LUNAR AND PLANETARY INSTITUTE

Annual Report
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USRA

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Respectfully submitted,

[Signature]
Stephen Mackwell, Director
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I. Executive Summary

Throughout its history, the Lunar and Planetary Institute (referred to as “LPI” or “the Institute” throughout) has made significant contributions to the understanding of a broad spectrum of lunar and planetary science. Beyond the Institute’s scientific contributions, the LPI-sponsored workshops and initiatives have provided focus and critical mass to scientific questions, resulting in landmark publications that continue to be important to the community many years after completion, including *Basaltic Volcanism on the Terrestrial Planets*, the *Proceedings of the Lunar Science Conference*, *New Views of the Moon* and most recently, *Oxygen in the Solar System*.

Over the last five years the Institute has continued the tradition of support to the planetary community and scientific excellence. Current leadership of the Institute has resulted in an LPI that strives to remain attuned to the needs of the community, more involved in NASA’s Science Mission Directorate (SMD), and extremely productive as a research organization.

We maintain a modest number of Staff Scientists who provide depth and breadth in our research programs, while contributing significantly to our service and education and public outreach activities. These individuals are highly productive scientists who are active in the service of NASA, the scientific community, and the public. They have had major success in attracting external support for their research activities and those of their postdoctoral fellows and/or students, while providing the perspective across the breadth of the planetary sciences needed for our service roles. Under support of the LPI-CAN and Staff Scientist R&A funds, we have been fortunate over the past five years to host a diverse group of postdoctoral fellows, visiting scientists, and graduate students, as well as Heritage and Urey Fellows. The enthusiasm, vigor, and experience of our short-term scientists have enabled a dynamic and productive research environment within the LPI and the JSC Astromaterials Directorate (also referred to as “ARES” throughout). With postdocs, visiting scientists, graduate students, and undergraduate interns working jointly on experimental and analytical investigations of extraterrestrial materials, the collaboration between the research groups at the LPI and ARES has strengthened significantly, invigorating both research programs. In parallel, having critical mass of researchers in particular fields has strengthened our activities across the spectrum of planetary sciences. As has been demonstrated over the last five years, funding postdoctoral fellows and students from external funds broadens research interests and fundamentally increases productivity.

We anticipate that the growth that we have seen in all our scientific endeavors will continue, as we move into the five-year option for the LPI-CAN. In order to guarantee that growth, we have new incentives for our Staff Scientists to bring in greater shares of their salaries, with the target of bringing in more than 50% of their salaries in grants. As NASA’s direction has evolved, with a renewed focus on the Moon, we have directed more resources into lunar science, and the support of lunar planning activities. We have actively sought to hire scientists with a lunar focus who can utilize the significant resources of the LPI lunar image and document collections and tap into the expertise that exists at LPI and JSC. With the importance of lunar resources in the strategy for lunar exploration, we see a role for the LPI as a facilitator of the synergy between basic and applied sciences that is needed to advance NASA’s lunar exploration goals.

LPI scientists contribute greatly in the service of NASA and the planetary science community. They have significant roles in NASA funding panels, analysis groups, management and operations groups, and mission and instrument teams, contributing at levels greater than is normal for the general planetary community. They are also highly active in planning and organizing workshops and meetings, including those related to the LPI Topical Initiatives, supporting the community in editorial roles, and participating on National Academy committees. With the current focus on lunar exploration, LPI scientists provide input and advice on posting of archived materials and images from our extensive RPIF collections to our website, making them available to NASA mission planners and engineers, planetary scientists, amateur astronomers and planetary buffs, and students of all ages throughout the world.
As the scientific community grows and evolves, our role in meeting planning and facilitation continues to expand. The Lunar and Planetary Science Conference (LPSC) remains the premier meeting of its kind in the world, with broad international participation and student attendance greater than 30%. The community-feel of the meeting and the structure and activities that favor engagement of young people and provide a means for easy interaction between sage and student reflects well on the LPI meeting organization team, which is made up of LPI staff and scientists. We support a diverse array of other meetings, workshops and activities in support of the scientific community, NASA planning groups, mission planning and analysis teams, and education groups. Over the past years, we have seen an increase in the number and diversity of meetings, with greater numbers of mission-related activities and workshops in support of NASA’s renewed focus on the Moon and the architecture needed to explore it.

The scientists at LPI also participate actively in all our education and public outreach activities, providing current scientific knowledge and perspectives for the education materials that we develop and utilize in our local and national programs. They bring content and experience to our in- and pre-service activities, communicating the excitement of active research directly to the teachers. As mentors to undergraduate interns and graduate students, they inspire and motivate the next generation to stay the course in science, and become part of the science community of the future.

Over the past five years, the LPI has evolved significantly in its roles. This evolution, which is detailed in the following pages, places the LPI in a key role for the advancement of NASA planetary science. The integration of science, service, and education in a single institute allows a diversity of programs that builds on the complementary skills of our staff and would not be possible in other settings. The LPI is a coherent grouping of talents all focused on serving the needs of planetary science, NASA, and society.
II. Technical Volume

Introduction

The Lunar and Planetary Institute was first described by President Lyndon B. Johnson in 1968 as a center of research where scientists working in the sciences of space cooperate to profoundly affect the community’s knowledge of the universe. To manage the Institute the National Academy of Sciences established the Universities Space Research Association (USRA) in 1969. Since its inception, USRA has evolved from an association of 49 universities to a complex network of scientific institutes and programs that draws upon the diverse talents of 100 member institutions, through an active and engaged connection, to offer scientific research and management expertise and act as a conduit for technological innovation and educational opportunities in a diverse array of scientific areas of study.

USRA is headquartered in Columbia, Maryland, and employs more than 350 scientists, engineers, and staff to deliver upon an annual business base of $80 million.

USRA is pleased to submit this final report of programs and activities supported under the Lunar and Planetary Institute CAN.

Institute Objectives

Over the last 37 years of interactions with NASA, the complexion of the Institute has changed and evolved as the Agency has altered course and shifted strategic focus. However, amid the dynamic environment in which the Institute operates, the underlying mission and key objectives of scientific excellence and service to NASA and the community have not changed.

The Institute’s objectives as laid out in the statement of work for Cooperative Agreement 02-OSS-01 (CAN) are:

1. Provide an academic and scholarly atmosphere that attracts scientists and serves as a focal point for lunar and planetary science activities, with special emphasis placed on providing expertise in astromaterials, and provide a forum to encourage participation of eminent scientists from the United States and other countries in solar system exploration programs;

2. Conduct and enable directed research studies on the formation, evolution, and current state of the Moon, planets, comets, asteroids, satellites of the planets, cosmic dust, and our solar system as a whole;

3. Coordinate and sponsor scientific forums on lunar and planetary topics;

4. Disseminate scientific information in the solar system sciences to the general public through various scientific educational and technical journals, conferences, and by other appropriate mechanisms;

5. Strengthen cooperation between NASA and universities;

6. Conduct and support education and outreach that enhances the public appreciation of lunar and planetary science; and

7. Promote university access to extraterrestrial samples curated by NASA.
Approach to the Report

The specific programs and initiatives currently undertaken at the LPI will be presented as four interconnected pieces and be cast in the context of how they support the Institute’s objectives delineated above. Care will be taken to clearly call out changes that have been made in the last five years of operation, with a discussion of what has been successful and where the potential for improvement has been identified.

- **Science** – This segment includes all programs associated with research activities, including staff scientists, visiting scientists, students, the Heritage Scholars Program, Urey Fellows, and the postdoctoral program, and will highlight the changes and incentives that have been implemented to further improve the breadth and quality of research pursued at the Institute.

- **Education and Public Outreach** – This segment includes all education efforts, including those funded by outside agencies, which are leveraging the efforts called for in the cooperative agreement, as well as the LPI/NASA Intern Program and other teacher training efforts.

- **Services to NASA and the Planetary Community** – This is the largest of the four segments and encompasses all meetings, the Regional Planetary Image Facility (RPIF), topical science initiatives, scientific mission support; the library, logistical and scientific support of analysis groups, CAPTEM (Curation and Analysis Planning Team for Extraterrestrial Materials), and LPI’s publication efforts.

- **Management** – This segment includes personnel directing the operations of the Institute at the interface between the Johnson Space Center (JSC) and the LPI, as well as the role of the external science council, which provides input into the operation of the Institute from the perspective of the planetary science community.

Finally, you will notice that research science achievements that have been realized by the Institute are not specifically documented within the formal text of the report. To convey a sense of the quality and quantity of research, a complete overview of publications, abstracts, and invited lectures are available in the accompanying appendices.
A. SCIENCE

Staff scientists, postdoctoral fellows, and visiting scientists pursue innovative research, support NASA programs, provide a connection to the university scientific community, and contribute the vital science focus to every program undertaken at the Institute.

The Role of the LPI Staff Scientists

Within the Lunar and Planetary Institute there is a small core of Staff Scientists, whose fields of research represent much of the breadth of the planetary science community. While most of the scientists who work at the Institute reside there for periods from several days up to three years, the Staff Scientists remain for longer periods, bringing stability to the LPI science program and acting as access points into unique subsections of the planetary community. While they are expected to perform cutting-edge, world-class science, produce quality publications, and present research at national and international conferences and workshops, the Staff Scientists are tasked with additional service roles that occupy approximately 50% of their time; they are required to provide at least 25% of their salaries from external grants, but can increase the percentage of time devoted to research by bringing in additional funds. These scientists are a critical part of the role of the Institute in the service of NASA, the scientific community, and the broader community at large. Scientists who have neither the interest nor aptitude for such service are not encouraged to remain at the Institute.

All activities, programs, and projects undertaken by the Institute require some level of scientific knowledge and expertise. Although the Institute can tap into the resources of the external community for support, easy access to Staff Scientists due to their proximity and their extensive experience with our service programs contribute efficiencies that enable the Institute to provide quality service and expedience at a significantly reduced cost to our constituency.

The LPI has a fundamental role in providing logistical support and planning for numerous planetary science meetings, including the Lunar and Planetary Science Conference (LPSC), as well as scientific and mission-planning workshops, analysis group meetings, and topical science initiatives. Assistance from the Staff Scientists in planning, organizing, and participating in such meetings is a major contributor to the success of our team, as reflected in the numerous requests for our support of future meetings.

In our Education and Public Outreach activities, Staff Scientists participate actively in all our programs, providing the expertise and currency needed to maintain a vibrant and captivating program of activities for educators and children alike. Scientists provide critical support for our RPIF, bringing expertise and knowledge of time-critical activities in support of the program. The Institute also plays a vital role in the professional development of the next generation of planetary scientists. Staff Scientists take a critical role...
in this development, serving as advisors and mentors for the Postdoctoral Fellows and students, as well as supporting the activities of the Visiting Scientists and Heritage Fellows. And, of course, the Staff Scientists play a key role in managing and supporting the highly reputed LPI/NASA Summer Intern Program, which has remained a resounding success since its inception nearly 30 years ago, and has resulted in numerous “converts” to planetary sciences, many of whom have remained in the field and are now senior scientists and NASA managers.

Staff Scientists are also expected to contribute fundamentally to NASA program activities. Because they receive salary support under the LPI, scientists are rewarded for taking on significant roles on panel activities, as well as on analysis and working groups.

**Staff Scientist Research Foci**

- **Dr. Stephen Clifford** focuses on the nature and evolution of the martian hydrosphere. His recent work with Essam Heggy on interpretation of radar imaging of Mars analog sites on Earth provides important constraints on present and planned observations of Mars.
- **Dr. Walter Kiefer** uses both gravity modeling and numerical mantle convection simulations to constrain the internal structure and the tectonic, volcanic, and thermal evolution of Mars, Venus, and the Moon. His current work combines computer models with martian meteorite geochemistry to constrain temperatures in the martian mantle and the role of mantle water in the magmatic evolution of Mars.
- **Dr. Laurel Kirkland** works jointly with Department of Defense researchers on remote identification of mineralogy using infrared spectrometers, providing her with access to unique high-quality laboratory, field, and airborne instrumentation. The results of her recent work have fundamentally changed our interpretation of infrared spectra of Mars.
- **Dr. Patrick McGovern** performs geophysical analysis of volcanic and tectonic features and crustal structures of the terrestrial planets, with emphasis on the growth and evolution of large volcanic edifices subject to lithospheric flexure.
- **Dr. Julianne Moses** performs theoretical investigations of physical and chemical processes in planetary and satellite atmospheres, with particular emphasis on photochemical modeling, aerosol formation and dynamics, aeronomy, and atmosphere-surface interactions. She is currently conducting comparative studies of the thermal structure, chemistry, and climate of the upper atmospheres of Jupiter, Saturn, Uranus, Neptune, extrasolar giant planets, and brown dwarfs.
- **Dr. Paul Schenk** investigates the geologic evolution and history of icy satellites from geologic mapping and cratering studies. His recent research has focused on developing and applying tools for topographic mapping and visualization of jovian and saturnian satellites.
- **Dr. Paul Spudis** researches on the interpretation of remote sensing data from the Moon. He is currently serving as the Principal Investigator of the mini-RF radar imaging experiment on the Indian Chandrayaan-1 mission to the Moon and as a team member of the mini-RF experiment on the U.S. Lunar Reconnaissance Orbiter mission, both scheduled for launch in 2008.
- **Dr. Tomasz Stepinski** is currently developing and implementing machine learning methods to automate the process of geomorphic mapping of Mars and other planetary surfaces. His research has led to a new, precise global map of martian valley networks that show an order of magnitude more valleys in Noachian terrain than were previously manually mapped, pointing strongly to ubiquitous precipitation on early Mars.
- **Dr. Allan Treiman**’s work emphasizes volatile species in planets and asteroids, applying evidence from solid samples (meteorites and lunar rocks). Some of his most important recent work is on water-deposited carbonate minerals in the martian meteorite ALH84001, aqueous alteration (on Mars) of the nakhlite martian meteorites, and the origin of water-bearing high-temperature minerals in an ordinary chondrite (LAP 04840).

*Highlights the research activities of the Staff Scientists; their recent activities in support of the LPI’s Service and Education and Public Outreach activities can be found in the Appendices.*

The connection between the LPI and the Astromaterials Directorate at JSC has been a key part of the role of the LPI since the early days of its existence. Facilitating access to the extraterrestrial collections and associated scientific activities has enabled much of the quality sample science that has been performed with these materials. In addition, the LPI/NASA Summer Intern Program places undergraduate
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interns not only with scientists at LPI, but also at JSC. Over the past three decades there have been innumerable collaborations between JSC and LPI scientists. Consequently, it is important for the health of the sample science programs at JSC and LPI, as well as in the broader planetary community, to retain that connection through maintaining the longer-term collaborations that can only be provided by having Staff Scientists at the LPI focusing their research on planetary materials.

Activities Over the Last Five Years
Throughout its history, the Institute has made significant contributions to the understanding of planetary science in a variety of areas. Over the last five years the Institute has continued this tradition, supporting a broad range of topical high-profile research activities. Significant changes within NASA coupled with a dynamic leadership within the Institute have resulted in an LPI that is attuned to the needs of the community, involved in NASA’s Science Mission Directorate (SMD), and productive as a research institute.

The Institute currently participates in production of an average of 61 scientific publications annually. For a complete listing of all publications generated over the last five years see Appendix I. This is a significant growth in productivity over the preceding five-year period, with an average of 18 publications per year. This growth is a result of a renewed interest in publishing by our Staff Scientists and a significant increase in the number of scientists, students, and postdoctoral fellows participating in the activities of the Institute. In addition to increases in publications, the LPI has become more focused on pursuing additional funding sources to support the research at the Institute. Over the last five years resident scientists have made a significant effort to secure external funding, enabling every Staff Scientist to cover at least 25% of their salary. A complete list of all externally funded awards appears in Appendix III. NASA is the primary source for this additional funding, although a number of grants come from the National Science Foundation (NSF), as well as funding from the French Space Agency and the Australian Research Council. The funds released in this way are used to build a stronger and more dynamic research program, including support of the Urey and Heritage Fellows, as well as the postdoctoral fellows and visiting scientists. A complete description of these programs appears below.

In addition to freeing up funds to support a larger number of science programs, the greater focus on pursuing grant money has had a number of unforeseen benefits. A report that is well thought out and fundable requires a plan with clear objectives and milestones as well as a number of alternative scenarios that will be instituted if the research does not proceed as first expected. Participating in the grant-writing exercise has allowed the Institute’s scientific staff to be more focused in their work. Additionally, the funding process has required Staff Scientists to be more attuned to the planetary community.

Increased levels of funding among the Staff Scientists have also put them in a position to hire students and/or postdoctoral fellows to collaborate on their research. As a way to encourage scientists to continue to pursue funding opportunities the Institute has devised a number of incentive programs that not only help the Staff Scientists, but stimulate continued scientific growth and development of the Institute.

A specific example of these types of incentives is the Institute’s policy that allows scientists to pay for 50% of a student or fellow’s salary, while the Institute picks up the remaining costs. This effort complements the Resident Postdoctoral Fellow Program proposed in the 2002 CAN proposal. Fellows hired under the this program are covered 100% by the funds associated with the CAN and undertake research of their own design, while fellows working with Staff Scientists are brought to the Institute to spend 50% of their time working on research proposed by their mentors and 50% of their time working on their own research.

Over the last five years the LPI has hosted 17 young scientists as postdoctoral fellows. Six have undertaken research of their own design, while the eleven others have worked closely with a Staff Scientist, splitting their time between their own research and that of their mentor. Over this time it has become clear that fellows associated with a Staff Scientist are often better positioned to be successful. It takes a unique and very advanced young scientist to be able to come to the Institute directly from a Ph.D. program, develop a project, and successfully execute the work to yield publications and fundable
research proposals. From this experience, the Institute has made some changes to the **Resident Postdoctoral Fellow Program** in the last two years. With few exceptions, fellows that are currently brought into the Institute work with a Staff Scientist who can help focus their work, mentor the fellow in preparation of publications and proposal writing, and introduce them to the complexities of working within the NASA community. Postdoctoral fellows work in this capacity for up to three years. At the end of that time, exceptional fellows who have made progress in publishing and have been successful in obtaining research funding to cover half of their salary may remain at the Institute for two more years as visiting scientists. By all measures this program has been highly successful. Fellows have participated in 41 publications and have received outside funding over the past 5 years.

Exceptional postdoctoral fellows who undertake research of their own design may be supported under the **Urey Fellowship Program**. This prestigious program is aimed at the postdoctoral level and recognizes excellence in research for scientists within five years of completion of their Ph.D. Fellows are expected to perform much of their research at the LPI or within the Astromaterials Group at JSC, but may spend up to six months per year at other institutions. Fellows have significant latitude in defining their own research direction. Highly competitive levels of remuneration and support for research and travel are provided to successful candidates.

The LPI views these types of science training programs as a critical service to the planetary community. Of the 17 young scientists working as postdoctoral fellows, five have moved on to tenure-track faculty positions or equivalent, while three have moved directly to a NASA center. These programs, in addition to the LPI/NASA Summer Intern Program, build goodwill and a close connection at all levels to the planetary science and NASA communities.

The **Heritage Scholar Program** was first proposed in 2002 to bring venerable, distinguished researchers to the Institute to pass on their knowledge and historic perspective of the NASA astromaterials program and decisions that have shaped the current curation efforts. The Institute has hosted two scholars in the

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<th>WHERE ARE THEY NOW?</th>
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<tr>
<td>Young scientists supported by LPI over the last five years and their current title and place of employment.</td>
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<tr>
<td>Christopher Herd</td>
<td>Assistant Professor</td>
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<tr>
<td>Brad Thomson</td>
<td>NRC Postdoctoral Fellow</td>
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<tr>
<td>Molly McCanta</td>
<td>Visiting Assistant Professor</td>
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<tr>
<td>Joseph Hahn</td>
<td>Associate Professor</td>
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<tr>
<td>Lisa Danielson</td>
<td>NRC Postdoctoral Fellow</td>
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<tr>
<td>Donald Musselwhite</td>
<td>Adjunct Faculty</td>
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<tr>
<td>Thomas Greathouse</td>
<td>Postdoctoral Fellow</td>
</tr>
<tr>
<td>Sylvie Demouchy</td>
<td>Postdoctoral Fellow</td>
</tr>
<tr>
<td>Vinciane Debaille</td>
<td>Research Fellow</td>
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<tr>
<td>Daniel Nunes</td>
<td>Postdoctoral Fellow</td>
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<td>Justin Filiberto</td>
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<td>Qingsong Li</td>
<td>Postdoctoral Fellow</td>
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<td>Axel Whitman</td>
<td>Postdoctoral Fellow</td>
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<td>Michelle Kirchoff</td>
<td>Postdoctoral Fellow</td>
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<tr>
<td>Erik Urback</td>
<td>Postdoctoral Fellow</td>
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<tr>
<td>Suzanne Schenzer</td>
<td>Postdoctoral Fellow</td>
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<tr>
<td>Essam Heggy</td>
<td>Visiting Scientist</td>
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last five years. Dr. Ross Taylor came from Australia for a five-month stay in Houston in 2005. During his
time in the U.S., Dr. Taylor utilized Houston as a home base and traveled intermittently to give lectures at
five different universities, broadening the impact of the program to a national level. Dr. Taylor was a
strong addition to the LPI scientific staff, offering his insights and perspective to local scientists. During his
stay Dr. Taylor gave a widely attended seminar entitled “Geochemistry of the Solar Nebula” and worked
closely with LPI and ARES scientists.

