

# The Lunar and Planetary Institute: SERVING PLANETARY SCIENCE SINCE 1968



## *Lunar and Planetary Information* **BULLETIN**

Universities Space Research Association — Lunar and Planetary Institute

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December 2015  
Issue 143

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— Steve Mackwell, Renee Dotson, and Julie Tygielski, Lunar and Planetary Institute

*Note from the Editors: This issue's lead article is the sixth in a series of reports describing the history and current activities of the planetary research facilities funded by NASA and located nationwide. This issue features the Lunar and Planetary Institute (LPI), which was established 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." — Paul Schenk and Renee Dotson*

## LPI History

During the mid 1960s, as NASA was aggressively working toward President John F. Kennedy's desire to land a man on the Moon, NASA administrator James Webb asked that a committee be established, to be led by Dr. Frederick Seitz, President of the National Academy of Sciences, to engage the academic community in NASA's efforts. In July 1967, the concept of a Lunar Science Institute (LSI) was born out of those discussions.

On March 1, 1968, President Lyndon B. Johnson visited NASA's Manned Spacecraft Center (MSC) (now the Johnson Space Center, or JSC) in Houston, Texas, and made the following pronouncement:

*"We are close to a landing on the Moon. Our space programs for the decade of the sixties are drawing to a close. Yet a mighty intellectual and technological effort, such as you are engaged in here, cannot just be turned on and off. We must stay the course. We must continue to build new strength by using the strength we have. We must continue to cross over new frontiers. This will certainly be our certain course in the next decade.*

*As a further step toward joining hands with the world's scientific community, I want to announce that we will build facilities here in this great space capital of Houston to help the world's scientists work closer together more effectively on the problems of space. We are going to establish here in Houston a new Lunar Science Institute along the side of this great center which you have here.*

*The new institute is a center of research designed specifically for the age of space. Here will come scientists — and their students — from all over the world. We will welcome here all who are interested in the sciences of space. We will strengthen the cooperation between NASA and*



## The Lunar and Planetary Institute *continued . . .*

*our universities. And we will set new patterns of scientific cooperation which will have profound effects on man's knowledge of his universe.*

*The new Lunar Science Institute will provide new means of communication and research for the world's scientific community. It will help unite the nations for the great challenge of space.*

*Let this great new institute stand as a symbol. Let it show the world that we do not build rockets and spacecraft to fly our flag in space, or to plan our banner on the surface on the Moon. We work to give all mankind its last great heritage. We are reaching for the stars."*

On October 1, 1968, the LSI was formally established by NASA contract with the National Academy of Sciences to operate the new entity in cooperation with Rice University. The objectives of the Institute were to enhance communications among scientists, universities, and governmental organizations; to encourage use of the unique Lunar Receiving Laboratory at MSC to the common benefit of NASA and the academic community; to provide all universities with appropriate services for associate and postgraduate education at the MSC; and to provide general assistance and support for research on lunar material. Since the primary responsibility of the Institute was to develop closer working relationships among the various organizations engaged in space research, the goal of the Institute was that it should encourage scientific discussion and exchange of ideas; the convocation of seminars, workshops,



symposia, and the like; accessibility of government employees and facilities such as the Lunar Receiving Laboratory (LRL) to university representatives; and the participation of interested scientists in spaceflight operations and LRL scientific activities.

Needing a more permanent entity to manage the LSI, in March 1969 the National Academy of Sciences, at the request of NASA, chartered the Universities Space Research Association (USRA), a nonprofit

consortium of universities. The stated purpose of USRA was to foster cooperation among universities, other research organizations, and the U.S. government for the advancement of space research, and in December 1969 USRA assumed management of the LSI under contract to NASA.

Dr. William W. Rubey, professor of geology and geophysics at the University of California, Los Angeles, was appointed as the first Director of the Institute on October 31, 1968, and began operation in temporary offices located at MSC. Five months later the Institute moved to leased office space within close proximity to MSC. Rubey's first order of business was to find a building to house the Institute. Fortuitously, the West Mansion adjacent to the MSC had been deeded to Rice University with the stipulation that the property be used for research purposes. The Institute moved into the newly renovated West Mansion in October 1969. The dedication ceremony took place on January 4, 1970, and included remarks from NASA Administrator Thomas Paine, who concluded his speech with reading the words cast

on a commemorative plaque, which still hangs outside the doors of the current building: “Dedicated to the scientists of the Earth who seek to understand the nature, origin and history of our solar system.”

In keeping with the stated goals of the Institute, the scientific staff included a very small in-house staff to supply continuity and aid the orientation of visitors, with the predominant population of the staff consisting of a unique array of visiting scientists and postdoctoral fellows. In May 1969, the first visiting scientist, Dr. S. Ross Taylor, arrived; in June 1969, Dr. Friedrich Hörz was appointed as a visiting scientist; and in July 1969, Dr. Harold Urey was appointed as the first senior visiting scientist.

