

RICE SPACE INSTITUTE

ANNUAL REPORT TO THE PRESIDENT 2001



"IMAGE"
Spacecraft,
launched March 25,
2000, with heavy
Rice University
involvement
(faculty, students,
staff, and alumni).

Launch image courtesy of Boeing Space Systems

**RICE SPACE INSTITUTE
OFFICE OF THE DIRECTOR**



MEMORANDUM

Date: 18 January 2001

To: Malcolm Gillis, President
Eugene Levy, Provost
Kathy Matthews, Dean of Natural Sciences
Sidney Burrus, Dean of Engineering

From: Patricia H. Reiff

Subject: Institute Annual Report, 1 January - 31 December 2000

I am pleased to provide herewith the first Annual Report to the President for The Rice Space Institute, covering 1 January - 31 December 2000.

The Rice Space Institute was created to be the focus of space research on the Rice campus, to fill the void resulting from the loss of the world's first Space Science Department. The Institute has grown far beyond those goals, though, reaching out to all members of the Rice community, not only in Natural Science and Engineering but to many others across the campus and around the world. Its mission is to "Make the Universe Smaller" by fostering interdisciplinary research and education. To accomplish these goals, we have created subgroups, comprising research in Space Astronomy and Astrophysics, Space Exploration, Space Weather, Space History and Public Policy, Space Education and Public Outreach, and Space Technology.

At the end of 2000, the Rice Space Institute has 104 self-identified members from 19 Departments and 5 Schools (Natural Science, Engineering, Humanities, Social Science, and Jones Management School). It also has members from Rice University staff, including the Library, the News Office, the Rice Counsel, the Provost's office, the Budget office and Facilities and Engineering. We have opened the RSI to Emeritus Faculty and alumni, and in 2001 we will seek corporate members.



The Rice Space Institute is off to an amazing start. I expect that the years to come will be equally exciting.

A handwritten signature in blue ink, reading "Pat H. Reiff". The signature is written in a cursive style.



Strategic Goals

Mission

"The mission of the Rice Space Institute is to *"Make the Universe Smaller"* by interdisciplinary research and education at all levels, charting the course for the next generation of peaceful uses of space. "

Goals

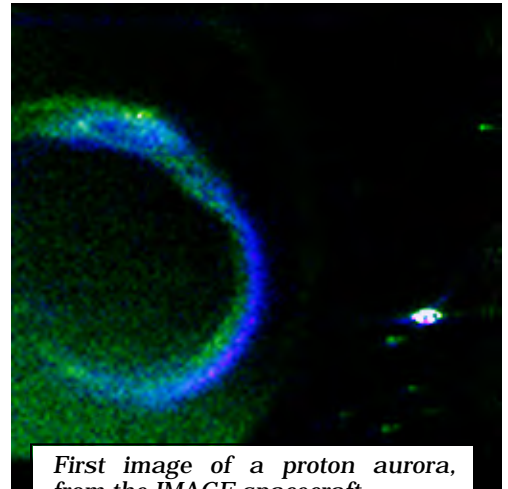
- to foster superior, cutting-edge **research** that commands national and international respect in various space-related Science and Technology disciplines;
- to continue to be a world leader in scholarship in the **history and philosophy of science**;
- to strengthen our leadership in **bringing space science to the public**;
- to become the recognized leader in the area of **space policy**;
- to build on our relationships with industry and government and continue to foster **technology transfer**;
- to continue to **serve the Rice community**.

To accomplish these goals, we have created groups within the RSI which focus on the research areas of the RSI. The groups comprise Space Weather, Space Exploration, Space Astronomy and Astrophysics, Space Technology, Space History and Public Policy, Space Education and Public Outreach, and Space Remote Sensing. (There is also a significant interest in Space Biology and Bioengineering, but that is the focus of the Rice Biomedical Institute). Each group has one or more group leaders. The group leaders and other significant advisors comprise the Council of the Rice Space Institute. The Council has worked in CY 2000 to form the governance and structure of the RSI, to lay out the major thrusts, and to select projects for seed funding from the RSI. These goals align well with the goals of the Schools and University we serve. As a non-degree-granting entity, we do not have degree goals, but we work closely with related departments on degree programs and course work, in particular the "Master of Science Teaching" degree which we proposed and which we are effectively administering through the Physics and Astronomy Department.