Dr. Kevin Burke was the 2005-2006 Heritage Scholar. While only in residence for a month each year, his
enthusiasm and scientific energy was a welcome addition to the local science community. Dr. Burke
participated in open discussions with LPI and JSC scientists and students, contributed to Education and
Public Outreach activities, and presented a provocative lecture on mantle plumes that generated
considerable debate. Looking toward the future, the Institute proposes to improve upon this program by
electronically capturing a lecture delivered by the participant and distributing it both as a download on the
LPI website as well as in a podcast format. This aspect of the program would not be a significant
expense, but would capture and distribute the wealth of knowledge of these venerable personalities,
especially to graduate students in planetary science.

The **Visiting Scientists Program** continues to be one of the cornerstones of the Institute’s activities.
Increased scientific activity and a focus on increased productivity have motivated greater visiting scientist
activities. The 2002 CAN proposal envisioned four visiting scientists annually; however, under the new
director’s guidance, the Institute has hosted more than 25 long- and short-term scientists in the last five
years. A complete list of visiting scientists may be found in Appendix XII.

The increased flow of visiting scientists and postdoctoral fellows has had significant effects in the ARES
community resident at JSC. Many of the fellows, visiting scientists and students hired by the LPI carry out
research that overlaps partially or substantially with research efforts by scientists at ARES. This dynamic
flow of science has created a collaborative and productive research environment both at JSC and at LPI,
resulting in enhanced research activities through collaborations with Staff Scientists, involving joint
publications and proposals to funding agencies.
B. EDUCATION AND PUBLIC OUTREACH

The Education and Public Outreach activities at the LPI leverage resource from a broad funding base to deliver NASA-focused space science programs designed to inspire, engage, and educate.

Education Approach Overview

The Education and Public Outreach at the Institute is an important and integral part of the services offered to NASA, the planetary community, and the general public. The staff has expertise in space and Earth science content, and considerable experience in instruction in formal and informal learning environments. The Institute’s scientific personnel are involved in developing and verifying scientific content of the educational materials and programs and often participate in training sessions to present their research knowledge. A complete list of all educational activities undertaken by the scientific staff at the Institute may be found in Appendix V.

To maximize the return from the education and public outreach programs, the efforts in this department are focused on training educators to inspire, engage, and educate their audiences in content related to the Institute’s mission. This approach allows our education professionals to have a much larger impact for a smaller investment of time and money. The programs offered are designed and developed around the “train the trainer” approach, which identifies a core group of motivated and dedicated education professionals, often serving underrepresented audiences, in each geographic area served by the Institute and supplies them with the tools and the training to bring the program to their communities and, in many cases, to train their colleagues. The LPI then utilizes a portfolio of communication tools to support these education efforts from a distance. Over the last five years the Institute has developed a network of education professionals that spans the nation and serves as a fast conduit for new programs and content development.

While the Education and Public Outreach Department has been successful in acquiring funding from external sources, such as NASA and NSF, changes in the structures of these organizations, smaller grants, and decreases in funding availability are realities that are impacting the department’s budget. In the coming years, the department will undertake considerable effort to diversify funding sources, with an emphasis on obtaining funding from private foundations and other federal agencies.

Service to NASA and the Planetary Community

LPI Education and Public Outreach has also taken a much more visible and active role in the NASA education community, and maintains an active presence in the current solar system education community. The Institute serves on formal and informal education committees such as the Pre-Service Education Working Group and the Lunar Precursor Robotic Program to help determine avenues for presenting content, services, products, and programs to target audiences. The Institute facilitates annual science-education community conferences, held in conjunction with LPSC, that explore timely topics of common interest to both planetary scientists and the planetary science education community. During LPSC, the Institute also hosts an “Education Programs Open House,” a display of recently developed educational resources from the planetary sciences community. In addition, the Institute is involved in several NASA solar system missions, including LRO and MSL.

As NASA prepares to return to the Moon, the LPI is pleased to be part of an active lunar education community and is exploring ways to utilize the existing education and scientific resources resident at the Institute to support the community and share lunar science and exploration with the public. Activities have included hosting lunar education strategy meetings and infrastructure; identifying and providing access to internal and external lunar resources, programs, and products for educators and the public;
developing formal and informal educator workshops focusing on lunar themes (formation, geology and environment, influence on Earth, future exploration, missions); creating products such as educational posters curriculum materials that support current lunar missions, and providing communications tools for scientists to use in their communities.

Key Areas of Activity
Currently the education portfolio focuses on three complementary and interconnected areas: Informal Education, Family and Community Support, and Training the Future Workforce. The following sections will convey a general overview of the main foci of the programs. A complete description of all of the Institute’s education programs is available in Appendix X.

Informal Education - The Institute has developed a number of programs for informal venues in response to the growing demand for science experiences in nontraditional learning environments such as libraries, planetariums and after-school programs. The demand is spurred in part by the increased focus on academic learning in out-of-school-time programs and the growing number of children enrolled in such programs. To respond to this growing demand the Institute has developed Explore! materials and training for library and after-school children’s and youth program providers. Explore! reaches over 24,000 children annually across the nation. The Institute’s SkyTellers: The Myths, the Magic, and the Mysteries of the Universe engages more than 30,000 children annually in science through planetarium, museum, and science center programs.

Family and Community Engagement – The Institute manages a number of programs directed at public outreach and engagement of the community, including Family Space Days, a collaboration between the Education Department, Staff Scientists, and Resource Services that invites families to monthly theme-based programs held at the Institute. Family Space Day experiences are designed to recruit and arm parents with the tools required for them to encourage and advocate interest in science. The Institute’s quarterly Cosmic Exploration Lecture Series invites inquisitive adults from the community to the Institute for presentations of current exciting research by leaders in the planetary science field.

Training the Future Workforce – These efforts take a number of forms at the LPI, the most notable of which is the highly regarded and widely known LPI/NASA Summer Intern Program. The other subsection of workforce development programs encompass Pre-service and In-service Educator Trainings. These trainings are directed at approximately 500 education professionals annually who are faced with teaching Earth and space science content to K-12 students and yet have limited content knowledge or experience. Educator training programs are complemented by Educator Field Trips. Institute scientists are integral parts of all these programs, offering opportunities for educators to learn about science – and the process of science – from actual researchers.

LPI/NASA Summer Intern Program - The Institute recruits 12 to 15 undergraduate students each year to participate in ten weeks of planetary science research at the LPI and JSC. Students are recruited from over 1500 colleges and universities. Through this program, students are immersed in the process of science and introduced to employment and research opportunities available in planetary science and the NASA organization. In addition to their intensive research projects, the students are given a variety of career development opportunities and group activities designed to foster a collegial environment among
the students, JSC and LPI scientists, and postdoctoral fellows, providing undergraduates with role models and establishing a network of like-minded peers and mentors who can champion their future planetary science research. Activities include seminars, tours of JSC mission control and the astromaterials curation facility, and various social activities.

Upon completion of the research experience, participants become part of the intern alumni group, with a current membership of more than 350. The alumni association has a board that oversees its operations and is responsible for organizing alumni events. Events include a reception hosted by the Institute during the annual LPSC, as well as other social events at meetings throughout the year. The alumni play an important mentorship role, speaking to current interns about career opportunities and providing perspective regarding graduate school choices. The alumni association is also an important network of contacts that extends vertically to the decision makers within NASA and the planetary science community and horizontally beyond the mainstream community to a diverse array of professions.

The intern program is overseen by resident senior scientists at the Institute and in the ARES laboratories. Staff and visiting scientists play a crucial role in making this program a success. Each mentor manages interaction with their intern differently, but in general, mentors meet daily with their assigned intern, talking about progress on their project, answering questions, and resolving confusions. Mentors understand the importance of being available to the interns and often decline travel opportunities during the 10-week period. It is estimated that each scientist dedicates 100 to 150 hours of their time while these students are in residence.

The professional success of the intern program alumni is strong evidence of the impact of the LPI/NASA Summer Intern Program. Of the 365 intern alumni, 80% went on to pursue STEM (Science, Technology, Engineering and Mathematics) related careers, while 25% are actively involved in research within the planetary community at universities, government facilities, or non-profit institutes. Additionally, 91 alumni currently hold advanced degrees with some additional number actively pursuing graduate studies. In the last five years, the scientists at the Institute have published 19 journal articles that include undergraduate authors. Over that same time period the Institute has provided financial support for 18 students to travel to the annual LPSC to present research work they undertook during their time in the program.
C. SERVICE TO NASA AND TO THE PLANETARY COMMUNITY

The Institute’s service efforts are a diverse and eclectic group of activities that are foremost designed to be customer focused, cost efficient, and developed to suit the unique needs of NASA and the planetary community.

The Institute’s largest and most important role as a NASA-sponsored entity is providing support and services to NASA and to the planetary science community. These efforts take many forms and involve a diverse array of personnel including scientists, logistics coordinators, librarians, and computer support staff, resulting in a broad range of current programs and projects. The driving mantra for all the activities outlined under this section of the technical volume is services-focused, cost-efficient programs designed to suit the unique needs of NASA and the planetary community.

What makes this focus possible is the collaborative, integrated effort of an experienced and knowledgeable staff working in close proximity within an established infrastructure. The Institute prides itself on maintaining shorter turnaround times and higher-quality service on requests than would be possible for other NASA or university organizations. The Institute’s excellent meeting facilities, location near the JSC, and lack of political agenda also make it neutral territory for such high-profile events as CAIB (Columbia Accidents Investigation Board) press briefings, and NASA planning activities for planetary science and lunar exploration missions.

In the service of NASA and the planetary community, LPI brings an established infrastructure that benefits from historical knowledge, as well as consistencies and economies of scale. An integrated program of activities that build on these strengths plus the ability to tap into planetary science resources and scientists makes the LPI a truly unique organization. The Institute has 30 years of developed resources, tools, and personal credibility and relationships that together total far more than the sum of the parts.

Recent efforts have been made to ensure that the Institute is responsive to the evolving needs of the community, expanding the role of our website to include broad dissemination of important lunar and planetary science news items, and highlighting new scientific breakthroughs and programs in the LPI and around the country.

Website

The LPI website is an indispensable and dynamic resource for the planetary science community. The Institute continues to evolve, with many of the pages updated and added to daily as new material becomes available. The Institute currently houses a large number of resources that translate into a significant amount of data. The website serves as one of the planetary community’s key access points for meeting registration, the archive of meeting abstracts, planetary images and data, and educational material. The Institute webpage receives over 47,000 "page views" a day, with 80% of those being registered in the service sections of the website. In the recent LPI survey 60% of the queried community reported using the website on a monthly basis, while 88% found the archive of meeting programs and abstracts useful or very useful.
The Institute also hosts secure internal sites for mission-related activities such as websites for the curation aspects of the Stardust and Genesis missions. Since the mission teams include many foreign scientists, export control and security issues result in cumbersome and time-consuming limits on NASA password-protected sites. The LPI serves as a highly secure, responsive middle ground to facilitate collaboration without issues of national security.

**Meetings**

Each year the Institute provides logistical and scientific support for 8 to 10 small meetings, workshops, and forums in addition to the annual LPSC. A well-established infrastructure enables the Institute to operate with maximum flexibility in responding to requests from NASA and the scientific community on a quick-turn-around basis at a low cost to the participants. An experienced staff provides for maximum efficiency and quality of all meetings that we organize.

**Lunar and Planetary Science Conference** — The LPSC has served the scientific community for 37 years by bringing together international specialists in petrology, geochemistry, geophysics, and astronomy to present the latest results of research in planetary science and new data resulting from NASA missions. Instituted six months after the return of the first samples from the Moon in January 1970, this conference provided the first opportunity for approximately 200 scientists to present their data from studies of the newly returned lunar rocks.

Over the years the scope of the LPSC has shifted to reflect an evolving understanding of the solar system brought about by ongoing exploration and shifting NASA priorities. (For example, approximately one-third of the 1467 presentations at the 37th LPSC related to Mars research as a result of data from current orbital and still-active Mars rovers missions.) What began as a focal point for sample data of lunar rocks now includes data from studies of the planets and their moons in addition to research regarding presolar grains, interplanetary dust particles, asteroids, comets, meteorites, chondrites, and other related disciplines, such as astrobiology and analog studies. Over the last ten years attendance at LPSC has increased from 820 to 1600 participants, with over 350 foreign participants from 24 countries in attendance in 2008. Of particular note, we maintain student attendance at around 30% of total registrants, reflecting the low cost and excellent networking environment for graduate and undergraduate students.

While planetary research is also presented at conferences sponsored by various professional societies (AGU, Geological Society of America (GSA), DPS, American Astronomical Society (AAS), Meteoritical Society, etc.), these conferences tend to be very broadly defined or much more narrowly focused on specific areas of research than LPSC. Furthermore, LPSC is more generally favored as the “first venue” for mission-related data.

**Other Meetings** — To provide a venue for new insights in areas of planetary research and mission development, the LPI sponsors a number of other focused workshops and conferences each year. Topics for these meetings can be proposed by any member of the research community or by advisory committees to NASA. The LPI Director reviews these proposals and determines if the scope of the meeting is within the framework of the Institute’s goals, and if the proposed timeframe is
feasible given our other commitments. Once the Institute agrees to sponsor and coordinate a meeting, a partnership is formed with the scientific conveners to ensure the success of the meeting. Normally an LPI scientist participates on the organizing committee to provide the local science connection.

Workshops and conferences recently sponsored or co-sponsored by the Institute have included such diverse topics as Mars polar science, spacecraft reconnaissance of asteroids and comets, early planetary differentiation, LCROSS mission site selection, and lunar resource utilization. A unique benefit of the Institute’s sponsorship of meetings is our responsiveness to accommodate individual needs of NASA leadership, meeting conveners and attendees, and educators. The Institute not only provides expertise in organizing and overseeing meetings, but also provides a value-added benefit through providing guidance in program development.

Publications
The Institute continues to serve as a gateway to both the scientific community and the general public for easy access to scientific information by providing a variety of products available both in electronic and hardcopy formats. A professional and experienced editorial staff disseminates not only the vital research results of LPI-sponsored meetings, but also publishes space-science-related newsletters and reports, and partners with other publishing entities on book and CD-ROM projects.

Lunar and Planetary Information Bulletin (LPIB) - The quarterly Lunar and Planetary Information Bulletin targets a diverse audience composed of professional scientists, educators, interested lay people, and libraries. Since its publication in electronic format on the LPI website, hundreds of subscribers have requested notification, either by e-mail or postcard, of a current issue being posted. Each quarter, the current issue of the LPIB is viewed online over 4000 times with a total of over 33,000 pages viewed annually. To accommodate those subscribers who do not have access to the Internet, the Institute publishes more than 30 hard copies and sends them out via the U.S. Postal Service. Issues of the LPIB include in-depth articles on interesting mission-related science, upcoming missions, spotlight on education and public outreach activities, highlights of recent scientific meetings, descriptions of new and noteworthy products related to planetary science, book reviews, and a calendar of upcoming meetings.

We have recently considered evolving the Bulletin to provide more information on current NASA activities, including HQ staff changes and as a medium for SMD to communicate with the planetary science community. Coupled with the feedback from our survey of the community, we will be looking over the coming months to upgrade the Bulletin to be more responsive to the needs of NASA and the planetary community.

University of Arizona Space Science series - The Institute provides prepress services for publication of books in the prestigious Space Science Series of the University of Arizona Press. Services include electronic receipt of manuscripts, coordination and tracking of reviews, copyediting, formatting, and page layout. Books that were completed over the last five years include Asteroids III, Comets II, Meteorites and the Early Solar System II (MESS II), Protostars and Planets V, and The Solar System Beyond Neptune (formally released in March 2008). Currently in production is Europa, scheduled for publication in early
2009. Work on the next book, tentatively titled *Exoplanets* is just beginning. Revised procedures have resulted in a decrease in production time and costs.

**Resource Services**

A professional staff comprising of Staff Scientists with extensive working knowledge of spacecraft imagery and data, data management technologists, and reference service personnel work together to deliver customer-focused service on programs and projects that cater to a diverse and eclectic constituency. The library and associated collections are heavily utilized by the local scientific community, including many of the scientists from JSC-ARES. The amateur astronomy community also makes heavy use of the image facility, frequently requesting the posting of specific images on our website. We usually have these materials available online within hours. The Institute is often cited by that community as one of the best and most responsive sources of lunar imagery. Educators make up an important segment of the Resource Services’ constituency. Many professors and instructors of planetary science courses at universities and colleges access our digital images for use in lectures, make use of the LPI slide sets, and point students to the LPI as an important resource for student research projects. This diverse audience presents an interesting challenge in the management and prioritization of resources and programs, and we continuously seek to improve our web interface as we increase the volume and scope of our electronic collections.

Over the last five years our resource services group has taken on a number of projects in response to the changing priorities within NASA. After the President's Vision for Space Exploration was unveiled, all available copies of the out-of-press *Lunar Sourcebook: A User's Guide to the Moon* were quickly snapped up by scientists, engineers, and aerospace contractors. Upon request of Dale Lueck at the NASA Kennedy Space Center and with help from Dr. David Lindstrom at NASA HQ, the LPI Resource Services personnel worked with NASA Legal and Cambridge University Press to make this work available electronically for a small fee. To date the Institute has distributed over 681 copies to a diverse group of interested parties working to support NASA’s efforts under the Vision.

**Library** – The library supplies reference services and support to scientists, students, and support staff within the Institute and at JSC, as well as the local planetary community, housing over 55,000 books, documents and multimedia resources, and more than 160 active journal subscriptions. The library staff provides a number of services to the broader planetary community, including distribution of LPI resources nationally through interlibrary loan. Beyond basic library services the reference efforts at the LPI act as an important conduit for information: the LPI library handles queries from scientists, educators, media, and the general public via e-mail, phone, fax, and written requests. Questions range from technical scientific queries, to verification of bibliographic references, to questions from children. Drawing from the broad range of science and education expertise within the Institute, the questions are answered or referred to the most appropriate person or agency on a timely basis. This role as “community help desk” has grown in parallel with heightened community interest in space exploration and the expansion of the RPIF, evolving into a planetary community database and historical archive.

**NASA Regional Planetary Image Facility (RPIF)** – The LPI has served as one of NASA’s Regional Planetary Image Facilities since the inception of the RPIF program. LPI continues this vital function, focusing on protecting NASA’s investment in planetary data and providing easy access for the user community.

The Institute continues to expand its web-based collection of planetary images and data. Currently the Institute houses 826,000 images, of which 33,000 are available online for download. The number of images online continues to grow to meet the evolving needs of the user community. Digital versions of the well-known *Lunar Orbiter Photographic Atlas of the Moon* and the *Consolidated Lunar Atlas* are examples of some of the most frequently accessed sections of the LPI website. These unique assets, designed to "rescue" lost datasets from oblivion, were first brought online in 1999. As the community requests images, the resource staff works to digitize them and make them available on our website. The RPIF (in collaboration with Dr. Mark Robinson) is also preparing to receive digital files of the first
generation Apollo 70mm (Hasselblad), metric (mapping), and panoramic camera imagery from JSC in the next few weeks. The Institute will act as an image distribution entity. General requests for images will be referred by JSC to the LPI. Since the first generation of digital files are each so large, with some panoramic images exceeding 10 gigabytes, LPI will post smaller, lower-resolution versions for general consumption, with full-resolution files available on request.