The Institute’s primary activities in the early years focused on retaining an atmosphere conducive to research, as well as organizing and hosting a number of symposia and seminars. When the Institute began its seminar series in September 1969, Dr. Gerard P. Kuiper was the first speaker. The Institute had already begun co-sponsoring the Lunar Science Conference (LSC) (now the Lunar and Planetary Science Conference, or LPSC), and assumed many of the administrative duties for the conference when it moved to MSC from downtown Houston (where the first two conferences, known as the “Houston Rock Festivals,” were held).

In 1973, NASA conducted a review of the LSI and determined continued operation of the Institute should remain under USRA management. The role of the Institute now included (1) the establishment of a lunar data center (photo, map, and document library; lunar sample information library; geophysical data files; and lunar science publication library); (2) visiting scientist program; (3) scientific symposium program; (4) publications and communications; and (5) management of the Lunar Sample Review Panel.

In December 1973, recognizing that one of the major goals of the Institute was to facilitate communication between investigators working in and beyond lunar science, the Institute announced that it would begin distributing an informal short communication to a wide

audience in lunar science and related areas. The first issue of the *Lunar Science Information Bulletin* (now the *Lunar and Planetary Information Bulletin*, or LPIB) was published in February 1974. In addition to short notes about information of interest to the lunar science community, it also contained a lunar science calendar and a list of lunar articles recently received in the Institute library.



Over time, the Institute’s research effort broadened to include the terrestrial planets, their satellites, the asteroids and meteorites, and the jovian and saturnian planetary systems, which prompted the LSI’s name change in 1978 to the Lunar and Planetary Institute (LPI). Growth in research and the desire to establish programs to support the community led to expansion in other areas such as internships. In the summer of 1977, the Institute began the LSI Summer Undergraduate Intern Program, which continues to provide

undergraduate students with the opportunity to perform experimental, theoretical, or library research under the supervision of JSC or Institute scientists.

## LPI Today

Throughout its history, the LPI has made significant contributions to the understanding of lunar and planetary science. LPI staff scientists, postdoctoral fellows, and visiting scientists, whose fields of research represent much of the breadth of the planetary science community, pursue innovative research, support NASA programs, provide a connection to the university scientific community, and contribute vital science focus to all LPI activities.

The LPI remains attuned to the needs of NASA and the planetary science community, is extremely productive as a research organization, and has major involvement in current and future mission activities. LPI activities, programs, and initiatives are implemented through the interweaving of three functional components: science, service to NASA and the community, and education and public outreach (EPO). The three functional components form an integrated network of scientists, managers, educators, and support staff collaborating on LPI activities.

## Science

Research pursued at the Institute is closely aligned with NASA's strategic plan. Research activities involving staff scientists, postdoctoral fellows, visiting scientists, students and interns, Heritage Fellows, and Urey Fellows include the performance and dissemination of fundamental peer-reviewed scientific research, sponsorship of topical science projects, and participation in space missions.

All activities, programs, and projects undertaken by the Institute require scientific knowledge and expertise. While most scientists work at the Institute for periods from several days up to three years, the



staff scientists remain for longer periods, bringing stability to the LPI science program and connecting across the scope of the planetary community. Having resident scientists familiar with NASA and the service/EPO programs contributes efficiencies that enable the Institute to provide quality service in a timely fashion at a significantly reduced cost. Should additional expertise be required, the staff scientists are established members of the community with deep connections in their respective disciplines. These connections are exemplified by the frequent inclusion of LPI scientists on mission teams, program and panel reviews, and planning committees.

While discipline-specific research studies and programs performed by a single researcher or team remain a cornerstone of lunar and planetary science, innovative multi-disciplinary, multi-institutional programs are increasingly becoming a venue for new scientific understanding and insight. LPI has facilitated a forum for interdisciplinary activities and discussion through organization of study projects and topical initiatives throughout its history. From the Basaltic Volcanism in the Terrestrial Planets Study Project in 1976 to Oxygen in the Solar System in 2004, the innovative concepts achieved in these topical projects result in the publishing of books based on each topical project. In response to the 2004 Presidential Vision for Space Exploration, LPI brought forth new focus on lunar science through the Lunar Science and Exploration Initiative, which involved development of a web-based information portal — the Lunar Science Exploration Portal, where the lunar science community could access Apollo-era documents to the most recent research reports. LPI also increased its lunar science cohort, leading teams for the NASA Lunar Science Institute in 2009 and Solar System Exploration Research Virtual Institute in 2013.

