



SMITHSONIAN Folklife Festival

2008

Bhutan: Land of the Thunder Dragon

NASA: Fifty Years and Beyond

Texas: A Celebration of Music, Food, and Wine



The 2008 Smithsonian Folklife Festival

Blowing Land of the Thunder Dragon

MAKING Fifty Years and Beyond

Texas: A Celebration of Music, Food, and Wine



(Left) Dubbed the "Dancing Cowboy" by his devoted fans, conjunto accordionist Mingo Saldivar is known for his vigorous performance style. Photo courtesy Texas Folklife Resources
(Right) Educator astronaut candidates Dottie Metcalf-Lindenburger, Ricky Arnold, and Joe Acaba (with microphone) answer questions about their training in a webcast at NASA headquarters in Washington, D.C. Photo courtesy NASA

(Left) Astronaut Heidemarie Stefanyshyn-Piper waves to the camera while participating in extravehicular activity (EVA) as construction continues on the International Space Station in September 2006. Photo courtesy NASA
(Right) The annual community religious festivals (*tsechus*) celebrate the life of Guru Rinpoche and the arrival of Buddhism in Bhutan. Photo by Andrew Connors



The annual Smithsonian Folklife Festival brings together exemplary practitioners of diverse traditions from communities across the United States and around the world. The goal of the Festival is to encourage the vitality of these traditions by presenting them on the National Mall so that tradition-bearers and the public can learn from one another and understand cultural differences in a respectful way.

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BHUTAN: LAND OF THE THUNDER DRAGON

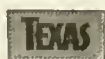
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NASA: FIFTY YEARS AND BEYOND



This program is produced in partnership with the National Aeronautics and Space Administration (NASA). Jacobs Technology Inc. is a Donor to the program. Contributors to the program are Lockheed Martin, Boeing, Northrop Grumman, and United Space Alliance.

TEXAS: A CELEBRATION OF MUSIC, FOOD, AND WINE



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Masked dances in Bhutan provide important communal opportunities for celebrating traditional Buddhist teachings. Photo by Andrew Connors

The Festival: A View from the Castle

Richard Kurn, Acting Under Secretary for History, Art, and Culture,
Smithsonian Institution

For the past three decades, I've been outdoors on the National Mall, looking up at the Smithsonian Castle, while we prepare for the Smithsonian Folklife Festival. This year, due to transitions in the Smithsonian's leadership, I've watched the preparations through a window in the Castle. What do I make of the Festival from that perspective? How do I understand this annual gathering of people who come from across the country and the planet to share their traditions with other human beings?

When you work in a building funded by a nineteenth-century Englishman's bequest, a building that stores his bones and one that saw the development of the first weather map, the card catalog system, and Civil War-era visits by Abraham Lincoln, you immediately think of history and look for antecedents. James Smithson, a chemist and mineralogist, left his fortune to the United States in order to establish in Washington an institution dedicated to "the increase and diffusion of knowledge among men." He became interested in sharing cultural knowledge after visiting a display of ancient and modern Mexican traditions in London. Joseph Henry, the first secretary of the Smithsonian, made the documentation and understanding of American Indian origins and life ways a central part of the Institution's research mission. Henry's assistant, Spencer Baird, who became the second secretary and really started the Smithsonian down the path toward becoming the nation's museum, wanted to bring American Indians to the Mall in the 1870s to demonstrate their cultures—a proposal rejected by Congress.

The Smithsonian Folklife Festival started in 1967, with support from Secretary S. Dillon Ripley, who famously declared, "take the instruments out of their cases and let them sing." For Ripley and Festival founder Jim Morris, the Festival was a way of livening up the museum. For the Festival's first director, Ralph Rinzler, it was a way of showing the value of diverse cultural traditions and literally giving them standing in the nation's most important space—the National Mall. The Festival was the cultural equivalent of the political March on Washington, led by the Rev. Martin Luther King, Jr. It was a way of allowing the voices of the people to be heard in the heart of the country's democracy.

The Festival was a feature of the U.S. Bicentennial in 1976 and has since emerged as a major vehicle for the representation of grassroots cultures. Enormously popular have been programs on the folkways of states (Hawaii, Iowa, Louisiana, Michigan, and New York), nations and regions of the world (Haiti, India, Mali, Mexico, Northern Ireland, Scotland, the Silk Road, South Africa, and Tibet with the Dalai Lama), and occupations (masters of the building arts, trial lawyers, and even Smithsonian workers). They have produced positive effects "back home," such as new publications, films, Web sites, and recordings that have won Academy, Emmy, GRAMMY, and Webby awards. The Festival has generated huge archives of research and documentation for scholars and educators. As a model of cultural practice, it greatly influenced UNESCO's 2003 International Convention on the Safeguarding of the Intangible Cultural Heritage, which has now been ratified by ninety-four countries.