Scientific personnel contribute significantly to the resource efforts of the Institute, supplying technical perspective on a variety of issues including recommendations for priority posting of images, how images and data should be made available on the web to be of the most use to the community, and community perspective on the importance of documents and material that have been donated to the library from the personal collections of eminent scientists. Finally, they provide input and recommendations to the reference staff regarding new material for the collection and recommendations for purchases of books and journals.

Science Support

Scientists employed at the LPI are evaluated annually on the activities that they perform over the year. While a major part of the evaluation is based on scientific activities, including publications, presentations at meetings, advising of students, grantsmanship, etc., they are also evaluated in regard to the service that they provide to NASA, the scientific community, and the larger community. The Staff Scientists, in particular, are required to have made major contributions to the support of topical initiatives, NASA analysis groups, mission or instrument team activities, NASA funding panel participation, administration of liaison activities with JSC, and/or education and public outreach roles.

Topical Science Initiatives - The 2002 CAN proposal formally outlined a program called Topical Initiatives as a mechanism for the LPI to work with the planetary community to document, contribute and solve important problems in planetary science. The projects were designed to bring together multi-disciplinary communities that were working on a single broad topic and facilitate the exchange of knowledge among the many diverse aspects of one far-reaching research question.

The Institute’s first effort under this funding was entitled, “Oxygen in the Solar System,” jointly chaired by Dr. James Papike of the University of New Mexico and LPI Director Steve Mackwell. The program of conferences and publications was endorsed by the Cosmochemistry MOWG and CAPTEM. Working closely with the scientific staff in the Institute, in JSC-ARES, and in the larger science community, the meeting and logistics staff coordinated three workshops over a 14-month period. Although the initial response to the project within the community was generally very positive, although attendance at the workshops was modest (57 for Terrestrial Planets, 38 for Asteroids and Meteorites, and 46 for Earliest Solar System), reflecting a parallel decline in attendance at many other topical conferences over the same period. Reduced budgets for science activities and scientist over-commitment appear to be the main causes of the lower attendance. A volume related to this initiative was recently published in the Reviews in Mineralogy Series of the Mineralogical Society of America entitled “Oxygen in the Solar System.”

The second Topical Initiative on “Differentiation of the Terrestrial Planets: A Multi-Planetary and Multi-Disciplinary Perspective” was proposed by Dr. Charles (Chip) Shearer of the University of New Mexico, and endorsed by CAPTEM, the Cosmochemistry MOWG, and the Planetary Geology and Geophysics (PG&G) MOWG. A workshop was held in Sonoma, California, on December 8-10, 2006, with attendance expected in excess of 100 scientists and students. We are currently considering additional conferences in this series focusing on “Shaping the Evolutionary Paths of the Terrestrial Planets,” “Early Impact History,” “Volatile and Atmosphere Evolution,” “Crustal Evolution and Planetary Tectonics,” and/or “Planetary Formation: the Initial Building Blocks.”

A third Topical Initiative was recommended by the PG&G MOWG, and approved by CAPTEM and the Cosmochemistry MOWG, entitled “From Earth to Mars: Terrestrial Analog Models for Planetary Interpretations,” and will be organized by Drs. Marjorie Chan (Ohio State University), John Grotzinger (California Institute Technology), and Scott McLennan (Stony Brook University). A series of field-oriented
workshops are planned, with visits to sites that may serve as representative analogs of Mars environments. Although initially planned for initiation in the summer of 2005, the organizers felt that a delay was warranted given the ongoing activities of the MER rovers; we are still roving, and waiting.

Our experience from organizing these topical initiatives to date has indicated that a strong groundswell of interest from the planetary community, which can be sustained throughout the program of activities, is vital, and that strong leadership is needed to maintain momentum and ensure successful products. It is also absolutely critical that a scientist at the LPI have a major role in the organization to ensure that the program remains on track and to facilitate the search for external funds in support of invited speakers and students. Further topical initiatives will be solicited from the advisory groups and scientific community as the existing projects draw closer to completion.

**Analysis Groups** – The Institute has taken an informal role in the management and support of three of the four community analysis groups - VEXAG (Venus Exploration Analysis Group), LEAG (Lunar Exploration Analysis Group) and OPAG (Outer Planets Analysis Group) - with LPI scientists also actively participating in MEPAG (Mars Exploration, Program Analysis Group). The LPI website serves as a common point of entry for the community to the information regarding each group's activities. As the home website for VEXAG, LEAG, and OPAG, our web team provides continuous support for posting of documents and connection to other sites worldwide. We continuously assess the structure and content of our sites to ensure that they remain easy to navigate and of optimal utility to the community. The LPI has also developed a number of web-based tools that allow the leadership and organizing committees from these communities to work on planning documents and white papers.

Institute scientists currently participate in OPAG, VEXAG and LEAG as active members and have leadership roles in VEXAG and LEAG. Of particular note, the LPI acted as the focus of activities associated with the preparation of the Lunar Exploration Strategy document and of the VEXAG Venus Goals, Objectives, Investigations and Priorities planning document.

**Mission Support and Activity on NASA Panels** – LPI scientists, notably the Staff Scientists, are strongly encouraged to take roles in mission activities and to serve on NASA funding panels. Through these activities, they serve NASA and the scientific community. Currently, LPI scientists are on instrument teams for several planned Mars (NASA and ESA) and lunar (NASA) missions, as well as currently active missions (NASA and ESA). The instruments range from seismometers, to chemical analysis tools for rovers, to radar instruments for surface and orbital deployment. The LPI Education and Public Outreach team is also engaged on current and planned NASA Mars and lunar missions. For the most part, this involvement has come to fruition over the past five years, as the scientists have increased their visibility in the community through increased levels of publication, grantsmanship, service, and outreach. It is anticipated that further expansion of these activities will occur in the coming years.

LPI scientists frequently serve as members, Group Chiefs, or Panel Chairs of funding panels for Planetary Geology and Geophysics (PG&G), Cartography, Cosmochemistry, the Mars programs, and others. In recent years, various LPI scientists have performed in each of these roles, demonstrating a level of commitment to service far greater than the average of the scientific community.

**JSC Liaison** - The LPI has, since its inception, maintained a strong connection to the Astromaterials Science and Curation programs at JSC. Inherent in the original charge to LPI was to provide connections between the international university community and the sample collections and sample science at NASA, especially those housed at JSC. As a part of this connection, a number of Staff Scientists and numerous postdoctoral fellows, visiting scientists, and students have utilized the experimental and analytical facilities, as well as accessed the samples, at JSC. Numerous long-term collaborations have resulted from these interactions. It is only natural then that the group in the Astromaterials Directorate at JSC and the scientists at LPI would share resources and develop joint programs that step beyond mere research interactions.

In order to facilitate the sharing of resources and formalize the interaction, a Memorandum of Understanding was signed by senior management at JSC and LPI early in the history of LPI. This MOU
has been periodically revisited and renewed as circumstances, resources, and requirements have changed, with the most recent MOU dating from 2003.

The LPI provides a range of service activities in support of the scientific and programmatic activities in the Astromaterials Directorate at JSC. Notably, we provide:

1. A local forum for scientific interactions and discussions with LPI scientists, postdocs, and students, as well as outside scientists from universities, institutes, and government facilities who come here to make presentations and join in discussions (weekly seminar series, Hard Rock seminar series, informal discussions);
2. Library facilities with the most important current journals and textbooks in planetary sciences, which are used heavily by ARES scientists (there is no other similar library in the area);
3. Image resources for lunar exploration activities (RPIF) in support of ARES and broader JSC activities associated with the Exploration Vision;
4. Computational resources to ARES scientists that are not available to them onsite (e.g., the use of mineralogy software on our computers);
5. support for both ARES and broader JSC activities by making our meeting facilities and support staff available for meetings, workshops, and conferences at a nominal or no-cost basis; in particular, we provide an environment where foreign nationals can interact with JSC management and scientists on short notice without the complications associated with badging at a NASA center;
6. A natural linkage between the broader university community (through USRA) and JSC management engaged in programs such as Constellation Systems.

Through these interactions, the LPI-ARES team acts more as a single, broadly defined group of scientists than as two discrete groups. In this way, we are able to leverage each other’s resources so that the net program is much greater than the sum of the parts.
D. MANAGEMENT

The LPI management structure is a flat, functional approach that allows considerable flexibility and encourages the cooperation required to successfully deliver the cross-functional and interdepartmental programs offered by the Institute.

Upon award of the 2002 CAN proposal, the LPI was placed under the direction of Dr. Stephen Mackwell. Over the last five years Dr. Mackwell has evolved the management team at the Institute, recruiting new faces and infusing new energy and strategic focus. These changes have not altered the emphasis on maintaining a flat, efficient structure for the Institute, avoiding layers of unnecessary middle management. In fact, the reporting structure has been simplified and an LPI-wide team approach implemented.

Due to the flat funding profile for the next five years, management is required to aggressively look for additional efficiencies as well as external funding sources to maintain the high level of service and diversity of programs NASA and the community have come to enjoy from the LPI. Management continues to put incentives in place that will encourage scientific staff to shoulder a larger percent of their salary with external funding. The Education and Public Outreach programs continue to be successful at attracting support from a diversified funding base. While additional external support is sought, the LPI - CAN has remained the primary focus of our activities.

Finally, the LPI has been fortunate in having a competent and creative staff that can rise to any challenge. We propose to operate the LPI with this continuing philosophy: to find and retain the most talented people, to give them the freedom to perform their jobs creatively, and to maintain the flexibility to evolve as institutional and contractual obligations change. We have identified the key LPI positions, proper staffing of which is vital to the operation of the Institute. Here we describe those positions, and cite the qualifications of the people in them.

Key Staff Positions

Director (Dr. Stephen Mackwell)

The LPI Director is responsible for the top-level operation of the Institute, its scientific and programmatic direction, and all interactions with the Institute’s contracting agency. Within the guidelines of its contractual obligations, the Director sets the strategic and scientific direction of the Institute. This includes the supervision of the science staff of the Institute, setting general research directions and goals, and managerial oversight.

The Director, representing the Institute, acts as the principal interface between NASA and the academic research community. This role includes ensuring that the LPI is represented by appropriate scientific personnel on committees, organizing (and co-chairing with the Deputy Director of JSC’s Astromaterials Directorate) the annual LPSC, and approving proposed workshops and other community-driven activities that require Institute support. The Director selects all Institute science staff. In this role, the Director acts to set the scientific agenda of the Institute and is thus directly responsible for staff balance and orientation.

Each Staff Scientist is evaluated annually by the Director, who uses this opportunity to discuss activities over the previous year, participation in other Institute support and educational programs, and plans for the coming year. These reviews are a key factor in career development and in annual assessments, which affect salary increases and possible promotions. Staff Scientist promotions are reviewed by the LPI Science Council, which also assesses Staff Scientist performance on a regular basis.

The role of Director is currently filled by Dr. Stephen Mackwell. As a scientist of international reputation and a senior member of the community who has made fundamental advances that have led to increased understanding of planetary processes, Dr. Mackwell brought the necessary scientific credentials, management experience, and vision to lead the LPI.
Dr. Mackwell has served as Director of the Bayerisches Geoinstitut at the Universität Bayreuth in Bayreuth, Germany, and has held a faculty position at Pennsylvania State University.

As Director of the LPI, Dr. Mackwell has participated in the Solar System Exploration Subcommittee, was a member of the Lunar Exploration Analysis Group in the definition of the 2008 Lunar Reconnaissance Orbiter and 2010 Lunar Lander missions, and is a member of the Venus Exploration Analysis Group. He also is a member of the Management Operations Working Group and has been Panel Chief for Planetary Geology and Geophysics.

Dr. Mackwell maintains an active research program focused on mantle and crustal processes on Earth and other terrestrial planets.

**Associate Director for Operations (Dr. Karin Hilser)**

As a member of the Director’s Office, the LPI Executive Officer is responsible for the daily operations of the Institute, including general oversight of the support staff and ensuring that the important support roles of the LPI are carried out, operationally and with scientific input. The responsibility for public relations and interfaces with the Institute’s numerous constituencies also lies within the purview of this position. The Executive Officer, in partnership with the Director, identifies staffing requirements, hires new staff, and is responsible for maintaining an efficiently run Institute as well as developing new strategies directed at continuous improvements and a broadened funding base for the organization.

The Executive Officer is also responsible for overseeing the annual evaluations of all support staff, identifying opportunities to develop innovative programs and partnerships with a variety of organizations as well as other duties as assigned by the Director.

The role of Executive Officer is currently held by Dr. Karin Hilser. A Ph.D. chemist by training, she has the scientific background necessary to understand the fundamental requirements for creating an environment that supports quality research. Dr. Hilser also holds an MBA and has served as a Head of Product Development for a fast-growing start-up company. She has also spent time working on the research side in a faculty position at the University of Texas in addition to patenting, licensing and managing the Intellectual property of the university.

**Associate Director for Scientist (Dr. Allan Treiman)**

A Senior Staff Scientist is responsible for the interface between the Director and the scientific community at the Institute, including postdoctoral fellows, visiting scientists, Staff Scientists, and students. Since the scientific community is such a dynamic group that is often made up of rather junior science professionals, it is important to have a local interface and mentor who can deal with most issues, while elevating those that specifically require the Director’s attention.

The Senior Staff Scientist also plays a key role in interfacing with the local scientific community. These tasks include membership in the JSC Liaison committee, helping develop new science initiatives, and organizing and coordinating science activities.

Dr. Allan Treiman is a Senior Staff Scientist at the LPI, and is a leader in the field of meteoritics and planetary geology. Dr. Treiman has been a scientist at the LPI for 13 years, following an NRC Senior Fellowship at JSC and a faculty position at Boston University. In his role as liaison with JSC, he has organized and runs a seminar series to facilitate intellectual interchange among scientists at LPI and JSC, and meets with JSC scientists bi-weekly to discuss matters of mutual concern.

Dr. Treiman participates as a member of VEXAG (Venus Exploration Analysis Group) and serves on a variety of NASA review panels. He is an Associate Editor of Meteoritics & Planetary Sciences, and is active in several of the education programs managed by the Institute.
Business Manager (Mr. Brett Harris)
The Business Manager is responsible for all tasks associated with managing the general business functions and maintaining the facility in which the LPI is housed. The Business Manager oversees all activities described below as USRA Facility Operations, including accounting services, procurement, administrating of grants, and regulatory compliance. The Business Manager is a valuable resource that the Institute utilizes on a regular basis to ensure compliance and to bring an outside perspective to the operations at the Institute.

The role of Business Manager is currently held by Mr. Brett Harris. Previous to his appointment at the USRA facility, Mr. Harris held the post of Business Manager in the USRA SOFIA program and spent time in business functions at both Hughes Aircraft Company and Chrysler Technologies.

Mr. Harris holds an MBA from the University of Mary-Harden Baylor.

Education Manager (Dr. Stephanie Shipp)
The Education Manager is responsible for overseeing the design, development, implementation, and evaluation of all Institute education programs including working with Staff Scientists to ensure the scientific integrity of the program’s content. In addition, the Education Manager is responsible for identifying opportunities to develop innovative programs and products for the Institute, often in partnership with other educational organizations. This includes seeking external funds from agencies, individuals, and foundations.

Internally, the manager oversees a staff of direct reports that includes Education Specialists and an Education Assistant. Staff members represent a broad range of content and experience and have been chosen to complement the Institute’s focus on Earth and planetary science content for target audiences of formal educators, informal educators, and families. The manager makes all staffing decisions and consults with the Director’s Office on hiring and compensation decisions.

The Education Manager serves as the liaison between the Institute and the NASA education community (notably the JSC ARES Education team) and actively collaborates in the Planetary Science Division education efforts.

The role of Education Manager is currently held by Dr. Stephanie Shipp. Dr. Shipp holds a Ph.D. in Geology and Geophysics from Rice University. As a scientist, she is adroit at interacting with scientific staff at the Institute in addition to the planetary science community. Dr. Shipp has been involved in Education and Public Outreach programs for over a decade in a variety of roles, including Project Director of the NSF-funded GLACIER middle-school curriculum development program, advising scientist on “Antarctica: The Farthest Place Close to Home” online curriculum at the American Museum of Natural History, and Project Director leading the Teachers Experiencing Antarctica and the Arctic program. In addition to her management duties, Dr. Shipp takes an active role in the presentation of science content in education products and in the instruction of pre- and in-service teachers and informal educators.

Management Structure

LPI Organizational Structure
The organizational structure of the Institute is shown below. Making use of the traditional organizational chart nomenclature, the solid lines are intended to represent direct lines of report, while the dashed lines represent the flow of ideas and information. All the programs and projects undertaken by the Institute are cross-functional in nature, so although the LPI is a relatively small organization, the more matrix approach implied in the organizational structure below allows for the speed, flexibility, and communication necessary to effectively deliver on programs and projects that involve all aspects of the organization.
All members of the science staff in addition to the managers for the Education and Public Outreach and Services report directly to the LPI Director’s Office. The Education and Public Outreach and the Service components have Staff Scientists working within every one of their programs and projects, contributing a scientific perspective and ensuring that the programs and projects meet the needs of the scientific community.

In addition to direct lines of report to the Director’s Office, the Science, Services and Education and Public Outreach efforts work together on many programs that transcend clear boundaries within the Institute. Examples of this intimate collaboration include:

1. The logistics for the education field trips are handled by the meetings personnel within Services;
2. The Intern program is situated in the Education and Public Outreach component, but all the mentoring and daily activities associated with the program are conducted by the scientific staff, and
3. The logistical and computer support for the analysis groups resides in the Publication and Meeting Logistics Services; much of the connection to the community is facilitated through the scientists and the Director’s Office.

The intensely collaborative nature of the programs managed by the LPI requires close working relationships among all the components represented in the organizational structure, as illustrated by dashed lines in the organization chart.

**Science Council**

In general terms, the scientific and strategic directions of the Institute are overseen by an independent scientific advisory body, the LPI Science Council (current chair, Dr. Lisa Gaddis, U.S. Geological Survey). This council is retained by USRA and reports directly to the USRA Board of Directors and the USRA President. It consists of approximately 8–10 active researchers, representing a wide spectrum of interests and expertise in planetary science. The LPI Science Council meets, usually at the LPI, once per year to review current activities and advise the Director on Institute directions, accomplishments, and deficiencies.

The LPI Science Council provides strategic scientific oversight for the Institute. We believe that it is important to continue to invite the NASA COTR to the Science Council meetings during their public (open) sessions to observe and advise the Council on NASA’s perspectives on the Institute, its mission, and its performance.
APPENDIX I

Peer-Reviewed Publications

Published
2006


Published 2005


Published 2004


**Published 2003**


37) Heidelbach, F., I.C. Stretton, F. Langenhorst, and **S. Mackwell** (2003), Fabric evolution during high shear-strain deformation of magnesiowüstite (Mg0.8Fe0.2O), *J. Geophys. Res.*, 108, B3, 10.1029/2001JB001632.


In Press


15) Treiman, A.H., M.D. Dyar, M. McCanta, C.M. Pieters, T. Hiroi, M.D. Lane, and J.L. Bishop (2006), Martian dunite NWA 2737: Petrographic constraints on geological history, shock events, and olivine color, *J. Geophys. Res*.


Submitted


APPENDIX II

Published Abstracts

2006


55) **Clifford, S.M.** (2006), Assessing the distribution and state of subsurface water on Mars: Theoretical expectations, the geologic evidence, and potential geophysical approaches *(submitted to the Fall AGU meeting in San Francisco, December 2006).*


2005


85) **Lindsay, J.F.,** V.C. Bennett and M.D Brasier (2005), The Late Archean Biospheric Explosion (Abstract) *Geological Society of America*, Salt Lake City, November, 2005.


94) **Kirkland, L.E.,** K.C. Herr, and P.M. Adams (2005), Infrared Remote Sensing Studies of Mars Analog Sites at the Nevada Test Site and the China Lake Naval Air Weapons Station, *GSA abs. 96956,* *GSA Abstracts with Programs,* 37, No. 7, 209.


2004


2003


7) **Treiman, A.H., W.S. Kiefer,** and 9 others (2003), Field/Lab Training Workshops in Planetary Geology and Astrobiology for High School and Middle School Teachers, *AGU Fall Meeting,* abstract ED41A-07.