Research Group Highlights

Space Weather

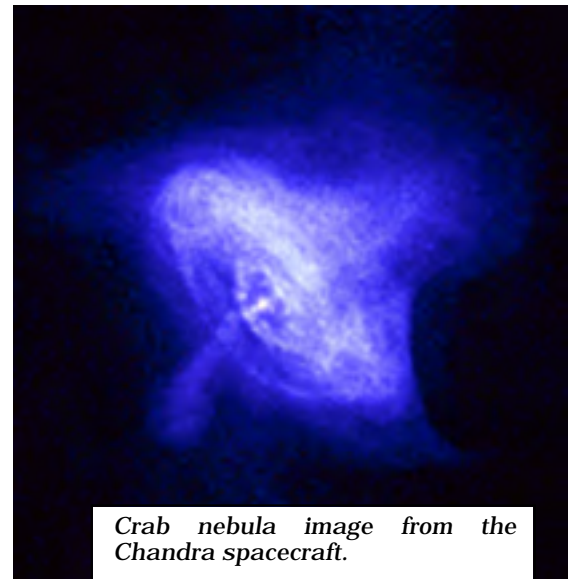
The Space Weather group comprises research in Magnetospheric Physics and Solar Wind-Magnetosphere-Ionosphere coupling. Led by group leaders Anthony Chan (theory) and John Freeman (observations), the Space Weather group at Rice is arguably one of the leaders in the world in theory and modeling of the space environment. Their codes are used by the Air Force for real-time understanding of space weather. With the launch of the IMAGE spacecraft (whose P.I. James Burch is a Rice alumnus), Rice comes to the forefront in global space environment imaging as well.



First image of a proton aurora, from the IMAGE spacecraft

Space Astronomy and Astrophysics

The Astronomy/Astrophysics group comprises theoretical and observational research in both high-energy astrophysics and stellar and planetary "origins". The RSI is pleased to have as a member Chandra Fellow Markus Boettcher, who studies the X-ray universe using that spacecraft. Organized by group leaders Edison Liang (Astrophysics) and Ian Smith (Astronomy), this group has heavy participation outside of the Physics and Astronomy Department, as well as input from several Adjunct Professors. Of particular note is the spectroscopy and binary star research of Richard Gomer of the Biochemistry Department (<http://www.bioc.rice.edu/~richard/rhg.html/Xstar.htm>)



Crab nebula image from the Chandra spacecraft.

Space Exploration

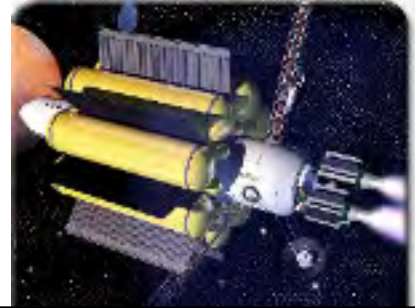
The exploration group focuses on research in both the manned and unmanned exploration of the solar system. Organized by group leaders Adrian Lenardic (unmanned) and Keith Berrier (manned), this group also has attracted much participation from around the campus. Paul Cloutier's Mars magnetic field observations and the Mars surface work in the Geology and Geophysics Department are highlights. Former Rice faculty member and present astronaut Jeff Wisoff gave a fascinating talk about the construction of the International Space Station at the November 2000 RSI meeting.



Astronauts Jeff Wisoff and Michael Lopez-Alegria perform a critical test of the SAFER backpack in the final of four STS-92 space walks.

Space Technology

The technology group focuses on research in space instrumentation and aerospace technology. Organized by group leaders Carter Kittrell (instrumentation) and Pol Spanos (technology), this group is interested in fluid flows and space technology. The plasma tank instrumentation work and the plasma propulsion research of Adjunct Professor Franklin Chang-Diaz's are highlights. The VASIMR system could cut short the travel time to Mars by months, making a manned trip much safer and less expensive.



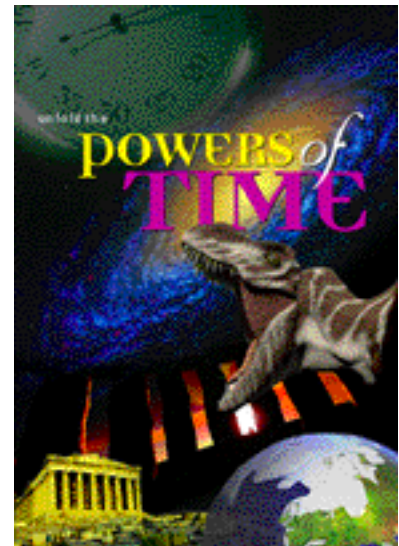
Graduate student Tim Glover works with Astronaut Franklin Chang-Diaz on the VASIMR propulsion system.