### Services to NASA and the Planetary Community

Throughout its history, LPI has maintained an exemplary culture of service in support of NASA and the lunar and planetary science community. This component encompasses the interface with astromaterials research at NASA JSC; meetings and workshops; scientific and technical support of proposal review panels; the Regional Planetary Image Facility (RPIF); the library and resource collections; logistical, technical, and scientific support of NASA's Analysis/Assessment Groups; support of the Curation and Analysis Planning Team for Extraterrestrial Materials (CAPTEM); publication efforts; and scientific support for planning and review committees at NASA and the National Academy of Sciences.

The Institute was formed so that scientists from around the world could interact with NASA in the performance of space science. Since the early days of the space program, the Institute has facilitated access to the lunar science samples from the Apollo missions. While access to the samples has evolved over the decades, the LPI still facilitates access to the collections and to the impressive array of cutting-edge instrumentation at JSC's Astromaterials Research and Exploration Science (ARES) facility that is available for use by the scientific community and is optimally configured for extraterrestrial samples.

LPSC maintains its position as the major focal point for discussion of planetary science issues worldwide. USRA has organized the premier conference for lunar and planetary scientists in the world since the 1971 LSC in Houston during the last stages of the Apollo missions. Since that first conference, USRA has organized 44 additional LSC or LPSC meetings, with



attendance growing steadily over the years. As the meeting has grown, LPSC has outgrown facilities at JSC and in the surrounding Clear Lake area, but retains a strong connection to Houston and the space program. Despite its size, LPSC remains a community-focused conference and the collegiality and open discussion of ideas is more like a meeting a fraction of its size. Students consistently comprise around 30% of attendees, making this meeting the premier opportunity for students in planetary science to make contacts and have easy access to senior colleagues.

In addition to the annual LPSC meeting, the LPI sponsors numerous conferences and workshops. Conferences organized by the Institute support mission activities as well as provide the major venue for discussion of planetary science research and analysis.

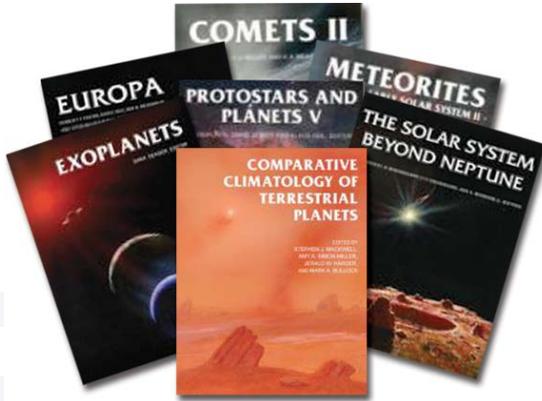
NASA's RPIFs provide convenient access to image and map data from the American lunar and planetary missions of the last 50 years as a resource to space scientists and the broader community of interested laypeople. These data include hard-copy paper and film positives, negatives, and mosaics; digital copies of select products are continually added to the collections. The LPI RPIF holds special expertise in lunar science and exploration, and data from lunar robotic and human missions (including extensive information on lunar samples) make up the bulk of the unique collections. The LPI RPIF also maintains a large collection of supporting information and study reports, including Apollo experiment reports, mission plans, transcripts, crew debriefs, and advanced studies to support future human and robotic exploration of the Moon. In the last decade, the LPI RPIF has made major progress in creating a comprehensive online digital archive of lunar maps, images, and reports. The collection includes a variety of online atlases and map collections for the Moon, as well as one of the largest lunar sample digital archives.



The LPI library organizes and maintains a collection of space science-related materials in a variety of media, including books, journals, documents, maps and images to facilitate lunar and planetary science research and disseminates information to the educational and public communities. Reference services are provided to scientists, educators, students, media representatives and the public requesting information related to lunar and planetary science.



LPI provides pre-publication services for books published in the prestigious Space Science Series of the University of Arizona Press. This series provides the planetary and space science community with a set of reference and source volumes that act as benchmarks for our current understanding of the field. Even more importantly, these volumes serve as gateways for new students and researchers to these fields. With nearly 40 volumes published over 40 years, Space Science Series books are found on the desks and shelves of virtually



every practicing planetary scientist and in the libraries of planetary and space science institutions worldwide.

In 2013, LPI launched *Planetary News*, an informational online news service for the planetary community. News and announcements are posted rapidly on the website, which provides a searchable database with links to the original materials, aggregated once a week in an e-mail to subscribers.

The quarterly LPIB, which began in 1974, targets a diverse audience comprising scientists, educators, interested laypeople, and libraries. The LPIB is published electronically on the LPI website, and notifications of the availability of each new issue are distributed via e-mail, Facebook, Twitter, and other social media. Issues of the LPIB include articles recapping interesting mission-related science, upcoming missions, highlights of recent scientific meetings, description of new tools and resources for researchers, a spotlight on EPO, obituaries for prominent members of the community, awards and other important milestones, descriptions of new and noteworthy products, and a calendar of upcoming planetary science meetings.

