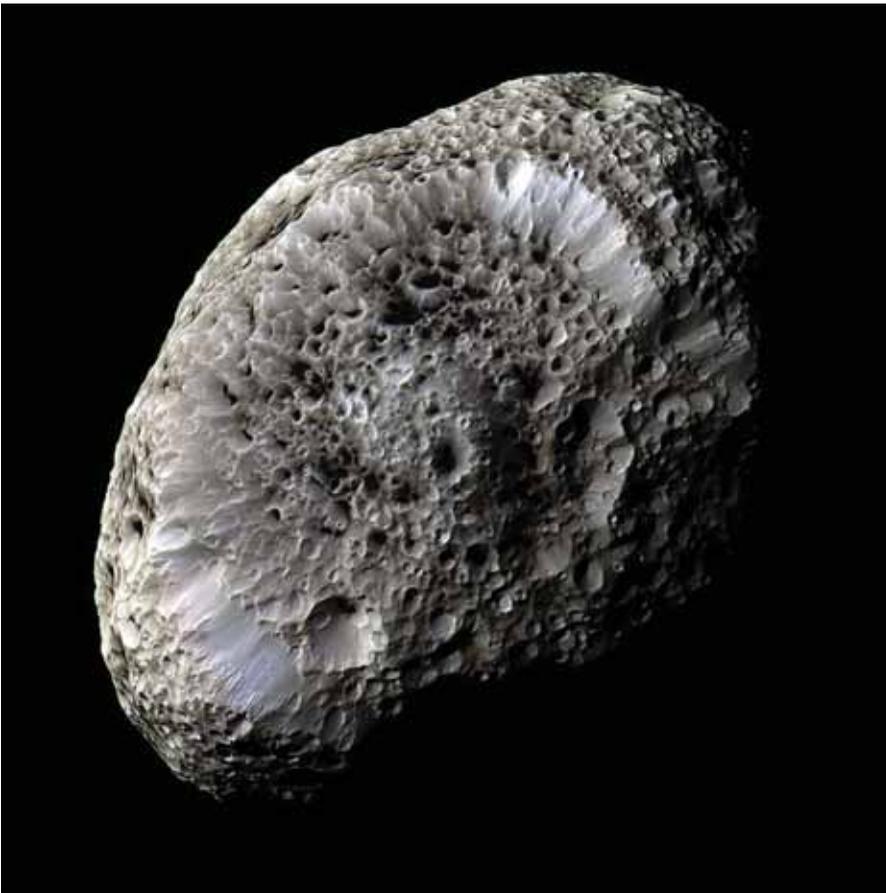
Imaging scientists identified eight source locations on the surface by triangulating jet positions in Cassini images. The researchers also predicted the locations of other hot spots to be found by future Cassini observations.

Top: Saturn's moons Janus and Prometheus. Courtesy NASA/JPL/Space Science Institute.

Bottom: Jets of ice particles, water vapor, and trace organic compounds stream from the fractures on Enceladus. Courtesy NASA/JPL/Space Science Institute.

Iapetus Revealed!

Cassini returned the first high-resolution images of the bright trailing hemisphere of Iapetus. The moon's strange two-toned appearance has been a mystery for over 300 years: one hemisphere is as dark as asphalt, the other is as bright as snow. The images strongly implicate differential warming by the Sun in creating the unusual look of Iapetus. And small bright craters within the dark material tell scientists that it is a blanket no more than a few meters thick.



Hyperion's Strange Appearance

Imaging scientists determined that Hyperion's unusual, sponge-like appearance can be attributed to the fact that it has a very low density for such a large object, giving it weak surface gravity and making it highly porous. The researchers found that impacts tend to make craters by compressing the surface material, rather than blasting it out. And Hyperion's weak gravity means that what little material is blasted out of craters has a good chance of escaping the moon altogether, rather than coating the moon and covering up its many potholes.

*Top: The bright, trailing hemisphere of two-toned Iapetus. Courtesy NASA/JPL/Space Science Institute.
Bottom: A false color view of Hyperion. Courtesy NASA/JPL/Space Science Institute.*

Education



A panoramic view of the Alien Earths exhibition. Courtesy Space Science Institute.

SSI's Education Branch is involved in a variety of innovative projects that promote inquiry and science literacy. We foster collaboration between scientists and educators to bring the knowledge and excitement of scientific discovery to audiences across the country. In addition, our programs help cultivate a greater appreciation and understanding of science in the general public. They span a range of audience needs and delivery methods, including traveling museum exhibitions; award-winning educational films, videos, and websites; hands-on teaching resources and activities; educator workshops; outreach to underserved audiences, such as girls' groups, Hispanic, Native American and rural communities; and successful partnership building between scientists and educators. SSI is committed to evaluating its projects and conducting educational research in order to improve what we do and to better understand the impact we are having on a national scale.

Guiding Principles

- Plan strategically for continued innovation
- Integrate science research and science education
- Contribute significantly to educational research
- Ensure scientific accuracy in all activities
- Evaluate all products and disseminate results
- Cultivate mutually beneficial partnerships in science and education communities
- Excite learners of all ages, ethnicities, and learning modalities with the thrill of scientific discovery

Education Program Impacts for 2007:

- 280,000 visitors to SSI museum exhibits
- 360,000 visitors to SSI educational websites
- 250 participants in educator workshops, virtual workshops, and conference presentations
- 37,000 downloads of SSI educational materials, activities, and resources distributed online

SSI's educational projects include large-scale, institutional-level efforts supported by the National Science Foundation and NASA (e.g. the *STEPS* project funded by NSF; *Giant Worlds* funded by both agencies), as well as smaller-scale programs that focus on individual scientists seeking educational support for research projects (e.g., an asteroids project called *Finding NEO* with SSI Senior Research Scientist Al Harris (California Office)). This strategic approach allows SSI to leverage the needs and effectiveness of both kinds of endeavors and allows our staff to explore new educational methods and effectively "scale up" those that show promise.

In keeping with that strategy, SSI is pursuing new directions for educational programming: the continued development of documentary film production capabilities; an innovative Twenty Ninth Street Mall public outreach project in Boulder's newest pedestrian mall; an emerging partnership with the American Library Association to pilot small exhibits in various types of libraries in Colorado and beyond; and applications of internet and multimedia technologies to facilitate social learning experiences. SSI and its partners are leading the way to a new generation of educational innovation, which bridges the worlds of science research



Left: Education Associate Brad McLain (standing) leads an educator workshop at the Orlando Science Center. Courtesy Space Science Institute. Right: Outreach event at Boulder's Twenty Ninth Street Mall. Courtesy Space Science Institute.



Panoramic view of the Giant Worlds exhibition at the Orlando Science Center. Courtesy Space Science Institute.

2007 Education and Public Outreach Highlights

Journey to the Outer Solar System

Beyond Mercury, Venus, Earth and Mars are four colossal planets that dwarf the inner, terrestrial planets. The Solar System's giant planets – Jupiter, Saturn, Uranus and Neptune – present some fascinating mysteries: enormous hurricanes that last for centuries; moons that harbor vast oceans below an icy surface; and magnetic environments that can generate massive storms of charged particles. Since Galileo first glimpsed the rings of Saturn in 1610, the beauty of the outer Solar System's giant planets has captivated us. Now scientists are seeing beyond their beauty to gain a deeper understanding of their importance.

The new science exhibition, *Giant Worlds: A Voyage to the Outer Solar System* will begin its national tour in February 2008 at the Orlando Science Center in Florida. It is funded by the National Science Foundation and NASA and produced by the Space Science Institute in Boulder, Colorado (PI: Paul Dusenbery, Colorado Office). NASA's Cassini and Juno missions are project partners. The 3,500 square-foot exhibit will give visitors an out-of-this-world experience as they learn about the role that the giant planets played in making Earth habitable. The exhibit is intimately linked to the progress and discoveries of NASA's outer planets missions, and it provides an engaging, real-life context for learning about science, math and technology. The Association of Science-Technology Centers (ASTC) will manage the national tour.



Giant Worlds invites visitors of all ages to explore our amazing Solar System. They learn about Galileo's early telescope to a bus-sized spacecraft that orbits Saturn, a billion miles away. The exhibit is filled with interactive experiences, models and spectacular murals that reveal the grandeur of these amazing planets. Visitors can learn about gravity by becoming a part of Saturn's spectacular ring system, where model ring particles actually interact with a visitor's shadow. They can design and launch a virtual probe into Jupiter's crushing atmosphere and see how far their probe gets before it is destroyed. Visitors can also experiment with the properties of visible and infrared radiation and learn how scientists use light to probe phenomena like Jupiter's Great Red Spot.

SSI is collaborating with project partners to create an education program to accompany the exhibit that consists of workshops for museum educators and teachers. SSI is creating an interactive exhibit website for the project that extends the exhibit's scope and reach. It will also provide support and follow-up for the education program (www.giantworlds.org).

Giving Wings to Science Education

Across the country, there is a growing concern regarding the number of students entering science and technology careers. We know that one way to reverse that trend is to make science and math fascinating and relevant for students. And, in order to engage students, we need educators who are excited about what they do and can bring unique learning opportunities into their classrooms. In order to address this concern, the Northrop Grumman Foundation has teamed with the Zero Gravity Corporation to develop the *Weightless Flights of Discovery* program. This program is designed to inspire students to pursue science and technical careers by inspiring their teachers first.



Teachers experience a "zero-gravity" flight. Courtesy Northrop Grumman/Zero Gravity Corporation



Enthusiastic teachers can better engage students in the fields of science and technology. Courtesy Northrop Grumman/Zero Gravity Corporation.