Many books and articles have been written about the Festival, including a special issue of the *Journal of American Folklore* this year. In its pages, former fellows and colleagues examine the Festival and particular programs and practices in laudatory and critical ways. At a time when many academic treatments in the social sciences and humanities seem intent on emphasizing the dystopian aspects of institutions, the utopian visions of the Smithsonian and the Festival shine through. The Festival embodies the Smithsonian ideal that knowledge can be a force for individual and social betterment. It stubbornly, against all bureaucratic odds, pursues the idea that sharing cultural knowledge, wisdom, skill, and artistry can contribute to understanding, tolerance, and a greater appreciation of human diversity. That's a big purpose worthy of a great institution, and while we at the Festival and the Smithsonian might not get it right all the time, imperfection should not keep us from pursuing its realization. Our efforts are evident every day in our museums and every moment of the Festival.

Lessons Learned from Many Voices

Dillard Kennedy, Acting Director, Office for Traditional Folklore and Cultural Heritage

A recent special issue of the *Journal of American Folklore*, "Constructing Folklife and Negotiating the Nation(al): The Smithsonian Folklife Festival," provides an opportunity for Festival staff, participants, and visitors to view the Festival through the academic lenses of six scholars. Looking at three American and three international programs, these writers shed light on the complex process of organizing the Festival and, in several cases, also describe the responses of participants and audiences. The Festival visitor would do well to read these analyses to gain a better appreciation not only of the complexity behind Festival organization, but also of the many voices in that organization. For more information about the journal, go to www.afsnet.org/publications/jaf.cfm.

The Festival has always been particularly proud to provide a place for cultural practitioners to discuss the joys and challenges of nurturing their arts in an ever-widening world, as well as to demonstrate them to the public. However, a quick glance at the back section of this program book will show that hundreds of people have actually been involved in what may appear to be the simple task of providing a stage for the participants. The Smithsonian Folklife Festival is not only a place for Festival visitors to see, listen to, and engage traditional artists, but it also, in effect, represents a process that has involved the input of Smithsonian curators, community leaders, government officials, National Park Service regulators, university scholars, program funders, and others. The Festival you witness on the Mall is due to the efforts of myriad people, and what ties them together is a commitment to provide the most appropriate context for you, the visitor, to meet extraordinary traditional artists.

A community leader may place the health of his community before that of the individual; the government official may have the good of the whole nation rather than that of the local community in mind when agreeing to cosponsor a program; the scholar may fear that, in spite of its best intentions, the Festival depoliticizes culture or participates in wider global movements that commercialize and undermine traditional arts; corporate funders may represent products that displace traditional crafts; and the Park Service is always concerned about the aesthetics of the Mall. Each of these voices may compete for a place in the program. But in my experience, all the people I have worked with in the organization of a Festival program recognize and support the crucial role that traditional arts play in the health of a community. That's why they're involved.

Smithsonian staff members are negotiators of these voices. The program curator works closely with his or her counterparts in the cosponsoring organization. Often these counterparts take a role in participant selection and even program design. But it is the curator's job to ensure that, whenever possible, everyone is heard in the development of the program. Articles like those in the *Journal of American Folklore* provide us with the voice of academic analysts, and annual surveys give us the responses of visitors. We welcome your opinions, and hope that, together, all voices will strengthen the Festival.

Welcome to the 2008 Festival

Diana Parke, Festival Director

The Festival is always wondrous, and this year is no exception. You will meet winemakers from Texas, Bhutanese silk weavers, and robotic engineers from NASA. All are masters of their trades, who can share deep knowledge of their arts and occupational skills with you. What makes the Festival truly extraordinary, however, is that the juxtaposition of programs creates an event that is greater than the sum of its fascinating parts.

We are often asked how we put together each year's combination of programs. The answer is we don't. It takes several years to produce programs, and the mix of programs is based on timing rather than planning. Selecting a program for the Festival is a very democratic process. Anyone can recommend one; curators, audience members, ambassadors, state department officials, and friends have suggested recent programs. We answer four questions about an exhibit before we proceed:

- Is there an interesting story that will work as a Festival program?
- Are there specialists who can help us research and shape the story?
- Are there overriding issues that might make it impossible to produce the program?
- Are we confident that we can fund it?

When we are satisfied with the answers to these questions, we schedule a program in the next available year. As you might imagine, this process creates some surprising combinations.