Space History and Public Policy

The history group (headed by Albert Van Helden) focuses on the history of Astronomy and Astronomers (particularly Galileo). In the philosophy area, co-leader Sherrilyn Rousch's research focuses on the anthropic principle and its application to cosmology. Her talk to "Scientia" last year was a highlight. This group is also planning an international high-level Space Summit for the World Space Congress in Houston in 2002. This summit, which will invite the heads of the space organizations of the spacefaring nations, will be held in the Baker Institute. A celebration of the 40th anniversary of the Kennedy "To the Moon" speech is being planned for the Rice Stadium.

Space Education and Public Outreach

The education and public outreach group builds on significant strength in public outreach. Education co-leader Lissa Heckelman is working with our new "Masters of Science Teaching" degree, to enable prospective teachers to earn their teaching certificate while improving their knowledge base of basic science. The public outreach group, headed by co-leader Carolyn Sumners, brings Earth and Space Science education to the public via museum exhibits and planetarium shows. Over a million visitors have interacted with Rice-designed exhibits at many museums around the world, and roughly the same number via our web-based outreach pages. One segment of the "Powers of Time" planetarium show, featuring the "birth of the moon", was seen by approximately 20 million people over the Discovery Channel. Over 30,000 people saw the "Powers of Time" show at the Houston Museum of Natural Science and our partner theater at Carnegie Museum of Natural History.



Poster for the "Powers of Time" planetarium show, sponsored by the Rice Space Institute.

Space Remote Sensing

The remote sensing group is the newest of the Rice Space Institute groups. With new faculty members Erzsebet Merenyi and Gary Morris, and Arthur Few returning this year from sabbatical, this group will elect its chair(s) this January. One particular highlight is the planning for a "Earth Imaging Center" on campus, with a public outreach display at the Houston Museum of Natural Science.

RSI Council

The RSI council sets policy and makes decisions for major thrusts. Group leaders are automatically members of the Council. New group leaders will be elected in early 2001. The members of the RSI Council, which reflect the diversity of the RSI membership, are:

William Gordon, Emeritus Faculty, NAS/NAE
Anthony Elam, CITI Executive Director
Keith Berrier, Computational and Applied Mathematics
Anthony Chan, Physics and Astronomy
John Freeman, Physics and Astronomy (Emeritus)
Lissa Heckelman, Education
Carter Kittrell, Chemistry
Edison Liang, Physics and Astronomy
Sherrilyn Rousch, Philosophy
Pol Spanos, Mechanical Engineering
Carolyn Sumners, Houston Museum of Natural Science
Ian Smith, Physics and Astronomy
Albert Van Helden, History

Future Thrusts

Corporate Members

Now that the goals and mission are well defined, and a core of Rice competency identified, we will reach out to the community to acquire corporate members, who can help sponsor programs and support scholarships.

We are already working closely with the American Institute of Aeronautics and Astronautics on the planning for the World Space Congress, and we are certain that the planning for this huge event (15,000 expected) will bring even closer ties to the aerospace community in "Space City".

We are pleased to announce our first Corporate Member, Lockheed Martin/CSOC. They are providing, without charge, 15% of the time of the Chief Scientist of their Science Advisory Office, Dr. David Talent, to work with our scientists on both research and in designing and building the oncampus observatory. This in-kind gift of Talent's talents amounts to approximately **\$15,000** per year.



World Space Summit

In conjunction with the World Space Congress, we are working closely with the Baker Institute for Public Policy to plan and host a policy meeting of the highest ranking space administrators of all the spacefaring nations. We expect that the space policy set here at the Rice Summit will be quoted internationally for decades to come.

In addition to hosting a celebration of the Kennedy "To the Moon" speech, we will be asking President Bush to provide a keynote address of similar breadth, power, and impact, which will guide the civilian space program in peaceful cooperation for the coming century.

As part of the World Space Congress we hope to bring talented K-

12 and undergraduate students to the campus for special programs, tours, and talks. This will conveniently fall on Fall Break, to minimize problems with finding classrooms.