Practicing and future middle school teachers have the opportunity to participate in hands-on science workshops and perform an experiment in a parabolic or “zero-gravity” aircraft flight that creates temporary weightlessness comparable to what humans would experience during space travel to the Moon and Mars. It also mimics how astronauts train for space flight. The 2007 *Weightless Fights of Discovery* program will give 480 teachers and future teachers in eight different communities the opportunity to participate in this incredible program.

In 2007, SSI partnered with Northrop Grumman and Acme Industrial Imagination to produce a feature length documentary about this exciting program. Funded by the Northrop Grumman Foundation, SSI’s Education Associate Brad McLain (Colorado

Office) is the project PI. The film will examine the state of science education in America, track several teachers from around the country as they participate in the *Weightless* program, and uncover the results of their extraordinary experience for their students.

Space Faring: The Radiation Challenge

Mr. McLain’s video project, called *Space Faring: The Radiation Challenge*, neared completion in 2007. The project was funded by NASA’s Exploration System Mission Directorate. Two versions of the film (one for middle school and one for high school) focus on the subject of radiation and human spaceflight. Set in the future, a pair of young astronauts enroute to Mars encounter a space weather emergency, requiring them to learn about cosmic rays, solar particle events, implications for human health, and shielding strategies and technology.

The project pushed SSI production capabilities into new domains with the use of extensive green screen compositing and digital special effect techniques. It also marked our first foray into high definition. The project included the participation of radiation and human spaceflight experts from around the country working on NASA’s “Moon, Mars, and Beyond” vision for space exploration.

Made in partnership with Marshall Space Flight Center and Ames Research Center, the videos are to be accompanied by complementary hands-on classroom activities created by NASA. The videos will be launched in mid-2008 on DVD and Blu-Ray as well as online.

Right Page: “Space Faring: The Radiation Challenge,” a film focused on radiation and human space flight. Courtesy NASA/Space Science Institute.

SPACE IS NOT EMPTY



SPACE FARING: THE RADIATION CHALLENGE

NASA EXPLORATION SYSTEMS MISSION DIRECTORATE in association with NASA MARSHALL SPACE FLIGHT CENTER presents a SPACE SCIENCE INSTITUTE production "SPACE FARING: THE RADIATION CHALLENGE" featuring JACKIE BULLOTE & ROCKY RAY BOND
with ROBERT SINGLETERRY MARK SHAWERS JAMES HAROLD MICHELLE HANAWSON and COURTNEY COTE special visual effects by DELPHORE VISUAL PRODUCTIONS sound by COLUPE STUDIOS edited by RACHEL CRIEBO BEAU CLARK & BOB ROSS
written and produced by BRAD MCLAIN & LISA CURTIS executive producer for NASA AL KRIVISE science consulting by JACK MILLER ROBERT SINGLETERRY BILL MORGAN MARK SHAWERS JACOB RADER ROBERT SCHRESTL JULIE HARMON
FRANK CUCINOTTA JOHN CHARLES JAMES HAROLD and PAUL DUSENBERGY directed by BRAD MCLAIN



Financial Report

Space Science Institute
Summary Statement of Financial Position
as of December 31, 2007 and 2006

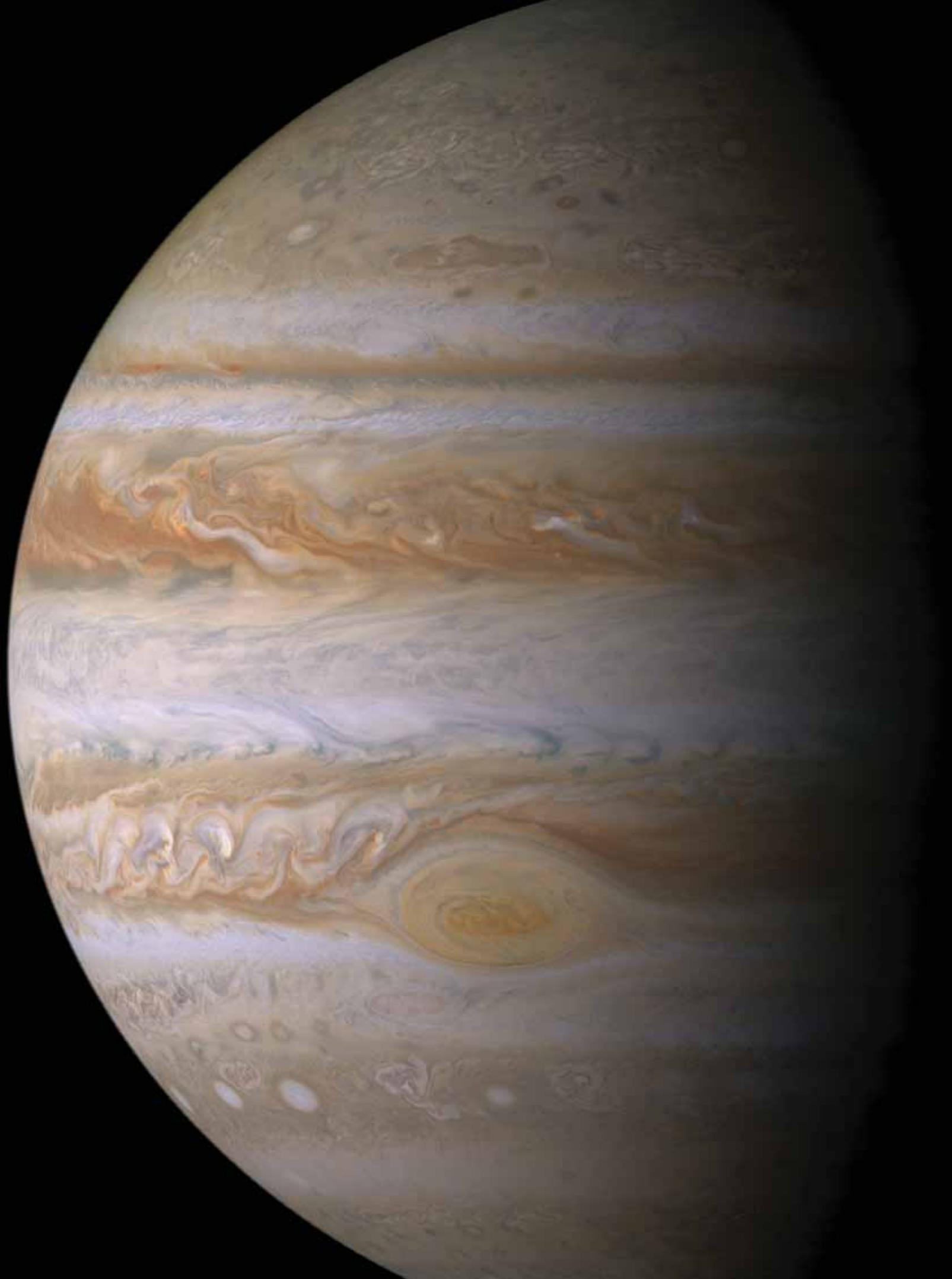
	2007	2006
Assets		
<i>Assets</i>		
Cash and cash equivalents	\$ 503,209	\$ 439,073
Accounts receivable	841,463	673,211
Prepaid expenses and deposits	60,857	64,868
Net furniture, equipment, and property	131,570	172,708
	<hr/>	<hr/>
<i>Total assets</i>	<u>\$ 1,537,099</u>	<u>\$ 1,349,860</u>
 Liabilities and Net Assets		
<i>Liabilities</i>		
Accounts payable and accrued liabilities	\$ 453,755	\$ 247,267
Capital lease obligations	-	269
Deferred revenues	424,151	502,354
Line of credit	351,500	405,000
Other	-	-
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<i>Total liabilities</i>	<u>1,229,406</u>	<u>1,154,890</u>
 <i>Net assets</i>		
Unrestricted	251,105	121,921
Temporarily restricted	56,588	73,049
	<hr/>	<hr/>
<i>Total net assets</i>	<u>307,693</u>	<u>194,970</u>
	<hr/>	<hr/>
<i>Total liabilities and net assets</i>	<u>\$ 1,537,099</u>	<u>\$ 1,349,860</u>

Summary Statement of Activities
for the years ended December 31, 2007 and 2006

	2007	2006
Support and revenue		
Grants, contracts, and cooperative agreements	\$ 5,696,201	\$ 4,791,240
Contributions	16,000	-
Exhibit income	113,294	81,682
Interest income	225	330
Other income	-	-
Gain/(Loss) on disposal of equipment	(9,445)	-
	<hr/>	<hr/>
<i>Total support and revenue</i>	<u>5,816,275</u>	<u>4,873,252</u>
 Expenses		
Program services	5,756,638	4,833,629
General and administrative	(53,086)	76,700
	<hr/>	<hr/>
<i>Total expenses</i>	<u>5,703,552</u>	<u>4,910,329</u>
	<hr/>	<hr/>
Change in net assets	112,723	(37,077)
	<hr/>	<hr/>
Net assets, beginning of year	194,970	232,047
	<hr/>	<hr/>
Net assets, end of year	<u>\$ 307,693</u>	<u>\$ 194,970</u>

The summary financial information does not include sufficient detail or disclosures to constitute presentation in conformity with accounting principles generally accepted in the United States of America. If the omitted detail or disclosures were included, they might influence the user's conclusions about the Organization's financial position, changes in net assets, and cash flows. Accordingly such information should be read in conjunction with the Organization's audited financial statements for the years ended December 31, 2007 and 2006, from which the summarized information was derived. A copy is available upon request.