44) **Bennett, V., A. Nutman, C. Friend, and M. Norman** (2003), Geochemical investigations of the oldest (greater than 3800 Ma) abyssal peridotites: implications for early differentiation Earth processes, *EGS - AGU - EUG Joint Assembly, Geophysical Research Abstracts, 5*, Abstract #14594.


APPENDIX III

Research Grants

Awarded

1) **J. Hahn**
   *Planet Migration and its Implications for the Kuiper Belt*
   NASA Origins of Solar Systems
   08/2001 - 08/2003

2) **W.S. Kiefer**
   *Modeling the Gravity Field of Mars: Constraints on Subsurface Structure and Lithospheric Properties at Large Highland Volcanos, Valles Marineris, and Large Impact Basins*
   NASA Mars Data Analysis Program
   04/2003 – 04/2006

3) **W.S. Kiefer**
   *Improved Models of Mantle Convection and Magma Production on Present-day Mars*
   NASA Mars Fundamental Research Program
   07/2005 – 06/2008

4) **J.I. Moses**
   *Chemistry in the Outer Solar System and Beyond*
   NASA Planetary Atmospheres Program

5) **J.I. Moses**
   *An Investigation of the Chemical-Dynamical Balance in the Methane Homopause Region of the Giant Planets*
   NASA Outer Planet Research Program

6) **J.I. Moses**
   *Chemistry in the Outer Solar System and Beyond*
   NASA Planetary Atmospheres Program
   06/2001 – 05/2004

7) **P.J. McGovern**
   *Emplacement Mechanisms of the Olympus Mons Aureole Deposits*
   NASA Mars Data Analysis Program
   06/2002 – 05/2005

8) **P.J. McGovern**
   *Studies of Tectonic Features on Mars*
   NASA Mars Data Analysis Program
9) **P.J. McGovern**  
*The Influence of Flexural Stresses in Planetary Lithospheres on Magma Ascent and Volcano-Tectonic Surface Structures*  
NASA Planetary Geology and Geophysics Program  
2005 – 2008

10) **P.J. McGovern**  
*Studies of Volcanic Spreading and Deformation on Mars*  
NASA Mars Data Analysis Program  
2005 – 2008

11) **P.J. McGovern**  
*Studies of Tectonic Features on Mars*  
NASA Mars Data Analysis Program  
2005 – 2008

12) **T.F. Stepinski**  
*Collaborative Research: A Statistical-Learning Tool for the Analysis and Characterization of Mars Topography*  
NSF Science and Engineering Information, Integration and Informatics  
09/01/04 – 08/31/07

13) **T.F. Stepinski**  
*Origin of Martian Valley Networks – A Computational Approach*  
NASA Mars Fundamental Research  
07/01/05 – 06/30/08

14) **T.F. Stepinski**  
*Automated Identification and Characterization of Landforms on Mars*  
NASA Applied Information Systems Research  
01/01/06 – 12/31/08

15) **R.R. Herrick**  
*Using impact craters to study the resurfacing history of Venus*  
NASA Planetary Geology and Geophysics  
1/1/2002 – 12/31/2005

16) **R.R. Herrick**  
*Study of the Shape and Appearance of Craters on Mars Resulting from Oblique Impact*  
NASA Mars Data Analysis Program  

17) **T.K. Greathouse**  
*Evolution of Giant Anticyclonic Storms in Jupiter*  
NASA Planetary Astronomy
18) T.K. Greathouse
   A Complete Radiative Seasonal Climate Model Applied to Saturn’s Stratosphere
   NASA Planetary Atmospheres

19) T.K. Greathouse
   Extra funding was received from the IRTF for Instrument Support
   NASA Infrared Telescope Facility
   2005

20) T.K. Greathouse
   Extra funding was received from the Gemini observatory for instrument support
   Gemini
   2006

21) V. Malavergne
   Délégation CNRS
   The Granting Agency is the C.N.R.S. (French national agency for fundamental research)
   02/2004 to 08/2006

22) K. Righter
   Cosmochemistry of the Highly Siderophile Elements
   NASA Cosmochemistry
   10/2003 to 9/2006

23) K. Righter
   Refurbishment of a Kiloton Press
   NASA Planetary Major Equipment program
   10/2003 to 9/2004

24) K. Righter
   Plio-Quaternary Uplift and Tectonism of Western Mexico from Geologic Studies and Cosmogenic
   $^{36}$Cl
   NSF International Programs, Americas Division
   1/2003 to 12/2005

25) K. Righter
   Experimental Noble Metal Geochemistry
   NSF Earth Sciences Division
   7/2002 to 6/2005

26) A.H. Treiman
   Antarctic Mars Analogue Svalbard Expeditions (AMASE)
   NASA Astrobiology Science and Technology for Exploring Planets (ASTEP) Program
27) **A.H. Treiman**  
*CheMin: An X-ray Diffraction/X-ray Fluorescence (XRD/XRF) Instrument for Definitive Mineralogical Analysis in the Analytical Laboratory of MSL*  
NASA Mars Science Laboratory ‘09 Mission  
6/2005 - 2011

28) **A.H. Treiman**  
*Linking Our Origins to Our Future*  
NASA/Ames node of NASA Astrobiology Institute (NAI)  

29) **A.H. Treiman**  
*Acid Fog on Mars*  
NASA Mars Fundamental Research Program  
01/2006 - 12/2008

30) **A.H. Treiman**  
*Enhancing LPI Field/Lab Workshops for Professional Development*  
NASA Code S education supplement to MRF proposal  
06/2004 – 05/2007

31) **A.H. Treiman**  
*Tracking Water In Martian Magmas – Light Lithophile Elements*  
NASA Mars Fundamental Research Program  
01/2003 – 12/2005

32) **A.H. Treiman**  
*Water And Light Lithophile Elements In Martian Magmas*  
NASA Cosmochemistry  
01/2003 – 12/2005

33) **A.H. Treiman**  
*CheMin: An X-ray Diffraction/X-ray Fluorescence (XRD/XRF) Instrument for Definitive Mineralogical Analysis in the Analytical Laboratory of MSL*  
NASA Mars Science Laboratory ‘09 Mission  

34) **S.M. Clifford**  
*MARSIS Investigations of the Nature and Evolution of the Martian Hydrosphere and Polar Layered Deposits*  
MARSIS NASA/JPL  
04/2003-09/2008

35) **S.M. Clifford**
Final Report of the LPI CAN NCC5-679

Broadband GPR Field and Laboratory Investigations of Remote Hyper-Arid Desert and Cold-Climate Analogs of Mars
NASA Mars Fundamental Research Program

36) S.M. Clifford
Early Climate & Geologic Evolution of Mars
NASA Planetary Geology and Geophysics

37) S.M. Clifford
NASA Astrobiology Institute, Indiana-Princeton-Tennessee Astrobiology Center for Detection of Biosustainable Energy and Nutrient Cycling in the Deep-Subsurface of Earth and Mars
NASA NAI
11/03 – 11/08

38) S.M. Clifford
GPR Field and Laboratory Investigations of Mars Analogs: Calibration and Blind Studies of Well-Characterized Sites in the Western United States
NASA Mars Fundamental Research Program

39) E. Heggy, S. Clifford
NASA Planetary Geology and Geophysics
7/2005 – 07/2008

40) E.S. Heggy
Rock Electromagnetic Characterization in Support of Radar Sounding and Imaging Investigations of Planetary Surfaces
NASA Planetary Geology and Geophysics
07/2005 – 07/2008

41) E.S. Heggy
Broadband GPR Field and Laboratory Investigations of Mars Analogs: Calibration and Blind Studies of Well-Characterized Sites in the Western United States
NASA Mars Fundamental Program Research

42) E.S. Heggy, S. Clifford
Broadband GPR Investigation: Remote Hyper-Arid Desert and Cold Climate Analogs of Mars
NASA Mars Fundamental Program Research

43) E.S. Heggy
Radar Mosaic in Band L of Africa and Arabic Peninsula: Mapping Subsurface Paleo-Hydrological Structures
44) **E.S. Heggy**  
*Sahara: What Lies Beneath*  
Education and Public Outreach NASA proposal grant Production of a 3D dome-projected movie on the Sahara as a Mars analog, description of the potential similarities between both paleoenvironments, collaboration with the Houston Museum of Natural Sciences

45) **M.D. Norman**  
*Early Evolution of the Solar System: A Planetary Perspective*  
Australian Research Council, Discovery Program  
January 2004 – December 2006 (current)

46) **M.D. Norman**  
*Early Evolution of the Solar System: A Planetary Perspective*  
Australian Research Council, Discovery Program  
January 2007 – December 2009 (pending)

47) **M.D. Norman**  
*Sediment Transport in the Murray-Darling River System Through Recent Time: Provenance, Budgets and Implications for Future Climate*  
Australian Research Council, Discovery Program  
January 2007 – December 2009 (pending)

48) **S.J. Mackwell**  
*Skytellers: A Resource for Smaller Community and School Planetariums*  
National Science Foundation: Education  

49) **S.J. Mackwell**  
*Hydrous Defects and Diffusion in Mantle Minerals*  
National Science Foundation: Geochemistry  
01/2004 – 12/2006

50) **S.J. Mackwell**  
*Lunar and Planetary Institute (LPI-CAN)*  
NASA, Science Mission Directorate: Planetary Sciences  

51) **L.E. Kirkland**  
*ChemCam — Laser-Induced Remote Sensing for Chemistry and Micro-Imaging*  
NASA-2009 Mars Rover  
USRA Proposal #04-333  
11/2004-10/2013

52) **L.E. Kirkland**
Final Report of the LPI CAN NCC5-679

Field and Airborne Infrared Spectral Studies
Non-NASA U.S Government agencies
Covers 80% of my salary, yearly airborne missions, field work, and equipment

53) **P.M. Schenk**
NASA Planetary Geology and Geophysics
1/01/04 – 12/31/07

54) **P.M. Schenk**
NASA Outer Planets Research
8/15/05 – 8/14/07

55) **P.M. Schenk**
NASA Outer Planets Research
8/15/05 – 8/14/07

56) **P.M. Schenk**
NASA Outer Planets Research
8/15/05 – 8/14/07

57) **P.M. Schenk**
NASA Planetary Geology and Geophysics
8/15/05 – 8/14/07

Pending

1) **W.S. Kiefer**
*Lunar Prospector Gravity Observations as Constraints on Lunar Volcanic Processes*
NASA Discovery Data Analysis Program

2) **W.S. Kiefer**
*Improved Models of Mantle Convection and Magma Production on Present-Day Mars*
NASA Mars Fundamental Research Program
07/2005 – 06/2008

3) **W.S. Kiefer**
*Understanding Mercury’s Early Volcanic Evolution*
NASA Messenger Mission Participating Scientists Program
04/2007 – 03/2013

4) **W.S. Kiefer**
*Modeling the Gravity Field of Mars: Constraints on Subsurface Structure and Lithospheric Properties in Ancient Tharsis and along the Hemispheric Dichotomy*
NASA Mars Data Analysis Program
04/2007 – 04/2010
5) **T.F. Stepinski**  
*Building a New Global Martian Valley Networks Database and Inferring Past Climatic History*  
NASA Mars Data Analysis  
08/16/07 – 08/15/10

6) **T.K. Greathouse**  
*Cassini Investigation of Jovian Chemistry, Energetics and Dynamics.*  
NASA Cassini Data Analysis Program  
10/2006 – 9/2008

7) **T.K. Greathouse**  
*General Circulation and Photochemistry of Saturn’s Stratosphere*  
NASA Cassini Data Analysis Program  
10/2006 – 9/2008

8) **E.S. Heggy**  
NASA Planetary Geology and Geophysics  
06/2007

9) **E.S. Heggy**  
*Multi-Frequency GPR and Other Electromagnetic Field and Laboratory Investigations of Hyper-Arid and Cold-Climate Analogs of Mars*  
NASA Mars Fundamental Research Program  
06/2007-06/2010

10) **E.S. Heggy**  
*Unique Egyptian Lacustrine Impact Facies: Key Analog of the Martian Sedimentary Record*  
NASA Mars Fundamental Research Program  
06/2007 – 06/2010

11) **E.S. Heggy**  
*Geophysical Field and Electromagnetic Laboratory Investigations of Mars Analogs: Characterization Studies in the Western United States*  
NASA Mars Fundamental Research Program  
06/2007 – 06/2010

12) **E.S. Heggy**  
*GPR Scattering & EM Induction Signatures from Buried Targets in the Presence of Antennas or Induction Sources*  
NASA Mars Fundamental Research Program  
06/2007 – 06/2010

13) **E.S. Heggy**  
*Radar Laboratory, Field and Numerical Investigations in Support of the Geologic, Hydrologic, and Polar Interpretation of the SHARAD Orbital Sounding Data*
14) **E.S. Heggy**  
*Development of Mars Surface Simulator for testing ExoMars Rover Geophysical package*  
CNES (French Space Agency)  
01/2007 – 01/2010

15) **D.S. Musselwhite**  
*Experimental Investigations of the Mantle Source of Martian Basalts*  
NASA Mars Fundamental Research Program  
01/2007 – 12/2009 (pending)

16) **J.F. Lindsay**  
*Martian biospheric limits: Evidence from late Archean Earth*  
NASA Mars Fundamental Research Program  

17) **J.F. Lindsay**  
*Understanding the Martian Glacial Record*  
NASA Mars Fundamental Research Program  

18) **J.F. Lindsay**  
*The Road to Mars: Understanding Prebiotic Earth as a Mars Analog*  
NASA Mars Fundamental Research Program  

19) **J.F. Lindsay**  
*Biogenesis – Deciphering the Ancient Rock Record*  
NSF – Geobiology and Low-Temperature Geochemistry  

20) **J.F. Lindsay**  
*The Martian Glacial Record: Searching for Earth Analogs*  
NASA Mars Fundamental Research Program  

21) **J.F. Lindsay**  
*The Road to Mars — Defining Robust Biosignatures*  
JSC Center Directors Discretionary Fund  
1/2007 – 12/2008

22) **P.M. Schenk**  
*MESSENGER Participating Scientist*  
01/08 – 01/13
23) **P.M. Schenk**  
* Cassini Data Analysis  
* 01/07 – 12/08

24) **C.R. Neal**  
* Development of a Lunar Geophysical Instrument Package  
* NASA Planetary Instrument Definition and Development Program  
* 01/07 – 12/08
APPENDIX IV

Support of NASA and Other Federal Agencies

S.M. Clifford
- Fourth International Conference on Mars Polar Science and Exploration (October 2006)
- Workshop on Radar Investigations of Planetary and Terrestrial Environments (February 2005)
- Second Conference on Early Mars (October 2005)
- Third International Conference on Mars Polar Science and Exploration (October 2003)
- Committee for Planetary and Terrestrial Analogs, U.S. Subglacial Antarctic Lake Environment (SALE) Program (2005 – present)
- National Research Council Committee on Preventing the Forward Contamination of Mars (2004 – 2006)
- Participant, Mars Exploration Program and Advisory Group (2000 – present)

R.R. Herrick

W.S. Kiefer

L.E. Kirkland
- LPSC Program Committee (2003 – 2004)
- NASA ASTEP review panel (2003, 2004)
- NASA IES Panel (2005)

S.J. Mackwell
- Panel Chair for Planetary Geology and Geophysics, NASA, Washington DC, 2005 – present
- Executive Committee, Lunar Exploration Analysis Group, NASA, Washington DC, 2005 – present
- Executive Committee, Venus Exploration Analysis Group, NASA, Washington DC, 2005 – present

P.J. McGovern
- Review Panelist, OPRP review panel (2004)
- Reviewer for NASA Postdoctoral Program (NPP) proposals (2006)

J.I. Moses
- Steering Committee, NASA Outer Planet Assessment Group (2005 – present)
- Committee Member, Giant Planets Panel
- PDS Atmospheres Node Advisory Group (1996 – present)
P.M. Schenk
- Team Member - New Horizons Jupiter Encounter Sequencing Team
- JIMO Science Definition Team (2003 – 2004)
- Lead, Planetary Cartography Ten-Year Strategic Outlook

T.F. Stepinski

A.H. Treiman
- VEXAG (Venus Exploration Analysis Group) (2005 – present)
- Review Panel member, NASA Exobiology Program (Jan. 2006)
- Review Panel member, NASA Interdisciplinary Exploration Science Program (Oct. 2005)
- LPI/JSC Liaison committee (2003 – 2006)

E.S. Heggy
- MARSIS (NASA-ESA 2004, Mars Express mission): Participating in MARSIS American work team, providing expertise in quantifying attenuation, scattering losses and data comparison from earth based analog study
- WISDOM (ESA-2011, ExoMars program): Participating in instrument design and setting field tests experiments using the updated GPR of the Netlander flight model. Collaborative work with the CETP (Velizy, France) and The Southwest research Institute (San Antonio, USA)
- CONSERT (ESA-2004, Rosetta mission): Perform dielectric measurements and field tests with the instrument flight model. Collaborative work with the LPG (Grenoble, France)
- P-band SAR group (CNES-ONERA, RAMSES experimental SAR): Preparing an air-ported field survey on the Western Sahara: evaluating the potential of polarimetric sub-metric resolution imaging of shallow subsurface geology

D.C. Nunes

K. Righter
- NASA Cosmochemistry Program review panel, August, Baltimore, MD (2004 – 2005)
- Member of CAPTEM (Curation and Planning Team for Extraterrestrial Materials) (2001 – 2004)

M.D. Norman
- Curation and Analysis Planning Team for Extraterrestrial Materials (2003 – present)
- Lunar Reconnaissance Orbiter Mission Requirements Definition Team (March 2004)

J.F. Lindsay
- Support of NASA’s Advanced EVA Program and their Desert RATS Field Program at Meteor Crater in Arizona (2004 – present)
- Member of the Astrobiology Field Laboratory Steering Group (2003 – 2004)
- NASA’s In Situ Resource Utilization Program (ISRU) (2005 – present)
APPENDIX V

Education Activities

S.M. Clifford
- Guest Lectures: Rice University, University of Houston, Valparaiso University (2004 – 2005)
- Seminar Speaker: University of Houston (2004)

R.R. Herrick
- PI on several grants and projects:
  -- Broker/Facilitator Partnership: Central, Southwest Region and Hawai'i Program (2002 – 2006)
- Adjunct professor: Rice University, (2003 – 2004)

W.S. Keifer
- Instructor for Summer Planetary Geology Workshops for Science Teachers: (2003-2006)
- Content Development and Scientific Reviewing for LPI Education Products
  -- Skytellers (2005)
  -- Mars Geology Education Modules (2005 – 2008)
- Instructor: The Ryder Program (2003)

S.J. Mackwell
- Adjunct Professor: Rice University (2005-present)

P.J. McGovern
- Presenter at local elementary schools (2003 - 2004)
- Instructor: Rice University (2004 - 2005)

J.I. Moses
- Coordinator, LPI Summer Intern Program (2004 – present)
- Adviser, LPI Summer Intern Program (2003 – 2005)

P.M. Schenk
- Development of Star Parties and lectures for Bolivar Peninsula School District, (Fall semester 2006)
- Jupiter lecture at Fort Bend Science Center, Fort Jackson, TX (Fall 2003)
- Attend Annual Space Day activities Little Elementary, Dickenson ISD, (May 2003-2006)

T.F. Stepinski
- Assisted in developing learning modules with the LPI education department (2005)
- Co-I: educational grant (2005)

A.H. Treiman
- Organizer/Presenter:
  -- Teacher Training Workshops (2003 – 2006)
Final Report of the LPI CAN NCC5-679

- Presentor: Multiple public lectures and demonstrations (2003 – 2006)

S. Demouchy
- Guest lectures: (2005 – 2006)

E.S. Heggy
- Advisor: in coordination with the Houston Museum of Natural Sciences, developed planetarium movie as part of Education and Public Outreach NASA project (2005 – 2008)
- Interviewed by The Discovery Channel (2005)
- Penned: Research paper printed on the first page of the CNRS journal (2005)

C. Herd
- Assisted in Development of Educational Poster (2003)

T.K. Greathouse
- Public lecturer: (2005)

M.A. Higbie
- Assistant Director of the South Central Organization of Researchers and Educators (SCORE) (2003 – 2006)
- Assisted with Coordination of LPI Summer Educator Fieldtrips (2003 – 2006)
- Lead and supported numerous educator workshops at state, regional, and national level science teacher conferences (2003 – 2006)
- Reviews and contributions made to several LPI Educational Products (2003 – 2006)
- Guest Lecturer: 2006