As we slotted this year's three programs into the schedule, we inspired some especially puzzled looks. But once we decided to produce the programs, the fun began. While the Bhutan, NASA, and Texas programs were conceived, documented, funded, and organized separately, their staffs still found surprising overlap.

To begin with, Texas is home to the Johnson Space Center, NASA's center for human spaceflight activities. We learned that the campus of The University of Texas at El Paso is filled with Bhutanese-style buildings, thanks to a dean's wife who fell in love with photographs published in *National Geographic* magazine in the early 1900s. And Bhutan, for years, has commemorated the U.S. space program with postage stamps.

At the Festival, we explore some even more interesting intersections. This year, you can hear an astrologer from Bhutan and an astronaut from NASA discuss the heavens and a Texas singer-songwriter sing "Have You Ever Seen Dallas from a DC-9 at Night?" The next day, you can ask a specialist from NASA's food lab and a chuckwagon cook from Texas about preparing food for remote locations. And I guarantee that before the Festival is over, traditional Bhutanese will dance to time-honored Texas dance tunes, and Texas musicians will learn dances from Bhutanese.

All of us face similar situations in our lives. Nowhere but here at the Festival can you enjoy such a rich variety of interpretations of our common circumstances.

2008 Annual Ralph Rinzler Memorial Concert: The Conjunto of René López and Ralph Rinzler

James Earl

Ralph Rinzler, founding director of the Smithsonian Folklife Festival, worked with countless gifted musicians, folklorists, and producers to conduct fieldwork, create publications and recordings, present concerts and public programs, and implement new cultural policies that led to diversity in the Smithsonian's workforce and programming. He was a strategic and outspoken promoter of collaboration with community-based artisans, musicians, academics, and cultural activists with whom he diligently worked to facilitate the Smithsonian's acquisitions and employment of professional staff to represent communities that were, in the polite parlance of the time, "underrepresented" at the Institution. The Ralph Rinzler Memorial Concert celebrates Ralph's mind and spirit, his untiring and wide-ranging cultural work, his all-encompassing humanity, his commitment to traditional musicians and artisans, and his never-ending will to increase and diffuse knowledge in support of cultural democracy.

The 2008 concert honors New York City's René López, a grassroots cultural activist, lay scholar, educator, collector, and music producer. René was among Ralph Rinzler's special friends and colleagues in many groundbreaking field research projects and musical endeavors.

René exemplifies the principles of recognition and respect for creative and expressive agency and profound community-based knowledge that Ralph Rinzler fostered in founding the Folklife Festival and in building the Smithsonian's Center for Folklife and Cultural Heritage. Self-taught through direct observation and lifelong conversations and formal interviews with musicians and through fraternal ties with artists, their families, and their communities, René is deeply loved by local, national, and globally acclaimed musicians. Music writer Alan Lockwood describes René as "one of Latin music's great offstage presences as lay scholar and producer of Rockefeller Foundation and Smithsonian recordings."

As an associate and advisor to Smithsonian Folklife and Folkways projects, René López almost certainly has a longer and broader relationship than anyone at the Smithsonian with Afro-Caribbean traditional music and musicians. His grounding in Latino music and community celebrations,

especially those of New York City, and his exceptional connection to Cuban musicians and ethnomusicologists in Cuba were central to the evolution of Ralph Rinzler's musical taste, Cuban ties, Festival productions, and Folkways recordings.

They met in 1975 when the Center for Puerto Rican Studies at New York's Hunter College invited René to join them in a meeting with Ralph at his Washington, D.C., home to discuss presenting Latino musicians at the Folklife Festival. Although they came from different cultural and class backgrounds, René and Ralph bonded because of their dedication to collaborating with musicians who identified with their communities as much as with their artistry.

Both were keen on research, documentation, and respectful presentation of musicians and their genres and on the importance of disseminating grassroots arts and traditions to diverse audiences across the world.

Their collegiality led to years of Smithsonian performances, archival documentation, recordings, and public programs. In New York City, Ralph made yet unpublished field recordings of Arsenio Rodríguez, whom René called "the founder of modern salsa music and most important spokesperson of the time for the underlying religious and social worldview of Afro-Cuban music." At the 1969 Folklife Festival, Ralph recognized Arsenio as a "folklore treasure, not just a popular musician." René recalls that Ralph was captivated by the harmonica player Francisco Tan of the group *Montañez y Sus Pleneros de la Ciento Diez* (110th Street).