*Right Page: The planet Jupiter. Courtesy NASA/JPL/Cassini.
Next Page: The Eagle Nebula region of the Milky Way Galaxy.
Courtesy NASA/Spitzer Space Telescope/Space Science Institute.*



Publications & Activities

R. Todd Clancy

PROFESSIONAL ORGANIZATIONS & SERVICE

American Geophysical Union, Member

AAS Division of Planetary Sciences, member

MEPAG Science Analysis Group (SAG), Goals and Objectives for the Human Exploration of Mars (HEM)

Mars Science Orbiter (MSO) Science Definition Team (SDT), member

PUBLICATIONS

Clancy, R.T., M.J. Wolff, B.A. Whitney, B.A. Cantor, and M.D. Smith, Mars Equatorial Mesospheric Clouds: Global Occurrence and Physical Properties from Mars Global Surveyor TES and MOC Limb Observations, *J. Geophys. Res.*, 112, E04004, 2007.

Montemessin, F., R.M. Haberle, F. Forget, and R.T. Clancy, Precession-induced exchanges of water between the poles on Mars, *J. Geophys. Res.*, 112, E08S17, 2007.

Murchie, S., et al., Compact Reconnaissance Imaging Spectrometer for Mars (CRISM) on Mars Reconnaissance Orbiter (MRO), *J. Geophys. Res.*, 112, E05S03, 2007.

Malin, M. C., et al., Context Camera Investigation on board the Mars Reconnaissance Orbiter, *J. Geophys. Res.*, 112, E05S04, 2007.

Pelkey, S. M., et al., CRISM multispectral summary products: Parameterizing mineral diversity on Mars from reflectance, *J. Geophys. Res.*, 112, E08S14, 2007.

Malin, M. C., et al., Climate, weather, and north polar observations from the Mars Reconnaissance Orbiter Mars Color Imager, *Icarus*, 194, p. 501-512, 2008.

Clancy, R.T., B.J. Sandor, and G.H. Moriarty-Schieven, Venus Upper Atmospheric CO, Temperature, and Winds across the Afternoon/Evening Terminator from June 2007 JCMT Sub-millimeter Line Observations, *Plan. Space Sci.*, in press, May 2008.

Franck Lefèvre, Jean-Loup Bertaux, François Forget, Sébastien Lebonnois, Franck Montmessin, Kelly Fast, R. Todd Clancy, Thérèse Encrenaz. Heterogeneous chemistry in the atmosphere of Mars, *Nature*, accepted, April 2008.

MEETINGS AND CONFERENCE PROCEEDINGS

Clancy, R.T., et al., Mars Ozone Measurements from the Mars Reconnaissance Orbiter (MRO) MARCI and CRISM Experiments, Seventh International Conference on Mars, LPI Contri. No. 1353, p. 3082, Pasadena, CA, July 2007.

Clancy, R.T., Sandor, B.J., and G.H. Moriarty-Schieven, Dynamics of the Venus Upper Atmosphere: Global-Temporal Distribution of Winds, Temperature, and CO at the Venus Mesopause, DPS Meeting, 39.6107C, Orlando, FL, October 2007.

Clancy, R.T., et al., MARCI Observations of Mesospheric Cloud Trails and their Association with Extreme Vertical within Localized (10's km), Short Duration (1-2 days) Dust Lifting Events, AGU Fall Meeting, P31D, San Francisco, CA, December 2007.

Conference: Exploring Venus as a Terrestrial Planet, Key Largo, FL, Feb 13-16, 2006

Paul Dusenbery

PROFESSIONAL ORGANIZATIONS & SERVICE

Proposal Reviewer, National Science Foundation
Proposal Reviewer, National Aeronautics and Space Administration
Journal of Geophysical Research
Member, 29th Street Wonder of Science Project
Member of AGU, AAS, DPS, NSTA, and ASCD

MEETINGS AND CONFERENCE PROCEEDINGS

Dusenbery, P. and C. Wuth, SSI Booth, AAS Winter Meeting, Seattle, WA, January, 2007
Dusenbery, P. and B. McLain, ASP-Project Astro Group Meeting, Space Center Houston, May, 2007
Dusenbery, P., NASA Education Forum Meeting, Cocoa Beach, FL, June, 2007
Dusenbery, P. and B. McLain, Space Weather and Human Space Flight Workshop, Ft. Lewis College, September, 2007
Dusenbery, P., Curtis, L., Harold, J., SSI booth, ASTC Annual Meeting, Los Angeles, CA, October 2007

PUBLICATIONS

Dusenbery, P.B., J. Harold, B. McLain, L. Curtis, Space Weather Outreach: an informal education perspective, Advances in Space Research, in press, 2007.

William Farrand

PROFESSIONAL ORGANIZATIONS & SERVICE

Geological Society of America, Member
American Geophysical Union, Member
American Society of Photogrammetry and Remote Sensing, Member
Institute of Electrical and Electronics Engineers, Member

PUBLICATIONS

Farrand, W.H., J.F. Bell III, J.R. Johnson, B.L. Joliff, A.H. Knoll, S.M. McLennan, S.W. Squyres, W.M. Calvin, J.P. Grotzinger, R.V. Morris, J. Soderblom, S.D. Thompson, W.A. Watters, and A.S. Yen (2007) Visible and near-infrared multispectral analysis of rocks at Meridiani Planum, Mars by the Mars Exploration Rover Opportunity, J. Geophys Res.: Planets, 112, E06S02, 10.1029/2006JE002773.
S.W. Squyres, O. Aharonson, B.C. Clark, B.A. Cohen, L. Crumpler, P.A. de Souza, W.H. Farrand, and 21 others (2007) Pyroclastic activity at Home Plate in Gusev Crater, Mars, Science, 316, 738-742.
Clark, B. C., R. E. Arvidson, R. Gellert, R. V. Morris, D. W. Ming, L. Richter, S. W. Ruff, J. R. Michalski, W. H. Farrand,

A. Yen, K. E. Herkenhoff, R. Li, S. W. Squyres, C. Schröder, G. Klingelhöfer, and J. F. Bell (2007), Evidence for montmorillonite or its compositional equivalent in Columbia Hills, Mars, *J. Geophys. Res.*, 112, E06S01, doi:10.1029/2006JE002756.

Lichtenberg, K. A., R. E. Arvidson, F. Poulet, R. V. Morris, A. Knudson, J. F. Bell, G. Bellucci, J. Bibring, W. H. Farrand, J. R. Johnson, D. W. Ming, P. C. Pinet, A. D. Rogers, and S. W. Squyres (2007), Coordinated analyses of orbital and Spirit Rover data to characterize surface materials on the cratered plains of Gusev Crater, Mars, *J. Geophys. Res.*, 112, E12S90, doi:10.1029/2006JE002850.

MEETINGS AND CONFERENCE PROCEEDINGS

Farrand, W. H., J. W. Rice, and T. D. Glotch (2007) Comparisons between phyllosilicate-bearing strata at Mawrth Vallis and Terra Meridiani, *Eos Trans. AGU*, 88(52), Fall Meet. Suppl., Abstract P13D-1561.

Farrand, W. H., J. W. Rice, T. D. Glotch, and J. A. Hurowitz (2007) Hyperspectral, multispectral and textural analysis of the Mawrth Vallis layered terrain, Seventh Int. Conf. Mars, abstract #3304.

Farrand, W. H., J. F. Bell III, J. R. Johnson, J. P. Grotzinger, S. W. Squyres, and B. L. Jolliff (2007) Spectral stratigraphy of Victoria Crater, Meridiani Planum, Mars, Seventh Int. Conf. Mars, abstract #3250.

Farrand, W. H., J. F. Bell III, J. R. Johnson, and D. L. Blaney (2007) Multispectral reflectance of rocks in the Columbia Hills examined by the Mars Exploration Rover Spirit: Cumberland Ridge to Home Plate, Lunar and Planetary Science XXXVIII, #1957.

Farrand, W. H. and M. D. Lane (2007) "Blebbly" terrain and domes on the northern plains of Mars: Evidence of Ancient Ice Ages?, Lunar and Planetary Science XXXVIII, #1972.

Joseph M. Hahn

PROFESSIONAL ORGANIZATIONS & SERVICE

American Astronomical Society (AAS), member
AAS Division for Planetary Science (DPS), member
AAS Division on Dynamical Astronomy (DDA), member

PUBLICATIONS

Hahn, J. M., 2007, The Secular Evolution of a Close Ring-Satellite system: the Excitation of Spiral Bending Waves at a Nearby Gap Edge, *Astrophysical Journal*, 665, 856.

MEETINGS AND CONFERENCE PROCEEDINGS

Hahn, J. M., The Secular Evolution of a Close Ring-Satellite System, poster given at the 2007 DPS meeting in Orlando, FL.

Hahn, J. M., The Evolution of the Outer Solar System During the Cluster Era, poster given at the 2007 DDA meeting in Ann Arbor, MI.

INVITED TALKS

"The Kuiper Belt, the Early History of the Outer Solar System, and Extra-Solar Kuiper Belts", given on October 23, 2007 at the Center for Space Research (CSR) in Austin, TX.

OTHER ACTIVITIES

Sorted abstracts and arranged the program for the upcoming 2008 AAS meeting Austin, TX. I also organized for this meeting a Special Session titled “DDA: The Dynamics of Astrophysical Disks”.