Research Programs

Identifying strengths

This first year, the focus was on identifying areas of strength in space research across the campus, in developing strategic ties among Rice faculty, staff, and students, and in learning the basics. Each group presented the program for one of the monthly meetings. Both the basic science and the opportunities for additional joint research were highlighted.

Seed Money program

The Council decided to spend a significant fraction of the total RSI budget on fostering new research programs. We announced a competition, specifying that programs which spanned more than one department would have priority. Priority was also given to programs which could compete for external funds from outside agencies.

The following three projects were selected for the first round of RSI seed funding:

P. Koucek, CAAM: "Numerical Solution of Homogenized Vlasov Equations Applied to the Magnetospheric Reconnection Problem." Granted \$1000 of RSI seed money, matched by \$1000 of CAAM money and \$1000 of CITI money. If successful, can lead to a major research thrust.

F. C. Michel and B. A. Hausman: "Space Weather Timing Project": Granted \$1000 of seed money. If successful, can be used to better predict the arrival of major space storms.

A. A. Chan: "Support of ISEC 2001"; Granted \$1000 to help organize and run a conference on relativistic electrons, to be held in New Zealand. Additional support is expected from the National Science Foundation.

Each of the projects is expected to present a report on the results of the research and any external funding which was developed as a result of this seed money. The RSI is now listed on the web pages for the ISEC meeting, and we expect that this conference will help the RSI's international visibility

University Seed Money program

We are pleased that the administration has taken the oft-voiced suggestion of the Research Council to make similar seed money resources available to researchers. With such support, the need for additional dollar seed money in the future from RSI should be reduced, but we still expect to spend at least \$5000 - \$8000 per year in direct support for research.

Educational Programs

First of all, the RSI has helped teach the Rice community about space. From RSI members:

"As a staff member of Rice who is not working in the space field, I appreciate the opportunities RSI creates for me to stay connected to space research and studies on campus. It gives me a sense of belonging to the commitment in space explorations. It also gives me a chance to meet people in this field whom I may not get a chance to meet otherwise or hear them speak. I find the meetings educational and inspiring."

"Thank you for all you do for the Rice community. I wouldn't appreciate solar or lunar eclipses, missions to Mars, Buckeyballs and tubes, or the universe half as much without your generous enthusiasm in sharing your expertise with the rest of us."

Colloquium Series

In order to bring all the members of the RSI "up to date" on present research, we organized a colloquium series. Below are the meetings of the RSI and their topics presented:

Name of Speaker/Session Chair	Title of Talk	Date of Talk/Meeting
Patricia H. Reiff, Chair	1 st Organizational Meeting	November 30, 1999
Patricia H. Reiff, Chair	2 nd Organizational Meeting	February 21, 2000
Patricia H. Reiff, Chair	IMAGE update, RSI Meeting	May 8, 2000
Anthony Chan, John Freeman, Edison Liang	Space Weather, Space Astrophysics, Space Exploration	June 12, 2000
Carolyn Sumners, Carter Kittrell	Space Education and Public Outreach, Space Technology, Eng. Technology	June 12, 2000
Patricia H. Reiff, Chair	RSI Meeting	July 24, 2000
Patricia H. Reiff, Chair	RSI Council Meeting	August 15, 2000
Anthony A. Chan, Richard A. Wolf, Frank R. Toffoletto	Space Weather Update	September 18, 2000
Richard E. Smalley	Uses of Buckytubes in Space	October 16, 2000
Jeff Wisoff	The 100 th Shuttle Flight: A Perspective on Building a Space Station	November 20, 2000
Reginald J. Dufour	The Oncampus Observatory	December 11, 2000
Richard Gomer	Accretion Disk Physics Using Keck High-speed Spectroscopy and Simultaneous X-ray Observations	December 11, 2000
Patricia H. Reiff, Chair	RSI Council Meeting	December 7, 2000

Oncampus Observatory

We provided the principal means of the alumni donations to the Oncampus Observatory. The account, now managed through the Physics and Astronomy Department, raised \$11,000 towards that important educational facility. In 2001, we will be using both Marlar Foundation resources and RSI resources towards purchasing and installing the telescopes and computers in that facility. We are continuing to contact our alumni and friends for additional resources for the observatory, its computers, and perhaps a wheelchair lift for disabled students.

Texas Space Grant Consortium

The RSI is the point of contact for the Texas Space Grant consortium, providing scholarships to students interested in space (<http://www.tsgc.utexas.edu>).