V. Malavergne
- Instructor: University of Marne La Vallée (France) (2004 – 2005)

A.K. Maloy
- Teaching Assistant: Rice University (2006)

D.S. Musselwhite
- Adjunct Professor: University of Houston Clear Lake (2005 – 2006)

M.D. Norman
- Public lecture: Aug. 2003
- Served on Board of Advisors, Department of Earth and Planetary Sciences, University of Tennessee (2004 – 2006)

D.C. Nunes
- Workshop Coordinator: (2006)
- Judge of a Missouri Middle School Science Fair: (2005)
- Presentor: (2004)

K. Righter
- Participant in the Distance Learning Outpost: (2003 – 2004)
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- Presentor: Brownsville, Texas Middle School Students (2006)

**B.S. Thomson**
- Judge of a local intermediate school science fair (2006)
- Instructor: Rice University (2006)
- Judge: Geological Society of America Stephen E. Dwornik Student Awards (poster presentations) at the 37th Lunar and Planetary Science Conference
APPENDIX VI
Support of the Planetary Community

S.M. Clifford
- Associate Editor:
  --Astrobiology, Mary Ann Liebert, Inc. (2000 – present)
- Member, American Geophysical Union (1982 – present)
- Organizer:
  --Special Section on Radar Investigations of Planetary and Terrestrial Environments JGR-Planets (Spring 2006)
  --2nd Special Section on Early Mars, JGR-Planets (December 2005)
  --Special Section on the Geophysical Detection of Subsurface Water on Mars, JGR-Planets (April 2003)

W.S. Keifer
- Member, LPSC Program Committee (2003 – 2005)
- Scientific Organizing Committee for Workshop on Early Planetary Differentiation: A Multi-Planetary and Multi-Disciplinary Perspective (Dec. 8–10, 2006)

S.J. Mackwell
- Member, Review Panel for Schwerpunktprogramm "Internationales Kontinentales Bohrprogramm (ICDP)", Deutsche Forschungsgemeinschaft (2001 – present)
- Member of Gilbert Award Committee, Geological Society of America (2003 – present)
- Member, Advisory Committee, Winchell School of Earth Sciences, University of Minnesota, Minneapolis, MN (2005 – present)
- Co-chair, Lunar and Planetary Science Conference Organizing Committee (2002 to present)
- Editorial Board Member:
  --Tectonophysics, Elsevier (2002 – present)

P.J. McGovern
- Judge, GSA Dwornik Student Paper Award (2003, 2004, and 2006)
- Guest Editor, GRL (2006)

J.I. Moses
- Program Committee Member
  --Division for Planetary Sciences meeting (2004)
T.F. Stepinski
- Program Committee Member: LPSC (2003 – 2005)

A.H. Treiman
- Associate Editor, Meteoritics and Planetary Sciences (2002 – present)
- Program Committee Member, LPSC (2002 – 2003)

P.M. Schenk
- Director, Regional Planetary Image Facility, Lunar and Planetary Institute (2002 to present)
- Organizer, Planetology Section, AGU Spring Meeting, New Orleans (2005)
- Convenor:

H. Becker
- Member Editorial Board: Chemical Geology (2001 – present)

E. Heggy
- Co-Convener:
  --Workshop on Radar Investigations of Planetary and Terrestrial Environments, Houston
- Associate Editor, JGR Special Review on Radar Investigations of Planetary and Terrestrial Environments (2006)

R.R. Herrick
- Scientific Organizing Committee Member, Third International Conference on Large Meteorite Impacts (2003)
- Program Committee Member, LPSC (2003)
- Student Award Committee Member, LPSC (2004)

L.E. Kirkland
- Convened:
  --Visible-Infrared Community Meeting (2004)

D.S. Musselwhite
- LPSC Selection Committee (2004 – 2005)

C.R. Neal
- Associate Editor, Geochimica et Cosmochimica Acta

D.C. Nunes
- Judge, GSA Stephen E. Dwornik Student Research Paper Award (2006)
- Planning Committee Member, LPSC (2006)
- Session Chair, LPSC (2006)

M.D. Norman
- Steering Committee and Chair, Planetary Sciences Working Group Australian National Committee for Space Sciences Decadal Plan (2006)
- Chair:
- Organized and chaired Special Session on the Composition and Evolution of the Lunar Crust in Honour of Prof. S. Ross Taylor, Meteoritical Society annual meeting (2005)
- Session Chair: Planetary Geochemistry at the 6th Australian Space Science Conference, Canberra (2006)
- Hosted NASA-supported student visitors to Research School of Earth Sciences, Australian National University to conduct geochemical studies of lunar samples and martian meteorites (2005 – 2006)

K. Righter
- Associate Editor,
- COMPRES Infrastructure and Development Committee (2003 – 2006)
- Editor, Antarctic Meteorite Newsletter (2003 – 2006)
- Member, Nomenclature Committee of the Meteoritical Society and Meteorite Bulletin editor for Antarctica (2004 – 2006)
- Program Committee Member, LPSC (2003 – 2005)

B.S. Thomson
- Program Committee Member, LPSC (2006)
APPENDIX VII

Invited Scientific Presentations


Demouchy S. “Mobilité et solubilité de l’hydrogène dans le manteau terrestre”, Seminar at laboratoire de tectonophysiques, Montpellier, France. (Feb. 07, 2006).


McGovern P.J. Colgate University, Departments of Geology and Physics Joint Colloquium. (2003).


Greathouse T.K. University of Texas at Austin. (May 6, 2005).

Malavergne V. “L’uranium et le Plomb dans un contexte planétaire primitif “, CEA, Laboratoire Pierre Süe, Saclay, France. (June 2005).

Berthet S., V. Malavergne, and K. Righter “The evolution of the EH4 chondrite indarch at high pressure and temperature: the first experimental results”, Johann Wolfgang Goethe University, Institute of mineralogy, Franckfurt, Germany. (July 2006).

Righter K. Invited Speaker for Department of Geosciences seminar series, University of Houston. (Nov. 2004).


Treiman A.H. "Geochemistry of Martian Meteorites", Gustavus Adolphus College, St. Peter, MN. (April, 2003).


Clifford S.M. “Mars analog investigations of the West Egyptian Desert utilizing multi-frequency GPR and other electromagnetic sounding techniques”, Centre d’étude des Environnements Terrestre et Planétaires, Velizy, France. (Jan. 2005)


Heggy E. Speaker at the National Program of Planetary Science in France. (Sept.11, 2006).

Heggy E. Invited speaker at Institute de Physique de Globe de Paris, France (June 4, 2006).

Heggy E. Invited Speaker at the Centre d’Etude terrestre et Planitaire, Velizy, France. (Feb. 3, 2006).

Heggy E. Invited lecture, University of Houston Geosciences department, Houston. (March 24, 2004).


Heggy E. Invited speaker, French National Office for Aeronautical Studies (ONERA), Paris, France. (Feb. 23, 2005.)

Heggy E. Invited speaker, Astronomy department, Cairo University, Egypt. (Dec. 18, 2004).

Heggy E. Invited speaker, Southwest Research Institute, San Antonio. (Sept. 2004).


Mackwell S.J. “Experimental deformation of rocks to high strains with application to creep in the Earth”. Presented at the University of Houston. (Feb. 14, 2003).

Mackwell S.J. “Experimental deformation of rocks to high strains with application to creep in the Earth”, Presented at University of New Mexico. (March 11, 2003).


Mackwell S.J. “Experimental deformation of rocks to high strains with application to creep in the Earth”, Presented at Rice University. (Sept. 3, 2003).


APPENDIX VIII

Mentoring

Stephen M. Clifford
- Visiting Graduate Fellow from Centre d’étude des Environnements Terrestre et Planétaires, Paris, France (2006)
- LPI/NASA Summer Intern Program (2005, 2006)
- Graduate Student from University of Houston-Clear Lake (1998 – present)
- Postdoctoral Fellow (2003 – 2006)
- Ph.D. Student from University of Paris (2001 – 2003)
- Visiting Graduate Fellow from Rice University (1998 – 2003)

Robert R. Herrick
- Undergraduate research student from University of Houston (2002 – 2004)

Walter S. Keifer
- LPI/NASA Summer Intern Program (2003 – 2006)
- Post-doctoral Fellow (2006)

Laurel E. Kirkland
- LPI/NASA Summer Intern Program (2003, 2004)
- Ph.D. Student from Rice University (2004)
- Visiting Graduate Student from Notre Dame University (2005)
- Masters Student from University of Houston (2003 – 2006)

Stephen J. Mackwell
- Graduate Student from Bayerishes Geoinstitut, Germany (2000 – 2004)
- Postdoctoral Fellow from University of Minnesota (2004 – present)
- Undergraduate Student from University of Minnesota (2004 – 2005)

Patrick J. McGovern

Julianne I. Moses
- LPI/NASA Summer Intern Program (2003, 2005)
- Ph.D. student from University of Texas – Austin (2004 – present)

Paul M. Schenk
- LPI/NASA Summer Intern Program (2006)
- Postdoctoral Fellow (2006)

Tomaz F. Stepinski
- LPI/NASA Summer Intern Program (2003 – 2006)
- Ph.D. student from University of Padova, Italy (2002 – 2005)
- Graduate student from Purdue University (2002 – 2006)
- Graduate student from Purdue University (2005)
- Masters student from University of Houston (2006)
- Masters student from University College London, UK (2006)

Allan H. Treiman
- Postdoctoral Fellow (Sept. 2006 to present)
- Postdoctoral Fellow (2003 – 2005)
• Masters student from Rice University (Sept. 2004 – present)
• Masters student from University of Houston (Sept. 2004 – 2005)
• Visiting Graduate Fellow from Louisiana State University (Sept. 2003)
• LPI/NASA Summer Intern Program (2003, 2005)
• Student from Miami University (2004)
• High School Students from Clear Creek High School (2004)

**J. Hahn**
• LPI/NASA Summer Intern Program (2002, 2003)

**Essam Heggy**
• LPI/NASA Summer Intern Program (2005)
• Master student from Cambridge University, UK (June 2005 – May 2006)

**Thomas K. Greathouse**
• LPI/NASA Summer Intern Program (2005)
• Ph.D. student from University of Texas – Austin (2004 – present)

**V. Malavergne**
• Ph.D. student from Laboratoire de cristallographie et mineralogie, Paris, France (2000 – 2004)
• Ph.D. student from Laboratoire des Géomatériaux de l’Université de Marne La Vallée, France (2004 – 2007)

**Kevin Righter**
• LPI/NASA Summer Intern Program (2003 – 2006)
• Ph.D. student from Laboratoire des Géomatériaux de l’Université de Marne La Vallée, France (2004 – 2007)
• Postdoctoral Fellows (2004)
• Postdoctoral Fellows (2003 – 2005)

**Daniel C. Nunes**
• LPI/NASA Summer Intern Program (2005)
APPENDIX IX

Other Conferences, Meetings, and Workshops

Upcoming Conferences and Workshops (2007–2010)

38th Lunar and Planetary Science Conference; March 12-16, 2007; League City, Texas; Stephen Mackwell (Lunar and Planetary Institute) and Eileen Stansbery (NASA Johnson Space Center).

Seventh International Mars Conference; July 9-13, 2007; Pasadena, California; Dan McCleese (Jet Propulsion Laboratory) and David Beatty (Jet Propulsion Laboratory).

70th Meeting of the Meteoritical Society; August 19-24, 2007; Tucson, Arizona; Timothy Jull (University of Arizona) and Timothy Swindle (University of Arizona).

Workshop on Impact Cratering: Bridging the Gap between Modeling and Observations II; September 24-26, 2007; Montreal, Canada; Robert Herrick (University of Alaska Fairbanks) and Elisabetta Pierazzo (Planetary Science Institute).

Workshop on the Lunar Reconnaissance Orbiter High Resolution Image Targeting Selection; TBD, 2007; TBD; Jeffrey Plescia (Johns Hopkins University, Applied Physics Laboratory).

Conference on Large Meteorite Impacts and Planetary Evolution IV; August, 2008; South Africa; Wolf Uwe Reimold (Humboldt-Universität zu Berlin); Roger Gibson (University of the Witwatersrand); C. Cockell (Open University); Christian Koeberl (University of Vienna); J. Morgan (Imperial College); J. Mungall (University of Toronto); Elisabetta Pierazzo (Planetary Science Institute); and U. Riller (Humboldt-Universität zu Berlin).

73rd Meeting of the Meteoritical Society; July 25-30, 2010; Manhattan, New York; Denton Ebel (American Museum of Natural History); Harold Connolly (City University of New York); Cyrena Goodrich (City University of New York); C.E. Nehru (Brooklyn College); and Michael Weisberg (City University of New York).

2006

Stardust Educator Conference; January 18-21, 2006; Lunar and Planetary Institute; Aimee Whalen (NASA Jet Propulsion Laboratory) and Jackie Allan (NASA John Space Center).

37th Lunar and Planetary Science Conference; March 13-17, 2006; League City, Texas; Attendance: 1582; Stephen Mackwell (Lunar and Planetary Institute) and Eileen Stansbery (NASA Johnson Space Center).

Workshop on Surface Ages and Histories: Issues in Planetary Chronology; May 21-23, 2006; Lunar and Planetary Institute; Attendance: 43; Paul Schenk (Lunar and Planetary Institute) and Eileen Stansbery (NASA Johnson Space Center).

Workshop on Desert Meteorites: Recovery, Documentation of Meteorite Finds, and Future Prospects of Cooperation in Research (Workshop to be held in partnership with the 69th Annual Meeting of the Meteoritical Society, August 7-11, 2006); August 3-4, 2006; Casablanca, Morocco; Hasnaa Chennaoui Aoudjehane (Casablanca Hassan II University, Chair).

69th Annual Meeting of the Meteoritical Society; August 7-11, 2006; Zurich, Switzerland; Rainer Wieler (ETH Zurich, Chair); Addi Bischoff (University of Münster); Marc Chaussidon (CRPG Nancy); Alex Deutsch (University of Münster); Beda Hofmann (Natural History Museum, Bern); Peter Hoppe, (MPI Mainz); Ingo Leya (University of Bern); Sara Russell (Natural History
Museum, London); Nadia Vogel (University of Bern); and Jutta Zipfel (Forschungsinstitut Senckenberg, Frankfurt a/M).

Fourth International Conference on Mars Polar Science and Exploration; October 2-6, 2006; Davos, Switzerland; Steve Clifford (Lunar and Planetary Institute); Walter Ammann (Swiss Federal Institute for Snow and Avalanche Research); Kathryn Fishbaugh (International Space Science Institute); and David Fisher (Geological Survey).

Scheduled in 2006:

Workshop on Spacecraft Reconnaissance of Asteroid Interiors; October 5-6, 2006; University of California Santa Cruz Inn and Conference Center; Erik Asphaug (University of California, Santa Cruz) and Louise Procktor (Johns Hopkins University, Applied Physics Laboratory).

Workshop on Lunar Crater Observation and Sensing Satellite (LCROSS) Site Selection; October 16, 2006; NASA Ames Research Center, Moffett Field, California; Jennifer Heldmann (NASA Ames Research Center/SETI Institute, Chair); Geoff Briggs (NASA Ames Research Center); Tony Colaprete (NASA Ames Research Center), Don Korytansky (University of California, Santa Cruz); and Pete Schultz (Brown University).

Workshop on Martian Sulfates as Recorders of Surficial-Atmospheric-Fluid Rock Interactions; October 22-24, 2006; Lunar and Planetary Institute, Houston, Texas; James Papike (University of New Mexico).

Space Resources Roundtable VIII; October 3-1 November 2, 2006; Colorado School of Mines, Golden, Colorado; G. Jeffrey Taylor (University of Hawai‘i); Michael Duke (Colorado School of Mines); and Leslie Gertsch (University of Missouri-Rolla).

Workshop on Early Planetary Differentiation; December 8-10, 2006; Sonoma County, California; Charles Shearer (University of New Mexico); Lars Borg (Lawrence Livermore National Laboratory); and Kevin Righter (NASA Johnson Space Center).

2005

Workshop on Radar Investigations of Planetary and Terrestrial Environments; February 7–10, 2005; Lunar and Planetary Institute, Houston, Texas; Attendance: 58; Essam Heggy and Stephen Clifford (LPI); Tom Farr (NASA Jet Propulsion Laboratory); Cynthia Dinwiddie and Bob Grimm (Southwest Research Institute).

36th Lunar and Planetary Science Conference; March 14–18, 2005; Lunar and Planetary Institute, Houston, Texas; Attendance: 1460; Stephen Mackwell (LPI) and Eileen Stansbery (NASA Johnson Space Center).

Workshop on Oxygen in Asteroids and Meteorites; June 2–3, 2005; Flagstaff, Arizona; Attendance: 38; David Mittlefehldt (NASA Johnson Space Center) and Tom Burbine (Smithsonian Institution).

Workshop on the Role of Volatiles and Atmospheres in Martian Impact Cratering; July 11–14, 2005; Laurel, Maryland; Nadine Barlow (Northern Arizona University); Joe Boyce (University of Hawai‘i); Olivier Barnouin-Jha (Johns Hopkins University); Sarah Stewart-Mukhopadhyay (Harvard University); and Horton Newsom (University of New Mexico).

68th Annual Meeting of the Meteoritical Society; September 12–16, 2005; Gatlinburg, Tennessee; Attendance: 356; Hap McSween and Larry Taylor (University of Tennessee).
Workshop on Oxygen in Earliest Solar System Materials; September 19–21, 2005; Gatlinburg, Tennessee; Attendance: 46; Glenn MacPherson (Smithsonian Institution) and Walter Huebner (Southwest Research Institute).

Workshop on Dust in Planetary Systems; September 26–30, 2005; Kaula'i, Hawai'i; Attendance: 91; Don Brownlee (University of Washington) and Eberhard Grün (Max-Planck-Institut für Kernphysik).

Protostars and Planets V; October 24–28, 2005; Waikoloa, Hawai'i; Attendance: 800+; Bo Reipurth and Karen Meech (University of Hawai'i).

Space Resources Roundtable VII: LEAG Conference on Lunar Exploration; October 25–28, 2005; League City, Texas; Attendance: 319; G. Jeffrey Taylor (University of Hawai'i); Stephen Mackwell (Lunar and Planetary Institute); James Garvin (NASA Chief Scientist).

2004

Workshop on Europa's Icy Shell; February 6–8, 2004; Attendance: 77; Paul Schenk (LPI); Francis Nimmo (University College, London); Louise Prockter (Applied Physical Laboratory, Johns Hopkins University).

Lunar Knowledge Requirements for Human Exploration Working Meeting; March 1–2, 2004; Lunar and Planetary Institute, Houston, Texas; Attendance: 53; G. Jeffrey Taylor (University of Hawai'i); Stephen Mackwell (LPI).

35th Lunar and Planetary Science Conference; March 15–19, 2004; South Shore Harbour Resort and Conference Center, League City, Texas; Attendance: 1317; Stephen Mackwell (Lunar and Planetary Institute), and Eileen Stansbery, Johnson Space Center.

Workshop on Oxygen in the Terrestrial Planets; July 20–23, 2004; Santa Fe NM; Attendance: 57; John Jones (NASA Johnson Space Center); Christopher Herd (University of Alberta).

67th Annual Meeting of the Meteoritical Society; August 2–6, 2004; Rio de Janeiro, Brazil; Attendance: 220; Rosalba Scorzelli and Izabela de Souza Azevedo (Centro Brasileiro de Pesquisas Fisicas); Klaus Keil (Hawai'i Institute of Geophysics and Planetology); Joseph Goldstein (University of Massachusetts). Abstracts sent to Meteoritics & Planetary Science (MAPS) for publication as a special supplement.

Workshop on Hemispheres Apart: The Origin and Modification of the Martian Crustal Dichotomy; September 30–October 1, 2004; Lunar and Planetary Institute, Houston, Texas; Attendance: 39; Thomas R. Watters (Smithsonian Institution); Patrick J. McGovern (LPI).

Second Conference on Early Mars: Geologic, Hydrologic, and Climatic Evolution and the Implications for Life; October 1 1–15, 2004; Jackson Hole, Wyoming; Attendance: 138; Steve Clifford (LPI); Jack Farmer (Arizona State); Robert Haberle (NASA ARC); Horton Newsom (University of New Mexico); Tim Parker (NASA Jet Propulsion Laboratory). The scientific output of the meeting has also been collected in a 30-paper special issue of JGR-Planets that will be published in December 2005.