Heidi B. Hammel

PROFESSIONAL ORGANIZATIONS & SERVICE

American Astronomical Society (AAS), Division for Planetary Science (DPS), Member
AAS George Van Biesbroeck Prize Committee (2006 - present), current Chair
DPS Prize Subcommittee (2005 - 2007)
DPS Web Site Developer, Administrator (1995 - 2007)
American Association for the Advancement of Science, Member
Council (2008 – present)
Elected Member-at-large for Section D (Astronomy) (2002 - 2007)
International Astronomical Union, Member
American Geophysical Union, Member
Association for Women in Science, Member
AURA, Board of Directors (2003-present)
The Planetary Society, Board of Directors (2005-present)
Advisory Committees
Outer Planets Assessment Group – “OPAG” (2008 - present)
AAAC/NSF Exoplanet Task Force (2006 - 2008)
NASA Astrophysics Subcommittee (2006 - 2008)
NASA Science Investigations
Team Member, Science Working Group, AURA/NOAO Giant Segmented Mirror Telescope development project (2007 - present)
Interdisciplinary Scientist, James Webb Space Telescope (2002 - present)
Organizing Committees for Scientific Meetings, both Science (SOC) and Local (LOC)
SOC, Planetary Atmospheres, Baltimore, MD, November 2007
LOC, Astrophysics in the Next Decade: JWST and Concurrent Facilities, Tucson, AZ, September 2007

PUBLICATIONS

Hammel, H. B., L.A. Sromovsky, P. M. Fry, K.A. Rages, M. R. Showalter, I. de Pater, and M.A. van Dam, R. P. LeBeau, and X. Deng. The Dark Spot in the Atmosphere of Uranus in 2006: Discovery, Description, and Dynamical Simulations. Submitted to *Icarus* (2008).

Fitzsimmons, A., A. M. Zalucha, J. Elliot, J. Thomas-Osip, H. B. Hammel, T. R. Marsh, V. S. Dhillon, F.W. Taylor, and P. G. J. Irwin. The 2003 Nov 14 occultation by Titan of TYC-1343-1865-1. I. High-cadence multi-colour occultation lightcurves. Submitted to *Astron. & Astrophys.* (2008).

Goldman, B., M. C. Cushing, M. S. Marley, É. Artigau, K. S. Baliyan, V. J. S. Béjar, J. A. Caballero, N. Chanover, M. Connelley, R. Doyon, T. Forveille, S. Ganesh, C. R. Gelino, H. B. Hammel, J. Holtzman, S. Joshi, U. C. Joshi, S. K. Leggett, M. C. Liu, E. L. Martín, V. Mohan, D. Nadeau, R. Sagar, and D. Stephens. CLOUDS search for variability in brown dwarf atmospheres. I: Infrared spectroscopic time series of L/T transition brown dwarfs. *Astron. & Astrophys.*, in press. (2008).

- Sitko, M. L., W. J. Carpenter, R. L. Kimes, J. L. Wilde, D. K. Lynch, R. W. Russell, R. J. Rudy, S. M. Mazuk, C. C. Venturini, R. C. Puetter, C. A. Grady, E. F. Polomski, J. P. Wisnewski, S. M. Brafford, H. B. Hammel, and R. B. Perry. Variability of disk emission in pre-Main Sequence and related stars. I. HD 31648 and HD 163296 - isolated Herbig Ae stars driving Herbig-Haro flows. *Astronomical Journal*, in press (2008).
- Zalucha, A. M., A. Fitzsimmons, J. Elliot, J. Thomas-Osip, H. B. Hammel, T. R. Marsh, V. S. Dhillon, F. W. Taylor, and P. G. J. Irwin. The 2003 Nov 14 occultation by Titan of TYC-1343-1865-1. II. Analysis of light curves. *Icarus* 192, 503-517 (2007).
- Sromovsky, L. A., P. M. Fry, H. B. Hammel, I. de Pater, K. A. Rages, and M. R. Showalter. Dynamics, evolution, and structure of Uranus' brightest cloud feature. *Icarus* 192, 558-575 (2007).
- de Pater, I., H. B. Hammel, M. R. Showalter, and M. A. van Dam. The Dark Side of the Rings of Uranus. *Science* 317, 1888-1890 (2007).
- Lynch, D. K., R. W. Russell, H. B. Hammel, and M. L. Sitko. Mid-infrared spectroscopy of Phobo and Deimos. *Astron. Journal* 134, 1459-1463 (2007).
- Hammel, H. B., M. L. Sitko, G. S. Orton, T. Geballe, D. K. Lynch, R. W. Russell, and I. de Pater. Distribution of ethane and methane emission on Neptune. *Astron. Journal* 134, 637-641 (2007).
- Hammel, H. B., and G. W. Lockwood. Suggestive correlations between the brightness of Neptune, solar variability, and Earth's temperature. *Geophysical Research Letters* 43, L08203, doi:10.1029/2006GL028764 (2007).
- Hammel, H. B., and G. W. Lockwood. Long-term atmospheric variability on Uranus and Neptune. *Icarus* 186, 291-301 (2007).

MEETINGS AND CONFERENCE PROCEEDINGS

- Hammel, H. B., C. J. Hansen, L. J. Spilker, T. R. Spilker, N. Strange, J. Stansberry, K. Khurana. A Fresh Look at Exploring the Neptune System and Beyond. LPSC, LPI Contribution No. 1391, p. 1117 (2008).
- Hammel, H. B., M. L. Sitko, G. S. Orton, T. Geballe, D. K. Lynch, R. W. Russell, and I. de Pater. Infrared Imaging of Neptune with Gemini/Michelle and Keck/NIRC2. *Bull. Amer. Astron. Soc.* 39, 527 (2007).
- Sitko, M. L., W. J. Carpenter, C. A. Grady, R. W. Russell, D. K. Lynch, R. J. Rudy, S. M. Mazuk, C. C. Venturini, R. L. Kimes, L. C. Beerman, K. E. Ablordeppey, R. C. Puetter, J. P. Wisnewski, S. M. Brafford, E. F. Polomski, H. B. Hammel, R. B. Perry, and J. L. Wilde. Time variability of dust sublimation zones in pre-Main Sequence Disk Systems. *Bull. Amer. Astron. Soc.* 39, 495 (2007).
- de Pater, I., H. Hammel, M. R. Showalter, S. Gibbard, K. Matthews, P. D. Nicholson, D. Stam, M. Hartung, and M. van Dam. First Results from Ground-based Observations of the Ring Plane Crossings of Uranus. *Bull. Amer. Astron. Soc.* 39, 427 (2007).
- Bauer, J. M., J. D. Goguen, B. J., Buratti, C. A. Hibbitts, L. Young, E. F. Young, K. H. Baines, H. B. Hammel, A. Fitzsimmons, V. Lainey, J.-E. Arlot, and M. D. Hicks. Palomar AO Observations during the Uranus Equinox. *Bull. Amer. Astron. Soc.* 39, 425 (2007).
- Rages, K. A., H. B. Hammel, and L. Sromovsky. Uranus: Direct Comparison of Northern vs. Southern Hemispheres at Equinox. *Bull. Amer. Astron. Soc.* 39, 425 (2007).
- Hammel, H. B. Mid-IR Observations of the Outer Planets. *Bull. Amer. Astron. Soc.* 38, 1223-1224 (2007).
- Hammel, H. B., M. L. Sitko, G. S. Orton, T. Geballe, D. K. Lynch, R. W. Russell, and I. de Pater. Distribution of Ethane and Methane Emission on Neptune. *Bull. Amer. Astron. Soc.* 38, 936 (2007).
- Lynch, D. K., R. J. Rudy, R. W. Russell, S. Masuk, Venturini, C. C., M. L. Sitko, H. B. Hammel, R. C. Puetter and R. B. Perry. The 0.5-13 μm Spectrum of V4332 Sagittarii in 2006. *Bull. Amer. Astron. Soc.* 38, 907 (2007).

Alan W. Harris

PROFESSIONAL ORGANIZATIONS & SERVICE

American Geophysical Union (AGU), Member
American Astronomical Society (AAS), member
AAS Division of Planetary Sciences (DPS), member
AAS Division for Dynamical Astronomy (DDA), member
International Astronomical Union (IAU), member
American Association for the Advancement of Science (AAAS), Fellow
Society for Astronomical Sciences (SAS), member

PUBLICATIONS

Kryszczyńska, A.; La Spina, A.; Paolicchi, P.; Harris, A. W.; Breiter, S.; Pravec, P.: New findings on asteroid spin-vector distributions. *Icarus* 192, p. 223-237, 2007.
Pravec, P.; Harris, A. W.: Binary asteroid Population. *Icarus* 190, 250-259.

MEETINGS AND CONFERENCE PROCEEDINGS

Harris, A. W.: An update of the population of NEAs and impact risk. *Bull. Amer. Astron. Soc.* 39, 511, 2007.
Pravec, P.; Harris, A. W.; Warner, B. D.: NEA rotations and binaries. In *Near Earth Objects, our Celestial Neighbors: Opportunity and Risk*, Proceedings of IAU Symposium 236. Edited by G. B. Valsecchi and D. Vokrouhlický. Cambridge: Cambridge University Press, pp. 167-176, 2007.