Masters of Science Teaching

The RSI is the point of contact for inservice and preservice teachers who seek a Masters of Science Teaching degree. We are also one point of contact with Houston Independent School District's HOU-LINC program, which promotes science and math improvements in local teachers. We have taught over 25 teachers in credit courses (partially funded by USRA - the Universities Space Research Association), and over 250 teachers in workshops.

Public Outreach

Museum Collaborations

Most of the interaction of the Rice University's space research efforts with the public is through the "Public Connection" program. Started in 1994 with funding from NASA's Digital Library program, it is now being funded by the Office of Earth Science and the IMAGE program. The program has three major outreach venues: interactive realtime museum displays, immersive digital planetarium productions, and interactive problem-solving group experiences.

We have developed two major pieces of realtime display software: "Space Update", which comprises Astronomy, Solar System, Space Weather, and Sky Tonight modules, and "Earth Update" which comprises Atmosphere, Biosphere, Cryosphere, Geosphere, and Hydrosphere modules. Each can be updated by the user with a single click. Over 4000 copies of the "Space Update" CD have been distributed to teachers and museums; over 2800 copies of the "Earth Update" CD, and over 10,000 copies of the "IMAGE" outreach CD (which includes the "Space Weather" portion of "Space Update" plus other material on the IMAGE program) have been distributed. Over 200,000 visitors have interacted with our software on display at 8 major museums in 2000, and users have downloaded over 195 gigabytes of data and images from our servers using this system.



Our digital theater productions create wide-screen (full dome or ultra [210° wide] panorama) video which are displayed on planetarium domes and other wide-screen theaters. Our main partners are the Houston Museum of Natural Science and the Carnegie Museum of Natural History, but other planetariums have used clips we have created. Our show for 2000 was "Powers of Time", demonstrating the fundamental cycles of Earth. Over 160,000 customers saw our shows at the Houston Museum of Natural Science and another 25,000 at Carnegie



"Powers of Time" at the Earth theater at the Carnegie Museum of Natural History

Museum of Natural History. One clip "The Birth of the Moon" was picked up by the Discovery Channel and is estimated to have been seen by 20 million people.

Our show for 2001 is "Force 5", which will highlight the fiercest forces on Earth (tornadoes, hurricanes, volcanoes, and space storms). It opened December 2000 at Carnegie Museum of Natural History and will open in May 2001 at the Houston Museum of Natural Science.

Living **THIS JUST IN** Friday, Dec. 22, 2000

Carnegie show offers wild ride through nature

Not too many people in southwestern Pennsylvania have lived through one of nature's temper tantrums. Save for the tornado that tore through Mt. Washington on June 2, 1966, and some nasty rain squalls, natural disasters of the most dramatic variety are reserved for movie screens in this region.

A trip to the Carnegie Museum of Natural History will help locals find out what they're missing. Starting Saturday, the show "Force Five" will be running in the museum's Earth Theater.

"Force Five" is a documentary that, thanks to the theater's 70-foot-wide, 210-degree screen, takes viewers inside the heart of the twister that demolished Oklahoma City in 1996, the hurricane that leveled Galveston, Texas, in 1900 and the base of Mount St. Helens as it erupted in 1980.

The show begins by detailing the creation of a hurricane over the ocean, and soon heads back to turn-of-the-century Galveston. The hurricane that struck the once-powerful port on the Gulf of Mexico is digitally re-enacted (complete with the bass-frequency booming surround sound), thanks to Sybilmedia in Houston, Texas, and a group of storm scholars from Rice University, the University of California, San Diego and others.

Then comes the Oklahoma City tornado, which moves so close to the camera that all you can see is the swirling wind from the inside of the tube. The next shot is the splintered wood and twisted metal that littered the southern end of the city.

And so on. The show even details



The 1980 eruption of Mount St. Helens plays a role in "Force Five" at the Carnegie Museum of Natural History.

\$100,000 for "Force Five" as opposed to several-million-dollar Omnimax productions.

"Imax will go by the wayside," she says.

"Force Five" shows Tuesdays through Sundays at the Carnegie Museum of Natural History, 4400 Forbes Ave., Oakland. The cost is \$2 in addition to museum admission.

— Derek Fuchs

products, and they'll even deliver them right to your door.

So, what's the catch? You have to try them out and report back online with your review. If you don't, they'll scratch you from their mailing list. OK, so it's not totally free.