Space Resources Roundtable VI; November 1–3, 2004; Golden, Colorado; Joe Burris (WorldTradeNetwork); R. Scott Baird (NASA JSC); David Criswell (University of Houston); Michael B. Duke (Colorado School of Mines); Stephen Mackwell (LPI); Clyde de Pari sh (NASA KSC); Sanders Rosenberg, In Space Propulsion, Inc.; Frank Schowengerdt (NASA Headquarters); G. Jeffrey Taylor (University of Hawai'i); Lawrence Taylor (University of Tennessee).
Workshop on Chondrites and the Protoplanetary Disk; November 8–11, 2004; Kaua'i, Hawai'i; Attendance: 160; Alexander Krot, Edward Scott, Klaus Keil, and Bo Reipurth (University of Hawai'i at Manoa).

2003

Impact Cratering: Bridging the Gap between Modeling and Observations; February 7–9, 2003; Lunar and Planetary Institute, Houston, Texas; Attendance: 72; Robert Herrick (LPI), and Elisabetta Pierazzo (Planetary Science Institute).

34th Lunar and Planetary Science Conference; March 17–21, 2003; South Shore Harbour Resort and Conference Center, League City, Texas; Attendance: 1179; Stephen Mackwell (Lunar and Planetary Institute), and Eileen Stansbery (Johnson Space Center).

ISPRS WG IV/9 — Extraterrestrial Mapping Workshop: Advances in Planetary Mapping 2003; March 22, 2003; Lunar and Planetary Institute, Houston, Texas; Attendance: 58; Randolph Kirk (U.S. Geological Survey); Jan-Peter Muller (University College London); and Paul Schenk (LPI).

Forum on Concepts and Approaches for Jupiter Icy Moons Orbiter; June 12–14, 2003; Lunar and Planetary Institute, Houston, Texas; Attendance: 140; Coll een Hartman (NASA Headquarters); assisted by Ron Greeley (Arizona State University); Torrence Johnson (NASA Jet Propulsion Laboratory); and David Senske (NASA Jet Propulsion Laboratory).

Sixth International Conference on Mars; July 20–25, 2003; California Institute of Technology; Attendance: 435; Arden Albee (California Institute of Technology).

66th Annual Meeting of the Meteoritical Society; July 28-August 1, 2003; Münster, Germany; Attendance: 390; Almar K. Jessberger and Addi Bischoff (Institut für Planetologie, Münster, Germany).

Third International Conference on Large Meteorite Impacts; August 5–7, 2003; Nördlingen, Germany; Attendance: 85; Dr. Burkhard Dressler (Ontario, Canada).

Workshop on Cometary Dust in Astrophysics; August 10–15, 2003; Crystal Mountain, Washington; Attendance: 65; Don E. Brownlee (University of Washington); Lindsay P. Keller and Scott R. Messenger (NASA Johnson Space Center).

Third International Conference on Mars Polar Science; October 13–17, 2003; Alberta, Canada; Dr. Stephen Clifford (LPI); Peter Doran (University of Illinois at Chicago); David Fisher (Geological Survey of Canada); Christopher Herd (University of Alberta).

All announcements, preliminary programs, and abstracts for each meeting were published on the LPI website and are available upon request.
The programs of the Institute’s Education and Public Outreach Department are primarily focused on training formal and informal educators (teachers, librarians, and after-school program providers), providing them with materials designed to engage, inspire, and educate students in the field of lunar and planetary science.

A. Informal Education

**Evolution of the Solar System Timeline**
[www.lpi.usra.edu/education/timeline/](http://www.lpi.usra.edu/education/timeline/)

The Evolution of Our Solar System resulted from the close collaboration of artists, scientists, programmers, image researchers, and educators at the Institute. The timeline is a 40-foot-long illustration of 4.56 billion years of solar system history depicting the major geologic and biologic events that have occurred from formation of the solar nebula to accretion of the planets to the floods on Mars and the evolution of Earth’s biosphere. Originally funded by the Institute, the timeline is being offered in partnership with the Houston Museum of Natural Science as a kiosk version available to museums and science centers.

**Explore! Fun with Science**
[www.lpi.usra.edu/explore](http://www.lpi.usra.edu/explore)

Explore! brings space science resources and after-school activities to the informal educational settings of library and after-school programs. Ten topics, each accompanied by hands-on activities, imagery, and additional resources, investigate rockets, comets, living and working in space, space health, our solar system, and more. Two hundred librarians and after-school youth program providers have been trained in nine states. An additional three modules will be added and training is pending in ten additional states. Librarians are not only continuing to present Explore! in their own settings, but also are offering staff development in their library systems, at state library conferences, and, in one case, through online training. LPI continues to support the Explore! trainers and broader community through updates of the Web page, electronic communication of news and events, and periodic phone surveys. Originally funded by the National Science Foundation, funds have been successfully acquired from NASA’s Exploration Science Mission Directorate (ESMD) and an E/PO supplemental grant from the Science Mission Directorates (SMD) to expand the program to additional states. Additional funding is pending from ESMD and through the Lunar Reconnaissance Orbiter (LRO), New Horizons, and MESSENGER missions to expand the program even further.

**Planetarium Shows**

Through an education supplement from SMD, the Institute is partnering with the Houston Museum of Natural Science to produce a series of full-dome digital planetarium show clips that explore the dramatic geologic features hidden beneath the sands of the Sahara, investigate the processes that created these features, and determine the processes that obscured the moon through the evolution of the desert. This geologic story on Earth will be compared with the search for water at the Moon’s poles and the features hidden under the Mars surface as revealed by new NASA missions. The program will emphasize remote-sensing tools, techniques, and results from research undertaken by Institute scientists. The Education Department will produce supporting educational materials and will evaluate the impact of the clips.
B. Training the Future Workforce

**Educator Field Trips**  
www.lpi.usra.edu/education/fieldtrips/index.shtml

Each summer the Institute provides a week-long field experience for fifth- through eighth-grade educators. These educators often are responsible for teaching science content, but only about a third of them hold a major or minor in science or science education. Covering such topics as planetary volcanism and Mars geology, these field trips provide teachers with hands-on, real-world experiences and classroom resources to enhance their teaching about Earth and space science and the connections between these exciting fields of research. While primarily supported by the Institute, the facilitators have successfully proposed for an SMD E/PO supplemental grant and have acquired supporting funds from Sandia National Laboratories; results of a second round of funding requests are pending.

**Pre- and In-Service Educator Training**

In partnership with ARES and the Harris County Department of Education, as well as a number of local school districts, the Institute supports and provides training in Earth and planetary science content and classroom-appropriate resources for fifth- and eighth-grade educators. Earth and space science content is a focus of fifth- and eighth-grade assessment tests in Texas, and science teachers at these levels often have not been prepared to educate their students in this content. These programs will be expanded in the future to week-long institutes for district science specialists and advertised nationally.

The Education Department leads a Texas Pre-Service Educator Collaborative, a small working group of primarily university-based space science and education faculty who train future teachers. Through periodic meetings and telecons, the group explores avenues for bringing Earth and planetary science content, best teaching strategies, and experiences to pre-service teachers. Efforts currently focus on developing a Web-based interface that assists pre-service faculty and teachers in accessing standards-targeted content, activities, and resources.

**Summer Intern Program**  
www.lpi.usra.edu/lpiintern/

The Institute provides undergraduates with an opportunity to experience cutting-edge research in the planetary sciences through its Summer Intern Program. Interns work one-on-one with scientists at the Institute or at the NASA Johnson Space Center to complete a research project of current interest in planetary science. The program allows participants to experience a real research environment, to learn from top-notch planetary scientists, and to preview careers in research. Currently funded solely by the Institute, funds are being sought from the National Science Foundation.

C. Family and Community Engagement

**Family Space Day**  
www.lpi.usra.edu/education/space_days/

A monthly free event held at the Institute shares SMD (and other directorates’) research and missions with parents and children ages 5 through 8 in the local area. The program is designed to engage and excite young children about Earth and planetary science. We frequently partner with ARES and the JSC Astronomical Society in planning and implementing these events, and have recently partnered with a local school district to provide two elementary-school teachers to be involved with the program.
Public Lectures and Speakers' Bureau
www.lpi.usra.edu/education/lectures/

The Institute invites the public to join us for lectures and discussions of current space science events, learning about NASA research and missions directly from the scientists involved. Scientists and staff of the Institute also make themselves available upon request for presentations to schools, civic groups, and other organizations.

SkyTellers: The Myths, the Magic, and the Mysteries of the Universe
www.lpi.usra.edu/education/skytellers

SkyTellers is a multimedia project that combines Native American myths and legends created to explain the mysteries of our universe with factual scientific information detailing the actual causes of these phenomena. The stories, told by Native American master storytellers and a Native American astronaut, cover such topics as day and night, the phases of the Moon, constellations, and our solar system. Presented in DVD format, SkyTellers is designed for use in small planetariums, museums, libraries, and other educational environments. A resource guide containing more detailed information and related activities is also provided with the DVD. Funding for this project was provided by the National Science Foundation (NSF).

D. NASA Support Programs

Broker Facilitator Program
www.lpi.usra.edu/education/score/about.shtml

The Institute serves as one of seven Broker Facilitators for NASA's Science Mission Directorate Space Science Support Network. As the South Central Organization of Researchers and Educators (SCORE), the Institute's E/PO staff members facilitate development of long-term partnerships between educators and SMD researchers across the six-state region of Arizona, Kansas, Louisiana, New Mexico, Oklahoma, and Texas. SCORE activities include providing electronic newsletters containing space science information and opportunities to educators and education specialists in the region; hosting booths and space science workshops at state science educator conferences; participating and presenting at conferences identified as strategically important for sharing SMD science, missions, and educational products and programs with an educator or scientist audience (e.g., the National Afterschool Association, AGU, AAS, ASP); and offering small grants for scientist-educator partnerships that involve development of educator workshops or special projects.

SCORE is involved as a co-chair on the Pre-Service Educator Working Group. This working group is helping to facilitate preparation of teachers in Earth and space science content by (1) developing a deeper understanding of pre-service programs and needs and (2) identifying diverse ways to meet those needs. The working group is gathering information from pre-service faculty and future teachers about challenges and needs, identifying models of best practices, and articulating this information to the SMD community. SCORE has initiated partnerships with organizations involved in the preparation of educators such as the Association for Science Teacher Education (ASTE).

SCORE also is a lead on the Planetary Data in Education Initiative with the Solar System Exploration Education Forum (SSE-EF). The initiative involves developing an understanding of the issues in bringing data successfully into the classroom and working to bring the necessary communities together.

Working Relationship with SMD (and ESMD) Missions

The Institute has established partnerships to develop educational materials for several missions. Mission E/PO funds support the Institute's role.
Juno — Educational materials will be incorporated into the Explore! program to present mission-related research, activities, and resource materials.

Moon Mineralogy Mapper Instrument Onboard Chandrayaan — ALTA spectrometer activities and an additional SkyTellers story will be developed.

ChemCam Project for Mars Science Laboratory — ChemCam is a remote-sensing instrument that uses laser interrogation to determine the composition of rocks and perform elemental analyses. The Institute will serve as E/PO lead for this project, in collaboration with AMNH and TERC. Specifically, we will develop an interactive Web environment, provide standards-based investigations, educator training, and public interactions with a nationally distributed team.

Lunar Reconnaissance Orbiter, New Horizons, and MESSENGER — Explore! modules are being proposed in conjunction with each of these missions. Funding is pending.
Appendix XI

Results of the LPI Community Survey

A formal online survey of the community was posted on the LPI web site in September 2006. An e-mail solicitation was sent out to approximately 3500 members of the community. The mailing list was compiled from a variety of sources, and included planetary scientists, educators, and members of the general public who have expressed an interest in space science by subscribing to our newsletters, attending LPI-sponsored meetings, or becoming involved with our public outreach programs. (The response rate, approximately 18%, is generally considered to be highly favorable considering the typical rate of response to unsolicited surveys.)

The survey primarily consisted of a brief series of multiple-choice questions; the results are displayed below. In addition, respondents were provided with an opportunity to provide open-ended comments on a variety of topics. The comments provided in these areas were overwhelmingly positive, with a number of constructive suggestions. The unexpurgated comments received in response to the question, “What is your perception of the LPI?,” appear at the end of this Appendix.

Responses to Multiple-Choice Questions:

How familiar are you with the Lunar and Planetary Institute (LPI)?

<table>
<thead>
<tr>
<th>Extremely familiar; I am aware of a number of LPI programs</th>
<th>Well acquainted</th>
<th>Familiar with the LPI; I attend LPSC every year</th>
<th>Not well acquainted</th>
<th>Who is the LPI?</th>
</tr>
</thead>
<tbody>
<tr>
<td>17%</td>
<td>27%</td>
<td>35%</td>
<td>21%</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

How often do you visit the LPI website?

<table>
<thead>
<tr>
<th>Daily</th>
<th>Weekly</th>
<th>Monthly</th>
<th>Once or twice a year</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>2%</td>
<td>15%</td>
<td>42%</td>
<td>36%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Please rate the usefulness of each section of the LPI website:

<table>
<thead>
<tr>
<th>Section</th>
<th>Very useful</th>
<th>Useful</th>
<th>Moderately useful</th>
<th>Not at all useful</th>
<th>Do not know, never used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting Programs and Abstracts</td>
<td>67%</td>
<td>20%</td>
<td>5%</td>
<td>&lt;1%</td>
<td>7%</td>
</tr>
<tr>
<td>Community and Institute News</td>
<td>10%</td>
<td>29%</td>
<td>25%</td>
<td>2%</td>
<td>34%</td>
</tr>
<tr>
<td>Education Programs</td>
<td>10%</td>
<td>24%</td>
<td>19%</td>
<td>2%</td>
<td>45%</td>
</tr>
<tr>
<td>Meeting Registration</td>
<td>53%</td>
<td>25%</td>
<td>7%</td>
<td>&lt;1%</td>
<td>14%</td>
</tr>
<tr>
<td>Lunar Images and Data</td>
<td>25%</td>
<td>24%</td>
<td>12%</td>
<td>1%</td>
<td>38%</td>
</tr>
<tr>
<td>Resources for Analysis Groups (LEAG, OPAG, VEXAG)</td>
<td>13%</td>
<td>17%</td>
<td>12%</td>
<td>2%</td>
<td>56%</td>
</tr>
</tbody>
</table>
How familiar are you with the LPI’s education and public outreach programs?

<table>
<thead>
<tr>
<th>Extremely familiar; I have often used or recommended them</th>
<th>Very familiar; I have occasionally used or recommended them</th>
<th>Familiar; I am aware of a number of the programs and products</th>
<th>Somewhat familiar; I know that the LPI has a program</th>
<th>Not familiar</th>
</tr>
</thead>
<tbody>
<tr>
<td>3%</td>
<td>9%</td>
<td>21%</td>
<td>35%</td>
<td>32%</td>
</tr>
</tbody>
</table>

How often do you read the quarterly Lunar and Planetary Information Bulletin (LPIB)?

<table>
<thead>
<tr>
<th>Regularly; I look forward to its publication each quarter</th>
<th>Somewhat regularly; I browse through it when I have a free moment</th>
<th>Sporadically; I intend to, but I often don’t have time</th>
<th>Rarely; I do not find it a good use of my time</th>
<th>I am not familiar with the LPIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>11%</td>
<td>16%</td>
<td>21%</td>
<td>4%</td>
<td>48%</td>
</tr>
</tbody>
</table>

How critical a resource do you think the LPI-sponsored University of Arizona Press Space Science Series is for the planetary community?

<table>
<thead>
<tr>
<th>Extremely critical; I use this series on a regular basis</th>
<th>Critical; I use the series on occasion</th>
<th>Somewhat critical; I have used the series</th>
<th>Not critical</th>
<th>I am not familiar with the series</th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>31%</td>
<td>16%</td>
<td>2%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Did you attend the 37th Lunar and Planetary Science Conference (LPSC 2006)?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>60%</td>
<td>40%</td>
</tr>
</tbody>
</table>

If so, please describe your overall experience with each of the following:

<table>
<thead>
<tr>
<th>Online Abstract Submission</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Did not attend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63%</td>
<td>19%</td>
<td>2%</td>
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<td>Quality of Science Presented</td>
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Besides the LPSC, have you attended other LPI-sponsored meetings in the last year?

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If so, please describe your overall experience with each of the following:

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<th>Category</th>
<th>Excellent</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>Did not attend</th>
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<td>Overall Experience</td>
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**EXCERPTS FROM RESPONSES TO OPEN-ENDED QUESTIONS:**

What is your perception of the LPI?

1. Doing a good job with meeting preparations.
2. The LPI is a high quality and dynamic institution that also serves as a focal point for the planetary science community. It seems to be broad in its scope of scientific interests, and very involved with the planetary science community at large.
3. FANTASTIC for arranging workshops - the y make everything so easy. LPI is the glue that holds the planetary community together.
4. Wonderful institute, good research and resources.
5. LPI does not advocate a quality assurance program for its own personnel.
6. Serves a very valuable function for the community.
7. I think the LPI provides a vital service to the planetary science community by both sponsoring meeting and continuing to have staff carry out cutting edge planetary research. In fact, I consider it to be essential that the organization that sponsors many of the premier planetary science meetings is also involved in the same research that is presented at such meetings.
8. By far, the most useful scientific conference I have ever attended was the Europa's Icy Shell Meeting held at LPI in 2004. You guys did a great service to my career and to the icy satellite community by organizing and hosting this meeting. Also, LPSC is also by far the most useful annual conference that I attend. The LPI support staff are always quick to answer questions about meeting logistics and abstract submission and are very friendly and helpful. Thank you for providing these services.
9. I don't have one... I'm sure I should know more about it!
10. Excellent facility with strong community support functions, especially for meetings and educational programs.
11. LPI is a very important part of the planetary science community. One weakness is that there seems to be very little that is "lunar" at the LPI anymore though. I'd like to see lunar science boosted substantially, most easily accomplished with personnel changes.
12. I associate the LPI almost exclusively with the LPSC, and other scientific meetings.
13. a very active and strong research institute in space sciences, with a key role in the space science community by organizing the LPSC and many other workshops.
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14. It does a great job of putting on the LPSC and other meetings and of handling the Space Science Series.
15. Vital resource. Library underutilized but use is growing, and online resources are extremely important. Intern program has high visibility. LPI scientists (e.g. Trieman) excellent and wide-ranging.
16. An excellent resource to a variety of communities with varied interests.
17. an excellent organization, providing up to date information on the planetary sciences
18. Honestly? I think that your logistical staff is composed of some of the best people in the world. Your scientific staff is very good, but eclectic, and I often find it hard to understand what kind of programs you're actually trying to develop there. You seem to be well-funded, but sometimes lacking focus. On one hand you come across as a service organization, on the other you're a research organization, and on the other you're an educational organization. You're better at doing the former, but you do a poor job of advertising that fact. For example, most people are not aware of the support you can provide for conferences and workshops beyond LPSC (and the other ones held in Houston). You might have some defined research programs, but you'd probably have to work there to know what those are. Instead, you come across as a collection of individual scientists. For those who don't know better, the perception is sometimes that a person works will work at LPI because they can't get a job anywhere else as it seems that LPI will hire someone because they have an empty office, not because LPI wants to expand a well-defined science program. Basically, you guys have a bit of an image problem, which isn't uncommon for an organization your size. You might think about packaging your website differently. In fact, it could use a full overhaul.
19. Very solid place for science management. Not at all a bad place for doing science, as long as you can do it in a swamp. I enjoy swamps, having lived in Houston for 8 years, but one of the problems geographically is that Texas is so big that few conference attendees get to see more of the fair state. For example, I think having LPSC in San Antonio would be awesome, once in a while. I am sure this has been thought of, but here's another vote for that.
20. LPI is, to me, LPSC and conference management. It used to be panel reviews, something I think LPI did very well. When LPSC was inside JSC, it had a special flavor to it; LPSC in the big Sheraton is quite boring if you ask me. Now that it is yet-another-meeting-in-a-conference-hotel, it would make sense to move it around just a little bit, within south Texas.
21. LPI plays a very valuable part in the planetary community
22. My first experience was using the Lunar Sourcebook which I still find a very useful resource. I have also found the LPSC one of the best conference venues I have ever attended as a geologist.
23. Excellent organization - the best in the business for organizing meetings (both from an attendee and a conference organizer perspective).
24. Performs valuable services for the planetary science community.
25. Valuable organization
26. Very well organized and very helpful institution who provides an essential, excellent and very professional service to the planetary science community.
27. LPI is a wonderfully successful institute for the planetary sciences. I am exceptionally impressed; this organization is superbly run and directed. Your weekly seminar series, the LPI Intern Program, and the technical courses you sponsor are exceptional.
28. Seems like LPI has no strong reason to exist. The handling of the U Az book series, while competent done, is EXTREMELY slow. And that series has page charges, when LPI is already supported by NASA. This is double-dipping. I wouldn't mind so much if the publishing were more efficient and the books used more up-to-date features (like color figures throughout, as with Ann Reviews).
29. Good, I have been to the LPI probably 50 to 100 times
30. The LPI plays an essential role in the planetary science community. It is great that there has been a "centralized" service that can produce a quality product for meetings and publications (i.e. abstracts). The professional staff for the meetings is outstanding. The LPI scientific staff is overall good - however there are areas where improvements need to be made. There are some areas where individual staff members should have an open mind about scientific hypotheses. There are LP I staff members who have few original scientific ideas and they only want to fit the scientist/policeman of the planetary science areas. They need to be recycled from the institute to other pastures.
31. It is a very well run organization and I feel very happy to attend LPSC because it is so germane to my
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research field that I always come away energized and excited about my continued contributions to the community.