Dean Hines, Ph. D

PROFESSIONAL ORGANIZATIONS & SERVICE

NASA Science Investigations: NICMOS/HST Instrument & Science Team; MIPS/Spitzer Instrument and Science Team; FEPS Legacy Program Data Lead, PI, Co-I on HST & Spitzer GO Programs
American Astronomical Society (1986 – present)
Spitzer Science User Panel (2005 – present)
NASA Infrared Telescope Facility (IRTF) TAC Member (2006, 2007)
Spitzer TAC Panel Member (2006, 2007)
Referee for *Astrophysical Journal* (ApJ), *Astrophysical Letters* (ApJL), *Monthly Notices of the Royal Astronomical Society* (MNRAS)
Grand Awards Judge, Intel International Science Fair, May 2007

PUBLICATIONS

Author/coauthor of 109 refereed publications on spectro- and imaging polarimetry, infrared astronomy, space-based instrumentation, quasars and other ultraluminous galaxies, evolved stars, and planetary debris disks (12 in 2007).
Hines D.C. et al. 2007, "The Moth: An Unusual Circumstellar Structure Associated with HD 61005," *ApJ*, 671, L165
Markwick-Kemper, F., Gallagher, S.C., Hines, D.C. & Bouwman, J. 2007, "Dust in the wind: Crystalline Silicates, Corundum and Periclase in PG 2112+059," *ApJ*, 668, L107
Schmidt, G.D. et al. 2007, "Multiple Scattered Sightlines to the Red QSO 2MASX J10494334+5837501," *ApJ*,

666, 784

- Gordon, K.D. et al. 2007, "Absolute Calibration and Characterization of the Multiband Imaging Photometer for Spitzer. II. 70 micron Imaging," *PASP*, 119, 1019
- Engelbracht, C.W. et al. 2007, "Absolute Calibration and Characterization of the Multiband Imaging Photometer for Spitzer. I. The Stellar Calibrator Sample and the 24 micron Calibration," *PASP*, 119, 994
- Shi, Y., et al. 2007, "Aromatic Features in AGN: Star-Forming Infrared Luminosity Function of AGN Host Galaxies," *ApJ*, 669, 841
- Grady, C.A. et al. 2007, "The Disk and Environment of a Young Vega Analog: HD 169142," *ApJ*, 665, 1391
- Gallagher, S.C., Hines, D.C., Blaylock, M., Priddey, R.S., Brandt, W.N. & Egami, E.E. 2007, "Radio through X-Ray Spectral Energy Distributions of 38 Broad Absorption Line Quasars," *ApJ*, 665, 157
- Gallagher, S.C., Richards, G.T., Lacy, M., Hines, D.C., Elitzur, M. & Storrie-Lombardi, L.J. 2007, *ApJ*, "An Investigation into the Effects of Luminosity on the Mid-Infrared Spectral Energy Distributions of Radio-quiet Quasars," 661, 30
- Moro-Martin, A. et al. 2007, "Are Debris Disks and Massive Planets Correlated?" *ApJ*, 658, 1312
- Shi, Y., Rieke, G.H., Hines, D.C., Gordon, K.D. & Egami, E. 2007, "Thermal and Nonthermal Infrared Emission from M87," *ApJ*, 655, 781
- Ganguly, R., et al. 2007, "Hubble Space Telescope Ultraviolet Spectroscopy of 14 Low-Redshift Quasars," *AJ*, 133, 479

MEETINGS AND CONFERENCE PROCEEDINGS

- Guiou, S., et al. 2007, "On The Circum(sub)stellar Environment Of Brown Dwarfs In Taurus" American Astronomical Society Meeting Abstracts, 211, #103.22
- Schneider, G., Hines, D.C., GO 10527 & 10847 GO Teams, 2007, "Coronagraphic Polarimetry of HST-Resolved Circumstellar T Tauri and Debris Disks," American Astronomical Society Meeting Abstracts, 211, #50.16
- Wisniewski, J.P., et al. 2007, "First Science Results from the UKIRT UIST Coronagraphic Imaging Polarimeter," American Astronomical Society Meeting Abstracts, 211, #50.10
- Kuraszkiewicz, J., et al. 2007, "The Spectral Energy Distributions of Red 2MASS AGN," American Astronomical Society Meeting Abstracts, 211, #46.01
- Shang, Z., Brotherton, M.S., Hines, D.C. & Dale, D.A. 2007, "Connections Between UV-optical and Mid-infrared Spectral Properties in Quasars – Effects of Dust," American Astronomical Society Meeting Abstracts, 211, #45.08
- Monin, J.-L., et al. 2007, "The Taurus CFHT optical survey," American Astronomical Society Meeting Abstracts, 211, #29.06
- Padgett, D., et al. 2007, "The Taurus Spitzer Legacy Survey: Taking the Bull by the Horns," American Astronomical Society Meeting Abstracts, 211, #29.04
- Buck, Z., et al. 2007, "New `Orion Population" Emission Line Stars in the Taurus Star Formation Region" American Astronomical Society Meeting Abstracts, 211, #12.25
- Pelton, P., et al. 2007, "New T Tauri Candidates in the Taurus Molecular Cloud," American Astronomical Society Meeting Abstracts, 211, #12.24
- Knapp, G.R., et al. 2007, "The Distribution of Optically-Identified Herbig-Haro Objects in the Taurus Dark Cloud," American Astronomical Society Meeting Abstracts, 211, #12.23
- Monin, J.-L., et al. 2007, "The Taurus CFHT Optical Survey," American Astronomical Society Meeting Abstracts, 211, #12.22
- Guedel, M., et al. 2007, "Gas and Dust Environments of Young Stars in the Taurus Molecular Cloud: A

- Synthesis from the XMM-Newton and Spitzer Surveys,” American Astronomical Society Meeting Abstracts, 211, #12.20
- Spuck, T., et al. 2007, “Resolved Galaxies in the Spitzer Survey of the Taurus Molecular Cloud,” American Astronomical Society Meeting Abstracts, 211, #12.18
- McCabe, C.-E., et al. 2007, “Searching for Signs of Disk Evolution in the Spitzer Taurus Legacy Survey,” American Astronomical Society Meeting Abstracts, 211, #12.17
- Noriega-Crespo, A., et al. 2007, “The Mid/Far Infrared Diffuse Emission of the Taurus Molecular Cloud,” American Astronomical Society Meeting Abstracts, 211, #12.16
- Huard, T.L., et al. 2007, “Optical and Infrared Extinction in Taurus American Astronomical Society Meeting,” Abstracts, 211, #12.15
- Oswald, E., et al. 2007, “Identification of Galaxies in the Spitzer Taurus Survey: Comparison with the 2MASS Extended Source Catalog,” American Astronomical Society Meeting Abstracts, 211, #12.14
- Fukagawa, M., et al. 2007, “Spitzer Detections of Disks around Very Low-Mass Stars in Taurus,” American Astronomical Society Meeting Abstracts, 211, #12.12
- Hines, D.C., et al. 2007, “Statistics of 24 Micron Field Asteroids in the Spitzer Space Telescope Taurus Legacy Science Survey,” American Astronomical Society Meeting Abstracts, 211, #12.10
- Tromp, J., et al. 2007, “After IRAS: Revisiting the Brightest Far-Infrared Sources in Taurus with the Spitzer Taurus Survey,” American Astronomical Society Meeting Abstracts, 211, #12.09
- Rebull, L.M., et al. 2007, “Spitzer Observations of the Taurus Molecular Cloud: Old and New YSOs,” American Astronomical Society Meeting Abstracts, 211, #12.07
- Padgett, D., et al. 2007, “The Taurus Spitzer Legacy Survey: Images from Spitzer,” American Astronomical Society Meeting Abstracts, 211, #12.06
- Shang, Z., Brotherton, M., Dale, D.A., & Hines, D. 2007, “UV to Mid-IR SEDs of Low-redshift Quasars,” in *The Central Engine of Active Galactic Nuclei*, 373, 604
- Schneider, G. & Hines, D.C. 2007, “High Contrast Imaging with NICMOS - I: Teaching an Old Dog New Tricks with Coronagraphic Polarimetry,” in proceedings of the conference *In the Spirit of Bernard Lyot: The Direct Detection of Planets and Circumstellar Disks in the 21st Century*. June 04 - 08, 2007. University of California, Berkeley, CA, USA. Edited by Paul Kalas.
- Hines, D.C. & Schneider, G. 2007, “High Contrast Imaging with NICMOS - II: Coronagraphic Polarimetry,” in proceedings of the conference *In the Spirit of Bernard Lyot: The Direct Detection of Planets and Circumstellar Disks in the 21st Century*. June 04 - 08, 2007. University of California, Berkeley, CA, USA. Edited by Paul Kalas.
- Metchev, S. et al. 2007, “Multi-Wavelength Modeling of the Resolved Debris Disk around HD 107146,” in proceedings of the conference *In the Spirit of Bernard Lyot: The Direct Detection of Planets and Circumstellar Disks in the 21st Century*. June 04 - 08, 2007. University of California, Berkeley, CA, USA. Edited by Paul Kalas.
- Hines, D.C. et al. 2007, “The Moth: An Unusual Circumstellar Debris Structure Associated with HD 61005,” proceedings of the conference *In the Spirit of Bernard Lyot: The Direct Detection of Planets and Circumstellar Disks in the 21st Century*. June 04 - 08, 2007. University of California, Berkeley, CA, USA. Edited by Paul Kalas.

Philip James

PROFESSIONAL ORGANIZATIONS & SERVICE

American Physical Society (Fellow);
American Geophysical Union,

American Astronomical Society
Sigma Xi (emeritus member).
MDAP Review Panel (December 1977)
NASA Science Definition Team for Mars Science Orbiter (MSO)
MARCI/CTX Team on MRO

PUBLICATIONS

Bonev, P.B., G.B. Hansen, D.A. Glenar, P.B. James, and J.E. Bjorkman. Near-perihelion global dust storms and the stability of the perennial south polar cap on Mars. *Planetary and Space Science* (in press).
Benson, J.L., D.A. Glenar, P.B. James, and M.J. Wolff. Properties of Mars aphelion volcano clouds from combined Mars Global Surveyor MOC and TES measurements. Submitted to *Icarus*.
Malin, M. and MARCI/CTX Science Team. Context Camera Investigation on board the Mars Reconnaissance Orbiter. *J. Geophys. Res.* 112 Issue E5 (2007).
James, P.B., P.C. Thomas, M.J. Wolff, and P.B. Bonev. MOC observations of four Mars year variations in south polar residual cap of Mars. *Icarus* 192, 318-326 (2007).
Malin, Michael C.; Calvin, Wendy M.; Cantor, Bruce A.; Clancy, R. Todd; Haberle, Robert M.; James, Philip B.; Thomas, Peter C.; Wolff, Michael J.; Bell, James F.; Lee, Steven W. Climate, weather, and north polar observations from the Mars Reconnaissance Orbiter Mars Color Imager. *Icarus* 194 (in press).