The site uses your reviews to rank the top 10 products in a category and then make them available to consumers. To sign up, visit

pages. Have them cut thin triangles that are as tall as the page. The width of the base will be the length of the bead, says Whitney Ferris, owner of the Creative Fitness Center in Nashville, Tenn.

Beginning with the base, wrap the triangle around a toothpick, then glue the tip. Slide the toothpick out, and you've got a bead ready for stringing.

Sit older children down with a pen

Public Presentations

The RSI has been very active in bringing space science to teachers and the public via many public presentations, some via the "Public Connection" and some in regards to the IMAGE spacecraft program. This year, in conjunction with the COSPAR meeting in Warsaw, we even appeared on Polish Television. We participate in many teacher meetings, both national (NSTA, AAPT) and local, for the MATS meeting, and serving as a representative on the HOU-LINC University Coalition. The RSI administrator, Umbe Cantú, organized the meeting of the Texas chapter of the APS meeting here on campus in October, and a number of teachers and students from around the state participated. Ms. Cantú also organizes the "GEM" conference, held in Snowmass, CO, each year.

Reiff, P. H. and C. Sumners, "Exploring Science via the Internet", AAPT meeting, Orlando, FL, January 17, 2000.

Reiff, P. H., Chief Organizer, Earth Science Information Partners Meeting, Houston Museum of Natural Science, January 19-21, 2000.

Reiff, P. H., "Careers in Science", Girl Scout Troop 2027 meeting, Houston, February 23, 2000.

Reiff, P. H., "Three Heavens - Our Home", University of Houston, Religious Emphasis Week lecture, Houston, February 8, 2000.

Reiff, P. H., "IMAGE - seeing the invisible", live TV/webcast performance, Vandenberg Air Force Base, March 25, 2000 (http://quest.arc.nasa.gov/lrc/poetry_image/).

Reiff, P. H., "The Space Program", lecture as part of "Ten Events which shaped the Century", Continuing Studies Series, Houston, April 5, 2000.

Reiff, P. H. and C. Sumners, "Space Science over the internet", NSTA meeting, Orlando, April, 2000.

Reiff, P. H., "Astronomy", lecture to Alumni, Houston, April 18, 2000.

Reiff, P. H., "IMAGE", lecture to Northwest Amateur Radio Society, Houston, April 21, 2000.

Reiff, P. H., "IMAGE", AGU press conference, AGU meeting, Washington, May 31, 2000.

Goldstein, J., M. Hudson, E. Miftakhova, J. D. Menietti, D. L. Gallagher, and P. H. Reiff, V. "Latitudinal Density Dependence along Magnetic Field Lines", AGU meeting, Washington, May 31, 2000.

Reiff, P. H., "Teaching Space Science", GIFT (Geophysical Information for Teachers) session, AGU meeting, Washington, June 1, 2000.

Reiff, P. H., "IMAGE - seeing the invisible", invited review, GEM meeting, Snowmass, CO, June 20, 2000.

Reiff, P. H. and C. Sumners, "Immersive Theatre", International Planetarium Society, Canada, July 9, 2000.

Reiff, P. H., "Earth Update", ESIP meeting, UNH, Durham, NH., July 12, 2000.

Reiff, P. H., "IMAGE" - interview with Wiktor Niedzicki on "Telewizja Polska" (Polish television), Warsaw, July, 2000.

Reiff, P. H., "IMAGE - seeing the invisible", colloquium, University of Texas at Dallas, Dallas, October 5, 2000.

Reiff, P. H., "Career Challenge", ASTC meeting, Cleveland, OH, October 15, 2000.

Reiff, P. H., "Physics Demonstrations", Girl Scout careers day, Rice University, Houston, October 21, 2000.

Reiff, P. H., Tamara Ledley and Carolyn Sumners, "Earth Update / Space Update - a Digital Library for the rest of us", AGU meeting, San Francisco, December 2000.

Carolyn Sumners and P. H. Reiff, "Globe theatre - Digital immersive Earth and Space Productions", AGU meeting, San Francisco, December 2000.

Taylor, W. W. L., Taylor, S. Odenwald, P. H. Reiff, S. Higley, T. Smith, B. Pine, and A. DiMarco, "The IMAGE Education and Public Outreach Program: Bringing POETRY to the K-12 community", AGU meeting, San Francisco, December 2000.