32. A valuable organization.

33. The LEAP Conference I attended (the one and only time) was rather boring in what was presented. It was agenda oriented. I would have preferred more technical discussion. The hallway discussion was very exciting. It would have made sense to have the speakers you picked sit down and let the folks that were not allowed to present a chance to show some technical information for the community to consider.

34. Effective community support for conference organization and abstracts handling

35. Great

36. Critical for survival of the Lunar & Planetary community. DPS, AGU and GSA do not provide the glue and institutional memory and support that LPI provides. LPI will become more important as we advance on lunar/Mars exploration.

37. Essential to the planetary community.

38. Very sophisticated organization that is well run.

39. An excellent value-added organization for the community.

40. Professional, meetings regularly include top researchers in any given field.

41. It is a valuable resource to the planetary/space research community and serves them well.

42. Pleasant working environment, great library, good people, great logistical support.

43. The LPI appears to be very active in designing programs of interest and importance to the community. I am a newcomer and will be in a better position to offer ideas for improvement as I gain experience.

44. It's a great place and a great resource. Covers Mars, meteorites, and outer planets but could use more inner planets people.

45. Could use some improvements.

46. I think the LPI provides a number of extremely valuable services and offers very successful programs - especially the LPI Summer Internship Program. Many outstanding planetary scientists got their start as LPI Interns. Keep up the good work!

47. Overall, a very positive one. I wish LPI would be more proactive in recruiting individuals for visiting scholar positions, perhaps through a regular application process rather than what appears to be an ad hoc version.

48. I think the LPI does a very good job keeping the community focused by bringing us together periodically. In what must be a logistical nightmare they are able to pull it off.

49. Excellent! LPI is a basically a facilitator of the spread of scientific knowledge which is all around a great thing. I very much enjoyed my LPI internship several years ago and have made a point to stay connected with LPI ever since.

50. Great organization that is an essential facilitator for the planetary community.

51. Excellent

52. My perception is very positive. LPI provides a level of continuity to the multitude of NASA and other space related programs that is vital to those whose lives don't revolve around the 'big' facilities like JSC or headquarters.

53. Very positive and that LPI is essential to the planetary community.

54. LPI's efforts in arranging conferences and workshops means I need only check one place to find out about most of the relevant conferences for my discipline.

55. One of a kind - and very important.

56. LPI coordinates LPSC and planetary workshops, including housing abstracts for later on-line reference. It also is a warehouse for old NASA data and helps coordinate some of planetary exploration analysis groups.

57. Very positive
58. Positive. Hard-working. Don't know enough about what you do BESIDES LPSC!
59. Very favorable. Well run organization with interesting, nice people.
60. It is an important institution in the planetary science community
61. High. I have often worked with LPI people on organizing meetings and book or reports.
62. Now that LPI is no longer involved in proposal review, except for reportage of PAGs, I have little interaction.
63. That it is an institute primarily involved in research and dissemination of research related to the Solar System, including meteorites.
64. Excellent resource and broker for scientists, both for research and for education support materials.
65. Very important institution. It's too bad it's so closed off to foreigners in the meantime - otherwise I would have been able to visit LPI in the past.
66. Provides a wonderful service to the planetary community by hosting LPSC (I last attended in 2005) but otherwise somewhat insular.
67. Very good - but I have limited interaction as based outside US
68. The LPI has a unique niche in the technical/educational world. They have successfully brokered events/educational opportunities that have brought communities together and helped to provide a venue for critical dialogue and professional development.
69. I appreciate the work of the LPI, which helps to understand what is going on in space research at the moment, and gives my ideas how I may be able to apply geology to extraterrestrial planets and understand their geology.
70. Those who work there are like a big extended family - the LPI is unique among NASA centers in that regard.
71. Actually visited only once - but I do think the LPI is a core player in the Planetary sciences.
72. It's a great place to visit and learn.
73. I see the organization as primarily in service to educators and researchers. When I think of LPI, the first thing I think of is how they organize professional conferences. The second thing I think of is the store (publications). The third is the materials they make available for science teachers.
74. Very good at what it does.
75. An excellent institution that provides a necessary function.
76. I very much look forward to every visit. When I worked at JSC, I was a frequent visitor to the LPI. Since I moved away, I have missed that easy access to all of the resources LPI makes available. The LPI staff are always approachable, friendly, and helpful. I enjoy working with them whenever I serve on the LPSC program committee, and I look forward to seeing them each year at the conference.
77. LPI is a great place. LPI researchers and staff give good support to guest researchers. Other colleagues of mine believe that the LPI is an excellent LOC for the LPSC and additional workshops but not necessarily a place they'd seek employment.
78. LPI is a wonderful focus for off-campus (JSC) Lunar and Planetary science and scientists. The resident scientists, including past and present directors, have been internationally recognized leaders in their field. The turnover of scientific staff, coupled with the long-term stability of support staff has worked out well and has benefited greatly the broader Lunar and Planetary community. The LPI has been instrumental in organizing and facilitating many wonderful and rewarding meeting. I look forward to continued results in the future.
79. It serves a very useful function that I am just getting to know.
80. It's a great institution. I was an intern and it made a big impression on me years ago. I have served on panels hosted by LPI, have attended LPSCs at JSC and South Shore, have collaborated with colleagues there on research and educational endeavors, and I have sent my students there to be interns in turn. I think very highly of all the things you folks do to which I have been exposed.
81. Good resource for tracking current research.
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82. other than LP SC and the sixth Mars conference, I really don't interact with the LPI. I receive email notifications of special workshops and meetings, which I appreciate should I ever want to attend one of them. My own field of research is bordering on space plasma physics so most of the other geology based workshops are not relevant to me.

83. It's a great resource for the planetary science community. And a great resource for the Houston area.

84. A very good broker of information.

85. They serve many critical roles for our community. They do it very professionally and better than all other geoscience or planetary science organizations who try.

86. Fills a critical role in community communications and facilitating detailed discussion of a wide variety of scientific topics. This very naturally leads to a significant role and responsibility in community organization and community response regarding matters of science priorities, mission planning, and programmatic decision making.

87. A fine institution, given its considerable disadvantage of being in Houston, TX. I go to as few meetings there as possible, and Houston's location plays a significant role in my not attending some meetings that otherwise interest me.

88. Looking for a mission...

89. Friendly, efficient, helpful.

90. I have always, since 1982, been of the opinion that LPI is a very useful support organization to keep the NASA funded science going by way of meetings, workshops and logistical support for review panels when it was still at LPI.

91. good work, efficient, very valuable service.


93. The LPI plays a fundamental role in the planning, advertising, and organization of any planetary and educational workshops and meetings, as well as the publication and dissemination of the literature associated with these gatherings. The LPI staff are very adept at assembling these materials, especially considering the volume of material to be handled at LPSC each year. The website and RPIF facility are good sources for information for the general public. I occasionally receive e-mails from people who are curious about planetary science & happenings (meteorites, lunar landings, etc.) and have consulted the LPI website on several occasions before responding (or directed people there myself).

94. LPI provides a critical role in supporting planetary science conferences and workshops that are vital to the health of our profession. I have been on the organizing committees of two LPI-sponsored workshops in the past 15 months (one at LPI, the other off-site) and the level of support that the staff has provided has been invaluable for making those meetings a success. We would have many fewer meetings on important topics if we didn't have the LPI resources available.

95. I think it plays an important role in stressing the importance of lunar and planetary processes as well as their importance to Earth science and Earth analogues.

96. LPI runs a good meeting and has a good and visible scientific staff.

97. very well performing (especially when table tennis can still played there today - as in "my" days with the Apollo program): perfect, good working atmosphere (when it has not changed principally since then)

98. A well run educational and resource center.

99. Critical to the needs of the community. Your survey questions are worded in a way that evokes a somewhat unfavorable survey response from more casual participants in planetary science. (e.g., Read the LPIB? "Rely; I do not find it a good use of my time"—which misguided consultant wrote those questions, anyway?) Just because I don't read the bulletins or attend the LPSC as often as I used to doesn't mean that I don't recognize the importance of the LPI. Your website and other functions definitely do provide me with critically important support at times.

100. Funny director, but mostly harmless.

101. I will try to become more familiar with the LPI programs, such as education and public outreach, that I am not aware of.

102. Good question. Obviously I need to learn more about the LPI. My current involvement in planetary
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science has to do with educational outreach at the K-12 level. My pet interest is Mars exploration, so I've made many presentations to school kids (I've reached about 2200 or so in the last nine years) and I'd like to spruce up my visuals. I've used slides and overheads mostly, because of the lack of availability of video projectors, etc. My slides have come from Finley-Holiday and from the LPI. I'd like to know more about cool images, including stills, animations, and video segments that you might have that might be good for classroom use.

103. A professional, well-organized, and well-run facility.
104. Good.
105. Centralized Contact Centre for Lunar and Planetary Community, otherwise where would one go?
106. A good organization that permits an open interchange of ideas.
107. I think LPI is great and essential for setting up low cost meetings in the community - this is a fantastic service!
108. I think LPI is a very good research group with a very strong 'service' component to the community in organizing/running meetings, providing outreach, and publications.
109. Extremely valuable to the community.
110. A great place for science. Our planet is lucky to have the LPI!
111. A forum for interaction of ideas that is independent of other agencies and a source of educational information (which should be increased).
112. Great people, good facilities.
113. A pillar of the planetary community. We miss Graham Ryder.
114. Extremely valuable resource, friendly and cooperative, high-value for NASA dollars, center for high-quality science, always a positive experience to visit LPI or participate in an LPI-sponsored meeting or function.
115. It's a good organization, but I really don't know what goes on in LPI. What would be good is to have a special poster section during poster session for LPI researchers to present their work. That way when we come down to LPSC we can see what you guys are up to.
116. The LPI appears to be an excellent research organization, that provides useful data products and meeting resources to the planetary science and exploration community.
117. I really like the LPI's role in supporting the lunar planetary community. This includes organization of topical conferences, the Arizona series, the library (when I visit), and sponsorship and organizational support of conferences other than those the LPI initiates (e.g. the MetSoc meeting).
118. I am old enough that I remember going to the LPI for NASA review panel meetings, and I came to view running panels as one of the most important things the LPI did, and did excellently. The folks in DC aren't bad, but as far as I'm concerned NASA/Congress was really stupid to take panels away from the LPI.
119. My biggest qualification about the LPI is its resident research staff. It's not like these folks are slobs or anything like that, but on the whole they have not been the best in the business and I can't recall a single major breakthrough in the planetary science business that was made by the LPI research staff. In terms of its service to the community there is only one LPI and it functions admirably well. In terms of research institutions, there are lots of them and among them the LPI has been, frankly, mediocre. If its charter permits, I suggest the LPI could better use its resources in support of the planetary science research community rather than in support of a second-tier resident research staff.
120. Very good regarding meetings and abstracts.
121. This is an excellent research institute.
122. Excellent at facilitating, but perhaps too much attached to the NASA "party line".
123. Good
124. It really coordinates and disseminates important information on planetary sciences to a worldwide scientific community.
125. It is one of the world's leading institutes in extraterrestrial science.
126. Enjoy reading it
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127. LPI is a beautiful and well organized flagship in planetary science. The sources collected there are useful for any visitors all over the world. Organizing planetary science conferences is enormous work and enormous benefit for the scientific community. Excellent transfer possibilities can be found there for new methods both for scientific works but for teaching works. The distribution of new results is quick and multiple sided. Summer intern program educates the future generation of enthusiastic scientists and teachers for planetary science. Long live LPI.

128. Keeping out some of the best and newest data because it comes from new people, younger in the field as opposed is really silly! What's the point in selecting to hear from people in charge of labs who do not do the actual work themselves can not manage to discuss the real data when perfectly competent people who did the real work would be able to share so much more? very silly a practice. It's a hindrance to the flow of most current information and slows down our field and makes it rather unwelcoming for our next generation of contributors. It's really a shame.

129. My perception is that the LPI plays an important role in organizing events that are important to the discussion of science.

130. Excellent Scientific body.

131. I consider the LPI to be a center of excellence which adequately supports well the planetary community, at least in the USA.

132. Updates of insider information to be used for outreach purposes.

133. + + positive

134. For me, until Mars-Express, the LPI was associated with the curatorial aspects of Apollo. At the first meeting after the Mars-Express launch, I discovered that the other aspects (atmospheres, icy surfaces etc) were important and that your meetings were oversubscribed. Now that manned space re-joins planetary science, I hope that it will be easier to visit Houston again.

135. I know that the scientific presentations and the knowledge and the cooperation are very known for the scientists in countries-knowing your cooperation with nasa.

136. A very strong center for planetary research.

137. Very good and very much well needed institution.

138. I was not aware of its aim to serve the wider community and perceived it simply as the home of a number of prominent scientists.

139. Planetary Image Facility is good.

140. A valuable contact point for information and a very useful reservoir of resources (images, abstracts, meeting reports) that is not readily available elsewhere.

141. It is great but the stature of the scientific staff should be improved. Also more staff should work on planetary materials.

142. LPI plays a valuable roll in assembling workshops, meetings, planetary data archives, proposal reviews, and providing a research institute to select planetary researchers.

143. Very good.

144. Brilliant.

145. An excellent organization reasonably welcoming to (what I am) an amateur with an interest in planetary sciences and its cartographic challenges.

146. Seems like a really well run Institute, and the scientific staff there is full of top-notch people. The LPI does a GREAT job of organizing the LPSC every year (it is my absolute favorite conference). I also like the fact that the LPI runs special session meetings (like the sulfates conference coming up this Oct.) outside of LPSC on topics of interest to a smaller subset of the planetary community. I think that LPI is doing a great job.

147. LPI continues to serve an important resource function for the planetary community.

148. Grossly underappreciated, and generally ignored except for LPSC.

149. Does an excellent job organizing and running meetings.

150. My perception is mainly from the research side. I view LPI as a dynamic place at the center of planetary
research, but sometimes a little too insular in its views. I wonder why I know so little about the educational side? Is it not well enough advertised to the research community, or am I just oblivious?

151. High quality but parochial

152. A wonderful place for planetary science, top researchers, famous LPSC.

153. I think that LPI is a well-run research organization. I have not attended other LPI-sponsored meeting in the last year, but I have attended them in previous years and I have found them to be well organized and very useful for my research.

154. LPI plays a nearly unique and vital roll in the planetary science community that is paramount to the wide dissemination of scientific planetary information on a timely basis.

155. There is not really a section for this comment, but as a U. K. resident, living far from the U.S., attending LPSC is considerably more difficult than for a resident in the US. Because of this, no regular attendance of LPSC for myself, and probably for others living and working far from the US, should not be taken as a comment on the quality of the LPSC meeting. I attended the 2005 meeting and found it excellent.

156. Excellent source of information on lunar and planetary sciences. The library staff is always very helpful when searching for certain information.

157. Very user friendly organization and excellent resource source. Keep up the good work, thanks

158. Although I did not attend any LPI sponsored meetings apart for LPSC in the last year, I have had the opportunity to work with LPI staff on a workshop I held at APL on "Martian Impact Cratering" and found them extremely helpful. Their help and sponsorship ensured that our meeting was very reasonable in cost. And it turned out to be quite successful. Thank you very much.

159. you guys do a great job

160. Good job and a good service

161. Pretty good at organizing meetings, review panels, and handling publications, etc. But the scientists who work there are on average pretty weak. And they essentially have tenure. If you compare the quality of the scientific staff to say, DTM, LPI does not fare well. You should give 5 year appointments and institute a professional review system to evaluate whether people stay.

162. This is harsh, but you must know it: LPI lost any serious purpose within NASA when the panel reviews were moved to headquarters. It is burdened with a mediocre scientific staff that has become permanent through the inability of most of its members to find jobs elsewhere and the inability of LPI management to enforce the original plan of insisting that these appointments are temporary. In this era of very tight NASA science budgets, LPI sticks out like a sore thumb as a prime candidate for cutbacks. Its only really important service to the Planetary Community is now its (admittedly excellent) hosting of conferences--but can that function really justify the support that LPI receives? I would not want to be in Steve Mackwell's shoes at the moment, but it is essential for LPI to find an essential role if it is to avoid extinction in the currently stressed science environment.

163. I'm familiar with universities, research institutions, and NASA centers. Universities and research institutes get NASA $ from proposals. NASA centers get NASA $ from proposals and directed, non-competed funds. I understand that LPI gets some $ from NASA each year without having to submit proposals. I don't know what LPI does to merit this income. Organizing meetings and Space Science series books doesn't seem like adequate return to me.

164. It's perfectly possible that LPI serves some valuable purpose, but I don't know enough about its activities to know what that purpose is.

165. I have been away from the LPI for 5 years and away from the States for the same time so my perception is rather "Euro" centered. Maybe because I worked there, I still feel that the LPI plays an important role regarding conference organisation and as a general center for planetary research activities. When there, I felt that the LPI was somewhat kind of "gateway" with people passing through, giving seminars on different aspects of planetary science, thus broadening the background of the local community (including JSC and the Universities at Houston).

166. The LPI staff work their tails off to pull off all the meetings they do every year, especially LPSC. No, no one likes the current facilities, but it's the best alternative that I can see, and I'm always impressed with how smoothly LPSC goes. Other than it being in Houston, I've never had a bad experience with LPI.
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167. Excellent at organizing conferences. Excellent summer intern program. Other E/PO duties are largely invisible.

168. I often have in the past, though. I think these workshops are very important.

169. Very useful resource, particularly for on-line lunar imagery. I attend the LPSC occasionally; not every year but (now that I'm retired) plan to attend more often.

170. I find the LPI to be a very professional, competent organization. It is my own time limits that keep me from using LPI's programs and resources as fully as I should.

171. Highly professional support staff for meetings. Well-maintained and current website.

172. Very positive: The things the LPI does, it does well. Workshops & meetings run by LPI are better organized than those run by anyone else. Review panels run by LPI in earlier decades were better than those I've attended that were run by other NASA consultants since.

173. The LPI serves a unique role to the planetary community. While the DPS is more geared to planetary astronomy and the Meteoritical Society typically focuses on meteorites and craters, the LPI-sponsored conference is geared toward geology, geophysics, geochemistry, and cosmochemistry. It also holds the richest archive of materials (images and reference materials) that are easily available to the community.

174. Exceedingly helpful. I have used the library frequently onsite, outside of LPSC times, and also have been very well served remotely, for instance by having an image scanned and put on the FTP server for me to download. This service especially was invaluable. I particularly single out Stephen Tellier for his help.

175. Basically, it is a lively Institution with a remarkable research staff and prime facilities.

176. I think it's a great scientific resource for the planetary community, both in terms of the science being done at the Institute and the data repository functions.

177. I have only a fuzzy view of what LPI is and is supposed to do. It used to run the proposal review process but doesn't now. It has a research staff so it's sort of like SETI Institute. I runs LPSC. It's associated with lunar sample work and legacy lunar data sets. I'm sure I don't really understand what it is.