MEETINGS AND CONFERENCE PROCEEDINGS

Seventh International Conference on Mars Polar, July 9-13 2007, Pasadena, CA:

James, P. B.; Calvin, W. M.; Lee, S. W.; Thomas, P. C., MARCI Observations of Spring Recession of Martian South Polar Cap
Thomas, P. C.; James, P. B.; Wolff, M.; Malin, M. C.; Cantor, B.; Edgett, K.; Calvin, W.. Residual South Polar Cap of Mars: Continuing Changes and Their Significance
Calvin, W. M.; Pockock, J. M.; James, P. B.; Lee, S. W.; Thomas, P. C.; Murchie, S. L.; Seelos, F.; Langevin, Y.; Titus, T. N.; McGuire, P. The Nature and Mobility of Bright Patches in the North Residual Ice Cap from MARCI, CTX, OMEGA and CRISM
Benson, J. L.; Glenar, D.A.; James, P. B.; Wolff, M. J.. Properties of Mars Aphelion Volcano Clouds from Combined Mars Global Surveyor MOC and TES Measurements

2007 AGU Fall Meeting December, 2007. San Francisco, CA:

James, P.; Calvin, W.; Thomas, P.; Wolff, M.. Residual South Polar Cap of Mars: MY28 MARCI Observations
Calvin, W. M.; Pockock, J. M.; Seelos, F. P.; Lee, S. W.; James, P. B.; Thomas, P. C.; Murchie, S. L.. Seasonal Changes in the Martian North Polar Region from CRISM, MARCI and CTX
Clancy, R. T.; Wolff, M. J.; Cantor, B. A.; James, P. B.; Haberle, R. M.; Malin, M. C. MARCI Observations of Mesospheric Cloud Trails and Their Association with Extreme Vertical Ascent within Localized (10's of km), Short Duration (1-2 days) Dust Lifting Events

38th Lunar and Planetary Science Conference, March 11-12, League City, TX:

Malin, M. and MARCI/CTX Science Team.. Initial Observations by the MRO Mars Color Imager and Context Camera

39th Meeting of Division of Planetary Science, AAS:

Glenar, David A.; Benson, J.; James, P.; Wolff, M.; Grundy, W. M. Small-scale Properties Of Mars Aphelion-season Volcano Clouds, From Combined MGS MOC and TES Measurements

Carolyn Porco

PROFESSIONAL ORGANIZATIONS & SERVICE

Co-Leader, Enceladus Focus Group, 2006-

PUBLICATIONS

- Spitale, J. and Porco, C. (2007). Association of the Jets of Enceladus with the Warmest Regions on its South Polar Fractures. *Nature* 449, 695-697.
- Thomas, P.C., Burns, J.A., Helfenstein, P., Squyres, S., Veverka, J., Porco, C., Turtle, E., McEwen, A., Denk, T., Giese, B., Roatsch, T., Johnson, T.V., Jacobson, R.A. (2007). Shapes of the Saturnian icy satellites and their significance. *Icarus* 190, 573-584.
- Porco, C., Thomas, P., Weiss, J., Richardson, D.C. (2007). Saturn's Small Inner Satellites: Clues to Their Origins. *Science* 318, 1602-1607.
- Charnoz, S., Brahic A., Thomas P., Porco C. (2007). The Equatorial Ridges of Pan and Atlas: Terminal Accretionary Ornaments? *Science* 318, 1622-1624
- Dyudina, U.A., Ingersoll, A.P., Ewald, S.P., Porco, C.C., Fischer, G., Kurth, W., Desch, M., Del Genio, A., Barbara, J., Ferrier, J. (2007). Lightning Storms on Saturn observed by Cassini ISS and RPWS during 2004-2006. *Icarus* 190, 545-555.
- Giese, B., Denk, T., Neukum, G., Roatsch, T., Helfenstein, P., Thomas, P.C., Turtle, E.P., McEwen, A., Porco, C.C. (2008). The topography of Iapetus' leading side. *Icarus* 193, 359-371.
- Tiscareno, M.S., Burns, J.A., Hedman, M.M., Porco, C.C. (2008). The Population of Propellers in Saturn's A Ring. *Astron. J.* 135, 1083-1091.
- Jacobson, R., Spitale, J., Porco, C.C., Beurle, K., Cooper, N., Evans, M.W., Murray, C.D. (2008). Revised Orbits of Saturn's Small Inner Satellites. *Astron. J.* 135, 261-263.
- Dyudina, U.A., Ingersoll, A.P., Ewald, S.P., Vasavada, A.R., West, R.A., Del Genio, A.D., Barbara, J.M., Porco, C.C., Achterberg, R.K., Flasar, F.M., Simon-Miller, A.A., Fletcher, L.N. (2008). Dynamics of Saturn's South Polar Vortex. *Science* 319, 1801.
- Young, L.A. Porco, C.C. ... et al. (2008). New Horizons: Anticipated Scientific Investigations at the Pluto System. *Space Science Reviews*. In press.
- Cooper, N.J., Murray, C.D., Evans, M.W., Beurle, K., Jacobson, R.A., Porco, C.C. (2008). Astrometry and Dynamics of Anthe (S/2007 S 4), A New Satellite of Saturn. *Icarus* 195, 765-777.
- Porco, C., Weiss, J., Richardson, D., Dones, L., Quinn, T., Throop, H. (2008). Simulations of the Dynamical and Light-Scattering Behavior of Saturn's Rings and the Derivation of Ring Particle and Disk Properties. *Astron. J.* In revision.
- McKay, C.P., Porco, C.C., Altheide, T., Kral, T.A., Davis, W.L. (2008). The possible origin and persistence of life on Enceladus and detection of biomarkers in the plume. *Astrobiology*. Accepted.
- Roatsch, T., Wählisch, M., Hoffmeister, A., Matz, K.-D., Scholten, F., Kersten, E., Wagner, R., Denk, T., Neukum, G., Porco, C. (2008). High Resolution Dione Atlas derived from Cassini-ISS images. *Planetary and Space Sciences*. Submitted
- "Cassini: The First One Thousand Days". *American Scientist*, July/August 2007. Reprinted in France, Brazil,

Italy and India.

“What I’ve Changed by Mind About”. Essay for “The Edge” World Question Center, January 2008. (http://www.edge.org/q2008/q08_10.html#porco)

INVITED TALKS

“Cassini Explores the Saturn System”. Invited colloquium to the Dept. of Astronomy and Radiophysics, Cornell University, Ithaca, NY, September 2007.

“Saturn’s Rings: The View from Above”. Invited presentation to the AIAA meeting, Long Beach, CA., Sept. 19, 2007.

“Cassini Explores the Saturn System”. Invited presentation to the Monterey Bay Aquarium Research Institute (MBARI), March 3, 2008.

“Voyages in the Promised Land: Cassini Explores the Saturn System”. Invited presentation to the Aspen Ideas Festival, Aspen, CO, July 3, 2007.

“Traveling Saturn”. Invited presentation at SpaceFest, Phoenix, AZ, August 18, 2007.

“In the Land of Enchantment”. Invited presentation to the annual meeting of the Council for the Advancement of Science Writing. Spokane, WA, October 23, 2007.

“The Cosmos and Life: The Greatest Story Ever Told”. Public presentation, Jefferson Center, Ashland, OR, October 25, 2007.

“Titan and Enceladus: A Tale of Two Moons”. Invited public lecture to the La Caixa Science Museum, Barcelona, Spain, November 13, 2007.

Presentations on Cassini to the Entertainment Gathering (EG) conference, Los Angeles, CA December 4, 2007; the Digital Life Design (DLD) 2008 conference, Munich, Germany, January 2008.

“Traveling Saturn”. Invited keynote presentation at UNAVCO meeting, Boulder, CO, March 11, 2008.

“At Saturn: Tripping the Flight Fantastic”. Invited public lecture held in conjunction with the American Astronomical Society’s Division on Dynamical Astronomy meeting, Boulder, CO, April 28, 2008.

“Our Place in the Cosmos”. Invited presentation to a global audience on Pangea Day, May 10, 2008 (<http://www.pangeaday.org/>). Sponsored by TED (the Sapling Foundation) and other companies.

OTHER ACTIVITIES

Panelist, “Science and the Public Sphere”. With Jim Lehrer, Walter Isaacson, Michael Lemonick, Shirley Jackson, and others. Aspen Ideas Festival, July 2007. http://fora.tv/2007/07/03/Science_and_the_Public_Sphere

Panelist, “Shaping Prospects for Improved Health & Longevity...Into the Future”, International Women’s Forum, Chicago, IL, October 12, 2007.

Judge, Saatchi & Saatchi World Changing Ideas Award, Saatchi and Saatchi, London, 2007.

Isaac Asimov Science Award, American Humanist Association.

Science Advisor for forthcoming motion picture “Star Trek”. Paramount Studios.