The quarterly LPIB, which began in 1974, targets a diverse audience comprising scientists, educators,

The LPI website contains a vast collection of scientific and technical data, as well as substantial collections of EPO and conference resources for the scientific, technical, engineering, education, and outreach communities. The website also supports the advisory structure for NASA, acting as the primary repository for meeting information, study findings, and background resources for CAPTEM, the Lunar Exploration Analysis Group (LEAG), the Outer Planets Assessment Group (OPAG), the Small Bodies Assessment Group (SBAG), and the Venus Exploration Analysis Group (VEXAG), and as the medium for fast dissemination of presentation materials from the Planetary Science Subcommittee of the NASA Advisory Council. Periodically, new pages are established at the request of NASA to disseminate information, such as during the recent reorganization of the Planetary Research and Analysis program. Pages were also established for the collection of White Papers for the most recent Planetary Decadal Survey at the request of the U.S. National Research Council.

### Education and Public Outreach

The LPI brings extensive experience and expertise in conducting a diverse portfolio of EPO activities directed at all educational levels and designed to enhance public appreciation of lunar and planetary science. EPO is an integral part of all LPI core activities, purposefully designed around LPI's scientific mission and NASA's vision of sharing planetary discoveries.





The LPI conducts trainings for formal and informal educators in the form of hour-long, day-long, and week-long professional development workshops. Trainings are designed based on audience need, and are tied to national and state science standards.



The LPI engages the local — and extended — community in lunar and planetary science and exploration. LPI holds family events several times a year by partnering with the JSC Astronomical Society to engage families in SkyFest, a celebration of celestial events or NASA milestones. Each event typically includes presentations by LPI staff scientists and postdoctoral fellows, hands-on explorations, story-time reading, and telescope viewing. The events are thematically based, with all activities tied to central learning themes and messages.

The LPI also holds an annual public lecture series designed to engage inquisitive adult members of the general public in current relevant topics in space science. The recorded presentations are archived on the LPI Education webpages for public viewing. In FY14, 780 visitors attended the Cosmic Exploration Lecture Series.

LPI also conducts student research programs, collaborates with other NASA organizations to host the International Observe the Moon Night, and shares a variety of resources with its audiences.

### **A Look to the Future**

Over the last 47 years, the complexion of the Institute has changed as NASA and its strategic focus have grown and evolved. However, amidst the dynamic environment in which the Institute operates, its underlying mission and key objectives of scientific excellence and service have not changed. Today, the LPI is an intellectual leader in lunar and planetary science. Our mission remains: to serve as a scientific forum attracting world-class visiting scientists, postdoctoral fellows, students, and resident experts; to support and serve the research community through publications, meetings, and other activities; to collect and disseminate planetary data while facilitating the community's access to NASA science; and to engage, excite, and educate the public about space science and invest in the development of future generations of explorers.

**About the Cover:**

*Top:* The LPI's first permanent home was the West Mansion, an Italian-Renaissance-style building located on a wooded tract of land adjacent to NASA's MSC.

*Inset top:* Styles may have changed, but the passion for science remains the same. Many of the students who have participated in LPI's summer intern program have gone on to become prominent researchers in the field.

*Inset bottom:* LPSC has grown exponentially from its early years at NASA MSC (now JSC), and one of the positive results of that growth is that it has become a meeting that is both accessible and important to young scientists, as reflected by the fact that student participation makes up nearly 30% of the overall attendance.

*Bottom:* LPI began operations in 1992 in its new home, a 48,000-square-foot building on a 9-acre tract of land located in close proximity to JSC and adjacent to the University of Houston–Clear Lake.

The *Lunar and Planetary Information Bulletin* collects, synthesizes, and disseminates current research and findings in the planetary sciences to the research community, science libraries, educators, students, and the public. The *Bulletin* is dedicated to engaging, exciting, and educating those with a passion for the space sciences while developing future generations of explorers.

The *Bulletin* welcomes articles dealing with issues related to planetary science and exploration. Of special interest are articles describing web-based research and educational tools, meeting highlights and summaries, and descriptions of space missions. Peer-reviewed research articles, however, are not appropriate for publication in the *Bulletin*. Suggested topics can be e-mailed to the editors, who will provide guidelines for formatting and content.

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Copy deadline for the next issue: February 15, 2016

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The *Bulletin* is published quarterly by the Lunar and Planetary Institute (LPI), 3600 Bay Area Boulevard, Houston TX 77058. Material in this issue may be copied without restraint for library, abstract service, education, or personal research purposes.

ISSN 1534-6587

*The LPI is operated by the Universities Space Research Association under Award No. NNX15AL12A from the Science Mission Directorate of the National Aeronautics and Space Administration. Any opinions, findings, and conclusions or recommendations expressed in this issue are those of the author(s) and do not necessarily reflect the views of the National Aeronautics and Space Administration.*