178. They are in a good location and offer a lot of resources. However, I don't always hear about things.

179. I think it is a very valuable organization that has a bright future.

180. The LPI provides a number of important services to the community, although the institute was much more visible and regarded as much more vital when LPI ran the proposal review process for most planetary R&A programs.

181. A long-standing issue is the quality of the science being carried out by long-term LPI staff. A partial response to this issue is to require staff members to secure grant funding from NASA R&A programs. However, some regular review of the science activities at LPI would go a long way toward persuading the community that R&A funds spent on LPI staff salaries is a worthy expenditure on a par with fully-reviewed support of R&A PIs. Either the LPI Council or some sort of visiting committee could carry out this review.

182. Well-run professional organization.

183. A great facilitator; Should be more proactive (scientifically/politically), but this may not be possible, given dependence on NASA funding; Of course, recent events indicate that NASA needs but does not want to receive independent advice; As funding shrinks, at least for the next few years, the danger is that the LPI will be viewed as a luxury; Should get proposal review function back.

184. All the staff are very friendly and extremely helpful. I love the library, and I appreciate the support LPI provides to the community in allowing groups such as the Astronomy Club and the Mars Society and National Space Society to hold meetings there.

185. The LPI is an extraordinary collection of people dedicated to the advancement of space science. The evolution from the Lunar Science Institute to the present broader scope has been one of the best things to happen for space science in the past few decades.

186. A wonderful resource for Houston's science community.

187. I believe that the LPI provides a critical support and facilitation service for the NASA-funded science community. Several of its meetings provide a major venue for dissemination of new science results by participants from all over the world. As a result, LPI meetings are excellent places to meet with and
discuss items of importance to the international planetary science community. LPI outreach serves as a community anchor for outreach and science activities by many planetary scientists, and is an outstanding resource. LPI science results are perhaps less well known in the community than in the past.

188. I only think of it in terms of a host for the LPSC meeting. It does not come to mind as a leading research institution.

189. I believe it is a high quality organization.

190. Excellent; role in the planetary science community is crucial for the tasks LPI performs that no one else does as well, such as meeting and workshop organizing.

191. LPI plays a valuable scientific and educational role within the planetary community.

192. I think LPI plays a crucial role for the planetary community.

193. An adjunct to NASA serving a role intermediate between government and academic environments and facilitating interactions between the two.

194. LPI kicks ass.

195. It's a good program and needed in the community.

196. Very high for meetings; moderately so for science research.

197. People who attend is very accessible, that why is easy to find information.

198. You guys are some of the hippest Earthlings I know!

199. A central player in the planetary science community. LPI is indispensable as a unifying force in the community.

200. Very good. In particular, and in addition to my feedback as an individual member of the community, I would add the following in my capacity as the Program Manager of the Mars Exploration Program (MEP) Science Office at JPL: LPI provides critical implementation support to the MEP's student travel program by handling the web-based applications to the student travel support program. Additionally, LPI is a critical partner for the MEP's support and sponsorship of Mars workshops and meetings. Thanks, and please do not stop doing that critical work.

201. An excellent institution doing an excellent job.


203. I think the LPI is a well-run and highly effective organization. The enthusiasm and eager communication at the LPSC are contagious, and I think that is due at least in part to the LPI's attitude and commitment. I am a science educator (not specifically Astronomy), and I always feel welcome and inspired, and also appreciate the extensive participation of students at the LPSC. I wish the general public was more aware of the LPI.

204. The LPI is, undoubtedly, the best and leading organization within the planetary science community; I rather approve Yours (and NASA's in a whole) policy of a broad public domain for planetary images as far as scientific and educational needs are concerned.

205. LPI is a leading centre of the Solar System (exoplanetary systems) investigation.

206. It's a great place to work, offers a clear service to the community in the meetings it organizes, has a good science staff whose visibility is certainly higher than its ever been, but our weak spot had and continues to be our self-promotion. We could really use a full-time PR person on staff to help increase the visibility of the good stuff we do here.

207. Interaction with the Space Science Series has been extremely positive. A very critical service to the community. Absolutely essential for students and for growing the field.

208. Efficient enough without completely excelling at everything.

209. The LPI activities and services I participate in are excellent, especially topical meetings. There are good scientific researchers on LPI staff. I cannot say whether the activities I don't are essential or not...there seem to be a fair number of people doing things at LPI that do not obviously serve me, but I can't be sure.

210. My principal and currently only interaction with the LPI is reading the web bulletin, which as indicated above I find useful. I am not currently involved in any projects connected with the Moon or planets. However, I could be again if the proposal I will submit in about six weeks in response to the NRA for Lunar
Sortie Science Opportunities concept studies program is accepted. If it is accepted I will probably ask to the LPI to help me find some information concerning the Moon and thoughts others have had on certain problems associated with operating experiments on the Moon.

211. My main impression of the LPI comes from the LPSC meetings. They appear to serve a larger and larger community.

212. Excellent organization that helps community enormously but could do even better! Superb help for workshops.

213. I think of it mostly as a research institute. I confess to thinking the University of Arizona was mostly responsible for the Space Science series (i.e. University of Arizona Press), and didn't know LPI played a major role in LPSC.

214. Great resource for education needs and staff always helpful and friendly whenever I contact the institute.

215. LPI is the most important single space research institution in the world.

216. A very positive.

217. I sense a lack of mission at the LPI. I am usually rather dismissive of "strategy sessions" and other navel-gazing activities, but maybe it would be a good idea in LPI's case. Other than organizing workshops and conferences, what is the LPI's mission? More importantly, what does NASA think the LPI's mission is? Where does the LPI want to be 5 years from now? 10 years from now? What unique niche does the LPI fill or is there one?

218. In the beginning the LPI was created to act as an end run around JSC bureaucracy. In that role, it brought in seminar speakers, visiting professors, and post-docs. It also published the Proceedings of the LPSC, organized workshops, and hosted funding panels. It was a real focal point for the community. Some of these activities have diminished and some have disappeared entirely. Therefore, the LPI's position in the planetary community has also diminished. I would hate to see the LPI disappear, but, if it did, I think NASA and the planetary community would find ways to cope. That can't be in the LPI's best interest.

219. There have also been changes in the science staff (or management thereof) in the intervening years. Early on, different directors would have different scientific interests and would populate the science staff accordingly. This resulted in fairly frequent turnover. This is not true today. Science staffing at LPI is pretty static and I'm not sure that's a good thing. The staff is also quite diverse. This may or may not be a good thing. Diversity is fine, but with such a small population [5-10], that means there is never a critical mass in any area. I know I would have difficulty doing research in that kind of environment.

220. Finally, I don't think the quality of the meetings/workshop organization is what it used to be. Admittedly, using Pam Jones & Co. as a standard is setting the bar pretty high. That said, there are some very basic things that the workshop organizers don't do anymore — like doing site visits before a contract is signed with a hotel. As a result, for example, the organizing staff can't know if the Mapquest directions they give out are right or not — and sometimes the y're not! I don't think conveners can take it for granted anymore that workshop organization will be performed excellently.

221. Going back to my original point, in the final analysis the LPI is a contractor to NASA and needs to provide a service(s) that NASA values. I see it as an LPI employee, I would want very clear upfront instructions from NASA on what those services should be. Maybe such exists and maybe it doesn't, I don't know. But it's possible that the lack of mission that I detect originates at NASA HQ.

222. They perform a useful function within NASA.

223. Frankly, besides the publication of the Space Science Series, I have little contact with LPI. I am not a part of the LPSC scientific community and do not attend that meeting. My previous experience was a number of years ago, when LPI used to help organize the DPS meetings and hosted NASA peer review panels. I had a fairly positive opinion at the time.
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228. Some good education and general public information emphases, but too much public sniping / arguing of relative merits of science vs. human exploration, or other scientific debates that do not foster public understanding and in fact undermine public support of a broad palette of science and engineering work in space.

229. The labor that LPI realizes with students and scientists is excellent and very important for the future development of the planetary sciences.

230. Fantastic! They have a leading role in research, conferences and curation of samples. It’s too bad that they can’t hire more permanent people in the planetary science fields.

231. I think LPI is terrific! LPI is an excellent resource for information and activities to use with children to explain various planetary concepts. I also use your website for my own personal interest or to expand my knowledge about a particular topic. The quality of LPI’s workshops and workshop materials are superior. I use just about everything in one way or another with our Library customers or with educators in the Community. I’ve referred many, many people to your website. I have also used your website in planning and developing programs for children and teens. The staff that I’ve met are very professional, skilled and willing to share their expertise with others.

232. Excellent for Lunar also for Planetary & Comets etc. scientific information.

233. As the organizer of a recent meeting in Europe (MetSoc 2006 in Zürich), the logistical support by LPI was extremely important for the meeting’s success. Thanks again a lot.

234. Very good source of information and link for the international planetary science community.

235. This is the unavoidable annual rendezvous of the planetary sciences community.

236. A very good place to work, good services and programs and excellent scientific staff.

237. My only experience of LPI is through meetings - LPSC, and as a sponsor for MetSoc and some workshops. I also know 1 or 2 individual researchers, but that’s it.

238. I know very little about LPI other than that it exists. I will look at the website though to see the resources available.

239. An excellent technical and support staff. A remarkable charter that is creatively pursued, to the benefit of the space community.

240. I really appreciate the support of LPI and it has made a real difference in my career. I am always talking about it. Especially to my foreign colleagues. The only problem that I had is that I contacted the LPI about the possibility of whether LPI had adjunct positions several times and no one got back in touch with me.

241. I find it very useful as a focal point for information and services that are useful to me.

242. Favorable.

243. Very good and a necessity to our profession.

244. As ignorant as this may make me sound, I get confused between LPI and JSC, and often think of the two institutions as a NASA-Houston entity. I usually attend LPSC and the Meteoritical Society meeting, and occasionally another LPI-associated meeting during the year. My experiences with LPI regarding meeting logistics (registration, abstract submission, viewing abstracts,...) have been excellent. I teach an undergraduate course in planetary & solar system science and have not used LPI educational resources--I have used NASA images. I have not been involved in meeting planning, and simply am not aware of the role of LPI within NASA regarding science policy.

245. An important component of the planetary science community. Leader in the science mission directorate education community

246. An essential institution for our community. Most in our profession are unaware of all the LPI does. The LPSC is the ONLY planetary science meeting on my MUST ATTEND list.

247. Great place, very useful service for the community. The science staff is bit too mixed, maybe, and should focus on fewer topics.

248. Excellent - runs very smoothly - excellent support staff.

249. Frankly, it use to be an exciting place when it had a terrestrial planets focus. But lately it has drifted into deep-spacey areas that I do not find of professional interest. I think it has become too astronomy-like in its
approach and less earth science-like.

250. An excellent institution with a very dedicated staff. Service to the scientific community is the hallmark.

251. My perception is that LPI provides many valuable services to our community, even though I don't use all of them. I do not know much about the research that LPI supports, but it is useful to support post docs and research scientists. I think that such support should mostly support a strong visitors program for post docs and visiting scientists.

252. We would like to have similar institutes in Europe

253. It is a valuable resource for the planetary science community. It provides a valuable service by promoting and hosting numerous workshops to promote research on timely and important topics. Unfortunately many people do not have sufficient funding to attend workshops in addition to major meetings. The links from the LPI web site to dozens of other planetary science web sites are very useful.

254. Excellent organization with great capabilities

255. First-class organization that has and fulfills a valuable role in planetary science and exploration.

256. LPI is involved in the community and organizes good conferences.

257. The leader in the organization of the planetary science community.

258. Extremely helpful staff! Whenever I am there for a meeting, I go to the library and always receive the best help with my questions, or receive printed info to take with me.

259. It's a very important institution for the planetary community.

260. LPI is well known within the community but it seems difficult for an undergraduate student to obtain the available resources which are offered by LPI.

261. Favorable

262. I think it's a sound institution doing interesting research, and I think they are doing a MAJOR service to the planetary sciences community by organizing the LPSC each year. The fact that the meeting keeps getting larger each year is a clear signal its being done right. I also utilize some of the other services, especially in the realm of education, and I can't think of any place else I could have obtained materials as easily that are as comprehensive as the ones I obtained from LPI.

263. LPI is an effective organization. High quality science is done there. The conference series, both LPSC and the many topical workshops, are an essential and irreplaceable part of planetary science.

264. Overall I think that the staff at LPI are an essential component of the Planetary Science community. They provide essential services that potentiate the science. Although specific interactions with the staff have been limited, they have always been extremely pleasant and always helpful. The website is a valuable resource -- and is generally well organized. Finding specific abstracts seems a bit harder than it needs to be, but that is a relatively minor complaint.

265. I think the LPI has an important role in the Earth and Planetary sciences, because of the meetings, and the volume and length of the abstracts. I just wish I had been able to go to a meeting! Perhaps more could be done to help students attend on a regular basis, instead of when their supervisor can afford it...

266. A useful arm of space science

267. A valuable scientific organization.

268. It's a valuable institution that provides meeting support, data, and educational materials that many in the community use on a regular basis. I have a favorable impression of the LPI, and I hope that it can continue to provide the valuable services that it has provided during the entirety of my career in the field.

269. It is not making the impact that it could make on the community. It seems a little sleepy.

270. Very good

271. It is a first-rate organization that has traditionally served the community well. I'm not too sure about that Kiwi director, though.

272. Closed to new ideas regardless of merit.

273. Important organization for planetary science and a useful bridge between the community and NASA HQ

274. I spent a very interesting year at LSI as a visiting scientist in 1973.
275. Pretty much specialized in areas that do not support what I am familiar with.

276. An Institute looking for a mission  

277. I am a retired physicist -- Planetary sciences are close to my heart -- I attend the Gordon Conferences on the Origins of Solar Systems regularly -- tho not the LPSC -- My understanding of the LPI may be out of date, but I consider you essential to progress in the planetary sciences.

278. LPI is one of the best and a very well organized institution in the space sciences. It enjoys high prestige among the scientists of various countries in this field.

279. Have had excellent relations with one senior scientist and conference staff working with him.

280. I appreciate the role LPI plays in the planetary community. I hope the basic services continue, but I have no major suggestions for changes.

281. Well organized. I am an outsider from the astronomy community, so not too familiar with LPI, but in all my interactions with them I have been impressed with the level of organization and the professional services provided.

282. world class in all regards: people, science, events, epo and service to community

283. An extremely valuable and indispensable resource, for E/PO products, for scientific information, for conference abstracts, for contact information. In my opinion, the status of the LPI is very high.

284. Valuable to the community. Good research, good conference-running, and a wonderful library of last resort for those of us without access to a wide range of planetary-related documents locally. Does good outreach too, but I am less familiar with that because I am not particularly involved with outreach myself.

285. great organization- i went thru the intern program around 85.

286. I have been very supportive of the role of the LPI ever since my time as Principal Investigator in the Apollo Lunar Sample Analysis Program and I enjoy keeping in touch with current programs through the LPI now that I am retired from active research. Please continue the good work.

287. Positive. Good people who welcome the general public, like me. A very encouraging atmosphere. Coming from a viewpoint where your website is the only way I know about your organization, I would have to say that the impression is of a very content-rich and informative group. I really liked the education section, with the creative navigation. It made that section feel more "fun".

288. I am mighty glad it exists, almost as glad it is located in Houston, and I would be terribly sad if it disappeared for any reason.

289. I have always felt that the LPI is an extremely important part of the community, particularly in that it does practical, very specific activities that support the community rather than sitting in some ivory tower some place with no connection to the real world of NASA mission development and support.

290. Excellent resource with good information.

291. A very professional organization. Your staff has always been very helpful.

292. LPI serves a very useful purpose for the planetary community by maintaining the websites of various analysis groups, providing logistical support to the analysis groups and diffusing critical information to the community on a timely basis. The LPSC meetings and extended abstracts are extremely important functions of LPI. The abstracts are often cited in open literature as if they are peer reviewed journals, which speaks highly of the standards maintained by LPI.

293. The LPI sits in a unique but important place between NASA and the academic community, and works best when it fosters communication between the two entities. Its expertise at running meetings is perhaps its most visible role to the community. Specialized websites (like the one about Martian meteorites) also make its web area a very useful resource that we can refer non-specialists to when they ask us questions.

294. Very good.

APPENDIX XII

Visiting Scientists
1. Richard Binzel, Massachusetts Institute of Technology
2. Jim Karner, University of New Mexico
3. Thomas Lapen, University of Houston
4. Cin Ty Lee, Rice University
5. Craig Schwandt, Lockheed Martin Engineering and Sciences
6. Somer Holger, Rice University
7. David Rajmon, Shell Corporation
8. N. Wei Luo, University of Illinois
9. Fred Singer, Science and Environmental Policy Project
10. Vicki Bennett
11. Michael Duke, Colorado School of Mines
12. Essam Heggy
13. Christopher Herd, University of Alberta
14. David A. Kring
15. John Lindsay
16. Valerie Malavergne
17. Marc Norman, Australian National University
18. Anne Peslier, University of Houston
19. Arch Reid, University of Houston
20. Kevin Righter, NASA Johnson Space Center
21. Harry Becker, Freie Universität Berlin
22. Hilary Downes, University of London
23. Joseph Hahn, St. Mary's University, Halifax, Nova Scotia
24. Clive Neal, Notre Dame University
25. Ross Taylor, Australian National University (emeritus)
26. Kevin Burke, University of Houston

APPENDIX XIII

Glossary of Acronyms
| AGU       | American Geophysical Union                  | STEM             | Science, Technology, Engineering and Mathematics |
| ARES      | Astromaterials Research and Exploration Science Directorate | TIAA-CREF       | Teachers Insurance and Annuity Association College Retirement Equities Fund |
| ASP       | Astronomical Society of the Pacific         |                 |                                                |
| ATM       | Asynchronous Transfer Mode                  |                 |                                                |
| AVS       | Advanced Visual Systems                     |                 |                                                |
| CAN       | Cooperative Agreement Notice                |                 |                                                |
| CAPTEM    | Curation and Analysis Planning Team for Extraterrestrial Materials |                 |                                                |
| CAS       | Cost Accounting Standards                   |                 |                                                |
| COBRA     | Consolidated Omnibus Budget Reconciliation Act |                 |                                                |
| COE-IT    | Center of Excellence in Information Technology |                 |                                                |
| COTR      | Contracting Officer’s Technical Representative |                 |                                                |
| CPSR      | Contractor Purchasing System Review         |                 |                                                |
| DCAA      | Defense Contract Audit Agency               |                 |                                                |
| DCMA      | Defense Contract Management Agency          |                 |                                                |
| DFARS     | Department of Defense FAR Supplement        |                 |                                                |
| EPO       | Education and Public Outreach               |                 |                                                |
| ESMD      | Exploration Systems Mission Directorate     |                 |                                                |
| FAR       | Federal Acquisition Regulations             |                 |                                                |
| FASB      | Financial Accounting Standards Board        |                 |                                                |
| G&A       | General and Administrative Procedures       |                 |                                                |
| GAAP      | Generally Accepted Accounting Procedures    |                 |                                                |
| IP        | Internet Protocol                           |                 |                                                |
| IPF       | Image Processing Facility                   |                 |                                                |
| JSC       | Johnson Space Center                        |                 |                                                |
| LAN       | Local-Area Network                          |                 |                                                |
| LEAG      | Lunar Exploration Analysis Group            |                 |                                                |
| LPI       | Lunar and Planetary Institute               |                 |                                                |
| LPSC      | Lunar and Planetary Science Conference      |                 |                                                |
| MEPAG     | Mars Exploration Program Analysis Group     |                 |                                                |
| NFS       | NASA FAR Supplement                         |                 |                                                |
| NPD       | NASA Policy Directive                        |                 |                                                |
| NSF       | National Science Foundation                 |                 |                                                |
| NSTA      | National Science Teachers Association       |                 |                                                |
| OMB       | Office of Management and Budget             |                 |                                                |
| OPAG      | Outer Planet Analysis Group                 |                 |                                                |
| OSHA      | Occupational Safety and Health Act          |                 |                                                |
| RPIF      | Regional Planetary Image Facility           |                 |                                                |
| SCORE     | South Central Organization of Researchers and Educators |                 |                                                |
| SMD       | Science Mission Directorate                 |                 |                                                |
| SOFIA     | Stratospheric Observatory for Infrared Astronomy |                 |                                                |