Three proposals submitted by CICLOPS to NASA

Ten Press Releases on Cassini’s results

Brad Sandor

PROFESSIONAL ORGANIZATIONS AND SERVICES

American Geophysical Union, Member
AAS Division of Planetary Sciences, Member
Mars Fundamental Research Program (MFRP) Review Panel

MEETINGS AND CONFERENCE PROCEEDINGS

- Clancy, R.T., B.J. Sandor, and G.H. Moriarty-Schieven. Time Variable Circulation above the Venus Mesopause (95-115 km) from JCMT Sub-millimeter $^{12}\text{CO}/^{13}\text{CO}$ observations during 2001, 2002, 2004, and 2006 Inferior Conjunctions. Venus Express Workshop. La Thuille, Italy. March, 2007.
- Sandor, B.J., R.T. Clancy, and G.H. Moriarty-Schieven. Global Variations of H_2O , SO_2 and SO in the Venus Mesosphere. Venus Express Workshop. La Thuille, Italy. March, 2007.
- Clancy, R.T., B.J. Sandor, and G.H. Moriarty-Schieven. Dynamics of the Venus Upper Atmosphere: Global-Temporal Distribution of Winds, Temperature, and CO at the Venus Mesopause. October 2007 meeting of the DPS. 2007.
- Sandor, B.J., R.T. Clancy, and G.H. Moriarty-Schieven. SO and SO_2 in the Venus Mesosphere: Observations of Extreme and Rapid Variation. . October 2007 meeting of the DPS. 2007.
- Sandor, B.J., and R.T. Clancy. Mesospheric HCN , N_2O , and CO : Measurements and Implications for Dynamics & Chemistry. Fall 2007 meeting of the AGU. December, 2007.

Michael L. Sitko

PROFESSIONAL ORGANIZATIONS AND SERVICE

Cincinnati Observatory Center: Board of Directors & Education Committee
Member: International Astronomical Union, American Astronomical Society, Division for Planetary Sciences, Astronomical Society of the Pacific, Meteoritical Society, Planetary Society
Referee for The Astronomical Journal, Icarus,

PUBLICATIONS

- Grady, C.A., Schneider, G., Hamaguchi, K., Sitko, M.L., Carpenter, W.J., Hines, D., Collins, K.A., Williger, G.M., Woodgate, B.E., Henning, Th., Ménard, F., Wilner, D., Petre, R., Palunas, P., Quirrenbach, A., Nuth, J.A., III, Silverstone, M.D., & Kim, J.S. (2007). The Disk and Environment of a Young Vega Analog: HD 169142, *Astrophysical Journal*, 665, 1391-1406.
- Hammel, H.B., Sitko, M.L., Lynch, D.K., Orton, G.S., Russell, R.W., Geballe, T.R., & de Pater, I. (2007). Distribution of Ethane and Methane Emission on Neptune, *Astronomical Journal*, 134, 637-641.

MEETINGS AND CONFERENCE PROCEEDINGS

- Collins, K., Grady, C., Wisniewski, J.P., Hamaguchi, K., van Boekel, R., Brittain, S., Carmona, A., Williger, G., van den Ancker, M., Sitko, M., Carpenter, W.J., Woodgate, B., Henning, Th. & Petre., R. (2007). The Disk and Environment of Herbig Star HD 100453", American Astronomical Society Meeting #210, #8714.
- Grady, C., Schneider, G., Woodgate, B.E., Wisniewski, J.P., Brittain, S., Sitko, M.L., & Collins, K. (2007). The Evolution of Protoplanetary Disks: A Decade of HST Coronagraphy, Lyot Conference, p. 34.
- Sitko, M.L., Carpenter, W.J., Kimes, R.L., Wilde, J.L., Lynch, D.K., Russell, R.W., Rudy, R.J., Mazuk, S.M., Venturini, C.C., Puetter, R.C., Grady, C.A., Brafford, S.M., & Perry, R.B. (2007). Time Variability of the Inner Dust Zone in Pre-Main Sequence Disk Systems, Meteoritical Society Meeting 42, Meteoritics & Planetary

Science 42.5284.

- Yanamandra-Fisher, P.A., Orton, G.S., Jezewski, S., Sitko, M., Lynch, D.K., Rudy, R., Baines, K.H., Momary, T.W., & Chen, P. (2007). Near-Infrared Spectra of Jupiter's North Temperate Belt Disturbance (NTBs) of 2007, Division for Planetary Sciences Meeting 39, #1911.
- Sitko, M.L., Carpenter, W.J., Grady, C.A., Russell, R.W., D.K., Lynch, Rudy, R.J., Mazuk, S.M., Venturini, C.C., Kimes, R.L., Beerman, L.C., Ablordeppey, K.E., Puetter, R.C., Wisniewski, J.P., Brafford, S.M., Polomski, E.F., Hammel, H.B., Perry, R.B., & Wilde, J.L. (2007). Time Variability of the Dust Sublimation Zone in Pre-Main Sequence Disk Systems, Division for Planetary Sciences Meeting 39, #4201.
- Hammel, H.B., Sitko, M.L., Orton, G.S., Geballe, T.R., Lynch, D.K., Russell, R.W., & de Pater, I. (2007). Infrared Imaging of Neptune with Gemini/Michelle and Keck/NIRC2, Division for Planetary Sciences Meeting 39, #5507.
- Orton, G., Baines, K., Yanamandra-Fisher, P., Mousis, O., Vanzi, L., Hayward, T., De Buizer, J., Simon-Miller, A., Bjoraker, G., Fletcher, L., Gladstone, R., Edkins, E., Kemerer, J., Sitko, M. & Lynch, D. (2007). Observations of Jupiter Supporting New Horizons Encounter and During a period of Global Upheaval, American Geophysical Union Fall Meeting 2007, #P53C-03.
- Yanamandra-Fisher, P.A., Orton, G.S., Jezewski, S., Sitko, M., Lynch, D., Rudy, R. (2007). Near-Infrared Spectral Analysis of 2007 Jovian Temperate Belt Disturbance, American Geophysical Union Fall Meeting 2007, #P53C-04.
- Sitko, M.L., Russell, R.W., Lynch, D.K., Rudy, R.J., Mazuk, S.M., Venturini, C.C., Carpenter, W.J., Kimes, R.L., Beerman, L.C., Ablordeppey, K.E., Grady, C.A., Wisniewski, J.P., Polomski, E.F., Brafford, S.M., Hammel, H.B., Perry, R.B., & Wilde, J.L. (2007). Time Variability of the Inner Dust Rims in PMS Disk Systems, American Astronomical Society Meeting 211 #5008.
- Wisniewski, J.P., Kowalski, A.F., Clampin, M., Grady, C.A., Sitko, M.L., Bjorkman, K.S., Hines, D.C., and Whitney, B.A. (2007). First Science Results from the UKIRT UIST Coronagraphic Imaging Polarimeter", American Astronomical Society Meeting 211, #5010.
- Gliniski, R.J., Bernstein, L.S., & Sitko, M.L. (2007). Ultraviolet Spectroscopy of HD 44179 in the Red Rectangle, American Astronomical Society Meeting 211, #5120.

Gorden Videen

PROFESSIONAL ORGANIZATIONS & SERVICE

- Co-Chair: 10th Conference on Electromagnetic and Light Scattering by Nonspherical Particles: Theory, Measurements, and Applications held in Bodrum Turkey, June 2007.
- Guest Editor: Journal of Quantitative Spectroscopy and Radiative Transfer, Special issue on Optics of Biological Particles (2007)
- Guest Editor: Journal of Quantitative Spectroscopy and Radiative Transfer, special issues on light scattering (2007).
- Thesis Committee, Maxim Yurkin, University of Amsterdam, December 11, 2007.

PUBLICATIONS

- Petrov D, Videen G., Shkuratov Y, Kaydash, M 2007: Analytic T-matrix solution of light scattering from capsule and bi-sphere particles: Applications to spore detection. J. Quant. Spectrosc. Radiative Transfer 108, 81-105.
- Mishchenko MI, Liu L, and Videen G, 2007: Conditions of applicability of the single-scattering approximation, Opt. Express 15, 7522-7527.
- N.V. Voshchinnikov and G. Videen, 2007: Light scattering by non-spherical particles. J. Quant. Spectrosc.

Radiative Transfer 106, 1-3.