Resources

Financial

With only a \$15,000 budget from the University, we have created a dynamic Institute with over 100 members from 19 departments and 6 offices. We have put \$3000 into directly fostering new research thrusts, with more to be selected for the spring competition. We hope that our \$15,000 expense budget would be maintained or grow slightly.

We have doubled the Rice University contribution by the \$15,000 annual award of the "Marlar Foundation". This award goes to improving space research. We are using it this year for our annual Marlar speaker (which for 2000-2001 will be James L. Burch), our annual

"Marlar Award" to the best graduate student, and for hardware to be put into the Oncampus Observatory which will be built this coming year.

We are delighted to announce a \$15,000 in-kind donation of time from Lockheed Martin Corporation, in the form of 15% time of Dr. David Talent. In summary, we have tripled the Rice contribution to \$45,000, and hope for future growth as well.

Special request: We would like to purchase a wheelchair lift for the new on-campus observatory, to allow handicapped students the ability to view through the eyepiece (as well as to lift heavy equipment up to the observing platform). Estimated cost: \$20,000-\$25,000. We are asking Rice for \$15,000 and will attempt to raise the remainder from outside sources.

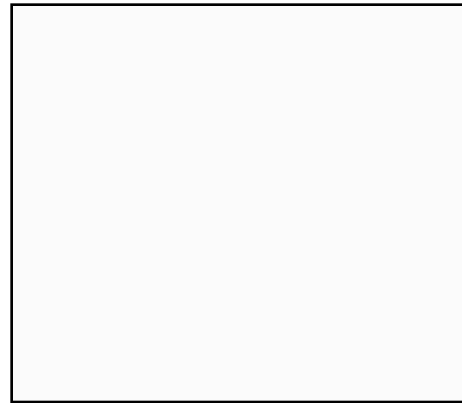
Personnel

Having all of our outreach and telescope grants be administered through the Physics and Astronomy Department makes us much less efficient than we would like. Our preference would be to move all RSI-related grants (including public outreach and the telescope) to the RSI org, and have Umbe Cantu manage these grants here. We purchase many items every day and having the staff to oversee payments, etc, across campus is inefficient. Our preference is for Ms. Cantu to be designated totally to the RSI and not to the Physics and Astronomy Department. She would still help them for special events, but would give most of her attention to RSI affairs.

Appendix 1:

Rice Space Institute members

(as of 1/1/01)



Last Name	First Name	Department /S = staff /G = grad student A/ = alumnus	Group GL = group leader	Research Interest
Ahn	Henry	Jones MGT		
Bearden	Chuck	Fondren/S		
Behr	Marek	MECH	Technology	
Berrier	Keith	CAAM/G	GL: Explorat-M	
Boettcher	Markus	P&A	Astro	
Carroll	Michael	CAAM	Technology	Engineering
Cates	Susan	Bioc	Bioscience	
Chan	Anthony	P&A	Space Weather	Plasma Theory, Space Physics
Chapman	Walter	CENG	Technology	
Chen	Yue	P&A/G	Astro	
Cloutier	Paul	P&A	Exploration-U	Venus/Mars
Collis	Scott	MECH	Technology	Mech E, CFD
Corcoran	Marjorie	P&A	Astro	Particle Physics/Cosmology
Daughterty	Jackie	Chem		
Dessler	Alex	Emeritus-SPAC	Space Weather	Jupiter
Dufour	Reggie	P&A	Astro	Observational Astrophysics
Dunning	Barry	P&A		Atomic collisions
Dye	Michael	ECE		
Earles	Christopher	Math/G		
Elam	Tony	CITI	Remote Sensing	
Eliot	John	Kinesiology	Bioscience	bone loss in zero g
Freeman	John	P&A	GL:Space Weather	Space Weather, Modeling, (EPO)
Friesen	Larry	A/JSC	Exporation	
Fullaway	Daniel	UG	AA; SE	
Garner	Trevor	P&A	Space Weather	Space Physics Modeling
Glover	Tim	P&A/G	Technology	Applied Physics, Plasma Rocket
Goldstein	Jerry	P&A/S		
Gomer	Richard	Bioc	Astro	Cataclysmic Variables
Gong	Bin	P&A		
Gordon	William	Emeritus-SPAC	Space Weather	Space Weather, Comm. & Electric Power