- M.I. Mishchenko, G.Videen, V.A. Babenko, N.G. Khlebtsov and T.Wriedt, 2007: Comprehensive T-matrix reference database: A 2004–06 update. *J. Quant. Spectrosc. Radiative Transfer* 106, 304-324.
- K. Muinonen, E. Zubko, J. Tyynelä, Y.G. Shkuratov and G.Videen, 2007: Light scattering by Gaussian random particles with discrete-dipole approximation. *J. Quant. Spectrosc. Radiative Transfer* 106, 360-377.
- D. Petrov, Yu. Shkuratov, E. Zubko and G.Videen, 2007: Sh-matrices method as applied to scattering by particles with layered structure. *J. Quant. Spectrosc. Radiative Transfer* 106, 437-454.
- Psarev, A. Ovcharenko, Yu. Shkuratov, I. Belskaya and G.Videen, 2007: Photometry of particulate surfaces at extremely small phase angles. *J. Quant. Spectrosc. Radiative Transfer* 106, 455-463.
- Yu. Shkuratov, S. Bondarenko, V. Kaydash, G.Videen, O. Muñoz and H. Volten, 2007: Photometry and polarimetry of particulate surfaces and aerosol particles over a wide range of phase angles. *J. Quant. Spectrosc. Radiative Transfer* 106, 487-508.
- D. Stankevich, L. Istomina, Yu. Shkuratov and G.Videen, 2007: The scattering matrix of random media consisting of large opaque spheres calculated using ray tracing and accounting for coherent backscattering enhancement. *J. Quant. Spectrosc. Radiative Transfer* 106, 509-519.
- J. Tyynelä, E. Zubko, G.Videen and K. Muinonen, 2007: Interrelating angular scattering characteristics to internal electric fields for wavelength-scale spherical particles. *J. Quant. Spectrosc. Radiative Transfer* 106, 520-534.
- E. Zubko, K. Muinonen, Yu. Shkuratov, G.Videen and T. Nousiainen, 2007: Scattering of light by roughened Gaussian random particles. *J. Quant. Spectrosc. Radiative Transfer* 106, 604-615.
- Voshchinnikov NV, Videen G, Henning T, 2007: Effective medium theories for irregular fluffy structures: aggregation of small particles. *Appl. Opt.* 46 (19). 4065-4072.
- Petrov D, Shkuratov Y, Videen G. 2007: Optimized matrix inversion technique for the T-matrix method. *Opt. Lett.* 32, 1168-1170.
- Petrov D, Shkuratov Y, Videen G, 2007: Analytical light-scattering solution for Chebyshev particles. *J. Opt. Soc. Am. A* 24, 1103-1119.
- Mishchenko MI, Liu L, Mackowski DW, Cairns B, and Videen G, 2007: Multiple scattering by random particulate media: exact 3D results, *Opt. Express* 15, 2822-2836.
- Shkuratov Yu., Opanasenko N., Zubko E., Grynkó Ye., Korokhin V., Pieters C., Videen G., Mall U., Opanasenko A., 2007: Multispectral polarimetry as a tool to investigate texture and chemistry of lunar regolith particles. *Icarus* 187. 406–416.
- Stankevich D, Istomina L, Shkuratov Y, Videen G, 2007: Electromagnetic phase differences in the coherent backscattering enhancement mechanism for random media consisting of large nontransparent spheres. *Appl. Opt.* 46, 1562-1567.
- Sun WB, Videen G, Lin B, Hu YX, 2007: Modeling light scattered from and transmitted through dielectric periodic structures on a substrate. *Appl. Opt.* 46, 1150-1156.
- Venkata PG, Aslan MM, Menguc MP, Videen G, 2007: Surface plasmon scattering by gold nanoparticles and two-dimensional agglomerates, *J Heat Transfer-Trans. ASME* 129 (1): 60-70.
- Merchiers O, Moreno F, Gonzalez F, Saiz JM, and Videen G, 2007: Electromagnetic wave scattering from two interacting small spherical particles. Influence of their optical constants, epsilon and mu, *Opt. Comm.* 269 (1): 1-7.
- G.Videen and D. Ngo, "Light Scattering from a Cell," in *Optics of Biological Particles*, edited by A. Hoekstra, V. Maltsev, and G.Videen (Kluwer, Dordrecht, 2007) 1-18.
- P.H. Kaye, K. Aptowicz, R.K. Chang, V. Foot, and G.Videen, "Angularly resolved elastic scattering from airborne particles," in *Optics of Biological Particles*, edited by A. Hoekstra, V. Maltsev, and G.Videen (Kluwer, Dordrecht, 2007) 31-60.

Videen, G., M. Mishchenko, M. P. Menguc, and N. Zakharova: Peer-Reviewed Abstracts of the Tenth Conference on Electromagnetic and Light Scattering (ICHMT, 2007).
Optics of Biological Particles, editors, A. Hoekstra, V. Maltsev, and G. Videen (Kluwer, Dordrecht, 2007).

MEETINGS AND CONFERENCE PROCEEDINGS

- G. Videen, "Backscattering effects in agglomerate particles," Seminar, University of Amsterdam, December 10, 2007.
- O.E. Zubko, H. Kimura, Yu. Shkuratov, G. Videen, K. Muinonen, and T. Yamamoto, "The composition of organics in cometary dust constrained by light-scattering properties of agglomerated dust particles," 39th DPS Meeting, Orlando Florida, Oct. 7-12, 2007.
- K. Muinonen, J. Tyynela, E. Zubko, G. Videen, and Y.G. Shkuratov, "Single-scattering mechanism for negative polarization and opposition brightening of atmosphereless solar-system objects," 39th DPS Meeting, Orlando Florida, Oct. 7-12, 2007.
- G. Videen, "Current topics in light scattering from irregular particles," at Seminario Fundamentals of Photonics: Current Advances, July 2-6 2007, Santander, Spain.
- Yu. Shkuratov, N. Opanasenko, A. Opanasenko, E. Zubko, Yu. Velikodsky, V. Korokhin, and G. Videen, "Mapping the Moon in Pmin," Proceedings of the 10th Conference on Electromagnetic and Light Scattering by Non-Spherical Particles: Theory, Measurements, and Applications, June 17-22 2007, Bodrum, Turkey.
- D. Petrov, Y. Shkuratov, and G. Videen. "Applying Sh-matrices to two merging spheres," Proceedings of the 10th Conference on Electromagnetic and Light Scattering by Non-Spherical Particles: Theory, Measurements, and Applications, June 17-22 2007, Bodrum, Turkey.
- J. Tyynelä, E. Zubko, G. Videen, and K. Muinonen, "Interrelating angular scattering characteristics to internal electric fields of wavelength-scale Gaussian particles," Proceedings of the 10th Conference on Electromagnetic and Light Scattering by Non-Spherical Particles: Theory, Measurements, and Applications, June 17-22 2007, Bodrum, Turkey.
- Ye. Grynko, Yu. Shkuratov, and G. Videen, "Modeling lunar reflectance spectra," Proceedings of the 10th Conference on Electromagnetic and Light Scattering by Non-Spherical Particles: Theory, Measurements, and Applications, June 17-22 2007, Bodrum, Turkey.
- V. Psarev, A. Ovcharenko, Yu. Shkuratov, I. Belskaya, G. Videen, A. Nakamura, T. Mukai, and Y. Okada "Photometry of powders consisting of dielectric and metallic spheres at extremely small phase angles," Proceedings of the 10th Conference on Electromagnetic and Light Scattering by Non-Spherical Particles: Theory, Measurements, and Applications, June 17-22 2007, Bodrum, Turkey.
- M. Kocifaj and G. Videen, "Optical characteristics of composite ellipsoidal solid-phase aerosols with variable carbon content," Proceedings of the 10th Conference on Electromagnetic and Light Scattering by Non-Spherical Particles: Theory, Measurements, and Applications, June 17-22 2007, Bodrum, Turkey.
- G. Videen, "Building Bridges..." Keynote address at European Sciences and Humanities Symposium, March 1, Heidelberg, Germany.
- G. Videen, "Recent results of light scattering from irregular particles," Seminar, Universidad de Cantabria, Fisica Aplicada, February 23, 2007.

Ann Wehrle

PROFESSIONAL ORGANIZATIONS & SERVICE

American Astronomical Society

IAU

Science Organizing Committee, for meeting on "EXTRAGALACTIC JETS: THEORY AND OBSERVATION

FROM RADIO TO GAMMA RAY”
GLAST User Committee

PUBLICATIONS

Unwin et al. (2008) 2008 PASP, 120, 38

MEETINGS AND CONFERENCE PROCEEDINGS

Wehrle, Ann E. and Unwin, Stephen C. “Prospects for Observing quasar jets with the Space Interferometry Mission- Planetquest”, in Vol. CS 386

EXTRAGALACTIC JETS: THEORY AND OBSERVATION FROM RADIO TO GAMMA RAY eds. Travis Rector and Dave De Young

Barbara A. Whitney

PROFESSIONAL ORGANIZATIONS & SERVICE

American Astronomical Society (AAS), Member

AAS Division of Planetary Sciences, member

AAS Employment Committee

Answered queries to publicly available radiative transfer codes, used worldwide

Answered queries to publicly available model grid and data fitter, used worldwide

Supervised 4 students

PUBLICATIONS

E. Churchwell, D. F. Watson, M. S. Povich, M. G. Taylor, B. L. Babler, M. R. Meade, R. A. Benjamin, R. Indebetouw, & B. A. Whitney, The Bubbling Galactic Disk. II. The Inner 20 Degrees, *Astrophysical Journal*, 670, 428-441, 2007.

D. S. Shepherd, M. S. Povich, B. A. Whitney, T. P. Robitaille, D. E. A. Nurnberger, L. Bronfman, D. P. Stark, R. Indebetouw, M. R. Meade, & B. L. Babler, Molecular Outflows and a Mid-Infrared Census of the Massive Star Formation Region Associated with IRAS 18507+0121, *Astrophysical Journal*, 669, 464-482, 2007.

M. Cohen, Q. A. Parker, A. J. Greene, T. Murphy, B. Miszalski, D. J. Frew, M. R. Meade, B. Babler, R. Indebetouw, B. A. Whitney et al., Spitzer IRAC Observations of Newly Discovered Planetary Nebulae from the Macquarie-AAO-Strasbourg H α Planetary Nebula Project, *Astrophysical Journal*, 669, 343-362, 2007.

J. D. Simon, A. D. Bolatto, B. A. Whitney, T. P. Robitaille, R. Y. Shah, D. Makovoz, S. Stanimirovic, R. H. Barba, M. Rubio, The Spitzer Survey of the Small Magellanic Cloud: Discovery of Embedded Protostars in the H II Region NGC 346, *Astrophysical Journal*, 669, 327-336, 2007.

R. Indebetouw, T. P. Robitaille, B. A. Whitney, E. Churchwell, B. Babler, M. Meade, M. Wolfire, & M. Wolff, Embedded Star Formation in the Eagle Nebula with Spitzer/GLIMPSE, *Astrophysical Journal*, 666, 321-338, 2007.

M. S. Povich, J. M. Stone, E. Churchwell, E. G. Zweibel, M. G. Wolfire, B. L. Babler, R. Indebetouw, M. R. Meade, & B. A. Whitney, A Multiwavelength Study of M17: The Spectral Energy Distribution and PAH Emission Morphology of a Massive Star Formation Region, *Astronomical Journal*, 660, 346-362, 2007.

L. V. Gramajo, B. A. Whitney, S. J. Kenyon, M. Gomez, & K. M. Merrill, High Spatial Resolution Near-Infrared

- Images of Taurus Protostars, *Astronomical Journal*, 133, 1911-1926, 2007.
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