Hausman	Bonnie	P&A/S	Space Weather	Magnetospheric modeling
Heap	Aaron	Math/G		
Heckelman	Lissa	Educ	EPO	Teacher education
Henize	Vance	P&A/G	Space Weather	Magnetosphere Observations/Modeling
Heymann	Dieter	Emeritus: G&G	Exploration-U	Chemistry in Interstellar material/Meteorites
Huegerich	Tim	UG	Space Weather	IMAGE
Huston	Priscilla	Provost's ofc	EPO	Education
Jeffries	Paul	P&A/CSST	History&Phil	foundations of physics, quantum non- locality, philosophy of science
Jones	Bryan	ECE/G	Technology	
Keilty	Kathryn	P&A/G	Astro	High Energy Observations/Lasers
Khabashesk	Valery	Chem/S		
Kittrell	Carter	Chem	GL: Instrumentation	Plasma rocket spectroscopy
Kloucek	Petr	CAAM	Space Weather	Computational Space Weather
Koller	Josef	P&A/G		
Kordzik	Kelly	Atty		Rice attorney
Lassiter	William	F&E/S		exploration, astronomy
Latner	Alexis	Fondren/S	EPO	writes articles on space research
Lemon	Colby	P&A/G	Space Weather	Computational Space Physics Plasma
Lenardic	Adrian	G&G	GL: Explor-U	Planetary Physics, Io, Europa
Lestrade	Patrick	A/MsSU	Astro	
Levy	Eugene	Provost	Astro	
Li	Yining	P&A/G		
Liang	Edison	P&A	GL:Astro	Astrophysics, High Energy Laser/Plasma
Liebschner	Michael	BIOENG	Bioscience	
Lin	Dechun	P&A/G	Astro	Blackholes
Lindsay	Bernard	P&A	Space Weather	Atomic Collisions
Linscott	Stephen	IS/S	Exploration, Astron, EPO	
Mack	Dinah	UG		
Martinez	Ipek	Budget Ofc		
McIntire	Larry	BIOENG	Bioscience	Bioscience
Meade	Andrew	MECH	Technology	
Mendell	Wendell	A/JSC	Exploration	
Menin	Jean-Louis	Provost's/S		
Merenyi	Erzsebet	ECE	Remote Sensing	
Meszlenyi	Roy	BIOENG	Bioscience	
Michel	Curt	P&A	Astro	Pulsars
Morris	Gary	P&A	Remote Sensing	
Naehr	Stephen	P&A	Space Weather	
Narbona	Jose	Hispanic&CS		
Nichols	Karen	P&A/S	EPO	Graphics for Educational Public Outreach
Oliver	Robert	HIST	Hist/EPO	History, Biology, Exploration
Ozturk	Kaan	P&A		
Padley	Paul	P&A	Astro	Particle Origins of Mass (Engineers)

Papanyan	Valer	ECE		
Prabhu	R.D.			
Reiff	Patricia	P&A	Director	Aurorae, Magnetosphere, Modeling
Reynolds	Dan	CAAM		
Roberts	Margie	Economics		
Roush	Sherrilyn	Philosophy	GL:History	Reasoning
Sass	Ronald	EEB		
Sawyer	Dale	G&G	Exploration-U	Mars
Sazykin	Stan	P&A/S	Space Weather	
Smalley	Rick	CHEM		
Smith	Ian	P&A	Astro	Astrophysics, (EPO)
Smith	Gwen	P&A/G		
Smith	Wayne	P&A/S		
Spanos	Pol	MECH	Technology	Aeronautical Eng'r: Civ E, Mech E
Spiro	Robert	P&A/S	Space Weather	Physics of Magnetospheres
Stebbins	Ronald	Emeritus:SPAC		Lab, Aeronomy
Stoll	Richard	PoliSci	Public Policy	
Streutker	David	P&A/G	Space Weather	Remote Sensing, (EPO)
Sumners	Carolyn	P&A	GL: EPO	HMNS 3D Data and (EPO)
Talent	David	A: P&A	Astro	
Tannian	Bridget	ECE		
Toffoletto	Frank	P&A	Space Weather	Modeling, Space Weather
Unrau	Lia	News	EPO	Rice news
Van Helden	Albert	Hist	GL: History	17th Century Telescopes, (EPO)
Vo	Trinh	CENG/G		
Wang	Jigang	P&A/G		
Wightman	Jennifer	CAAM/G	Space Weather	
Williams	Tom	Hist	History	History of Astronomy
Wolf	Richard	P&A	Space Weather	Magnetospheric Modeling, Space Weather
Yee	Weiqing	MECH		
Yepes	Pablo	P&A		