Born in 1939 in the Bronx, New York, René, in the midst of a vibrant musical and dance culture of the 1940s and 1950s, encountered great musicians like Tito Puente, Machito, Marcelino Guerra, and the renowned Cuban band *Sonora Mantancera*—to whom he later introduced Ralph—in well-attended clubs like New York's Palladium, where his Uncle Catalino Rolon booked talent. His socially grounded music taste set him on a lifelong course to friendships with legendary musicians like Arsenio Rodríguez, Alfredo "Chocolate" Armentero, Johnny Pacheco, Eddie Palmieri, Ray Barreto, Manny Orquendo, and Tito Puente. His encyclopedic knowledge of Afro-Cuban and Afro-Caribbean musical traditions in the Caribbean and New York City attracted the interest

of young musicians like the González Brothers (Andy and Jerry), Nelson González, Oscar Hernández, Milton Cardona, and others who would emerge as leaders in various genres of Latino music. Legendary Afro-Caribbean jazz pianist Eddie Palmieri insisted that younger band members “spend time with René López.” Bassist Andy González, considered one of the foremost music authorities, told me that René became a mentor to him, “responsible for my education, sharing everything I needed to hear when I was studying and applying jazz scholarship to learn, because there were no books—only history from René and his collection—when we were up and coming young musicians.”

In 1974, Ralph, his wife Kate, my wife Miriam, Jim Rooney (a specialist on bluegrass music), and I visited René and his family in their Bronx apartment, where the soon-to-become-celebrated Grupo Folklórico y Experimental Nuevayorquino was rehearsing their first double-album *Concepts In Unity*, which drew upon traditional Afro-Caribbean styles such as rumba, *son*, bolero, *bomba y plena*, and the poetics of traditional, community-based storytelling and social singing to create a powerfully contemporary music. Their style called attention to New York-based Afro-Caribbean tradition bearers, attracted audiences in Cuba (the musical source and religious inspiration for so many of their broad, distinctive musical talents), and synthesized Afro-Caribbean and “Nuevayorquino” musical traditions.

Grupo Folklórico, comprised of many members with roots in the South Bronx, became legendary for experimental recordings that brought together some of the most gifted, often little-noticed elder composer-musicians (with deep connections to Puerto Rican and other Caribbean and Latin American communities and audiences) with some of the brightest young musicians, who would go on to master traditional musical genres, become major innovators in various Latino and other musical genres, and continue to explicitly identify themselves and their art as grounded in traditional, community-based music and participation.

Among the original Grupo Folklórico guest musicians were the celebrated Julito Collazo (with whom renowned Cuban anthropologist Fernando



René López, Mario Bauza (“the Father of Latin Jazz”), Israel “Cachao” López (one of the creators of the mambo), and Gaiovanni Hidalgo (one of Latin music’s greatest percussionists) gather in New York City in 1982. Photo courtesy Harry Sepulveda

Ortiz consulted in his groundbreaking work on Cuban African-descended music and culture) and the recently deceased Patato Valdez, once popularly described as the “world’s greatest conga player.” These musicians joined other tradition bearers—such as Los Pleneros de la 21; Israel “Cachao” López, the “inventor of mambo”; Jesús “Chucho” Valdés, the extraordinary Afro-Cuban jazz pianist—and a younger generation of Latino musicians, including Andy and Jerry González, Papo Vásquez, and Manny Orquendo, all of whom, through direct connections to René López, performed at the Smithsonian and enriched its archival and recording collections.

The historical friendship and collaboration between Ralph Rinzler and René López continue to bear fruit, most recently in the 2007 Smithsonian Folkways recording *Tío Tom* produced by René.

James Counts Early is the director of Cultural Heritage Policy at the Smithsonian Center for Folklife and Cultural Heritage. He served as deputy assistant secretary when Ralph Rinzler was assistant secretary for Public Service at the Smithsonian, and he is a close friend and longtime colleague of René López. He works on the development of cultural heritage policy and is an activist for cultural diversity and equity issues in national and international institutions.

Bhutan

By Susan S. Small



The Thunder Dragon Comes to Washington

(Far left) Bhutan's geography is punctuated by elegant architectural forms unique to the remote eastern Himalayan kingdom. Photo by Beth... (Second from left) The deep respect for cultural traditions still found in Bhutan is reflected in clothing styles, as well as in reverence for rituals incorporating important artistic skills practiced for generations. Photo by Julia Bremner. (Third from left) Painting is one of the thirteen traditional arts of Bhutan, known as *zorig chusum*, celebrated at the 2008 Smithsonian Folklife Festival. Photo by Preston Scott. (Right) With more than half of its population under the age of twenty-five, Bhutan looks toward a new future in the twenty-first century that will necessarily bring change but will build on the country's rich and independent cultural foundation. Photo copyright Michael Tobias.



More than a thousand years ago, the great Indian teacher Padmasambhava came to the remote part of the eastern Himalayas now known as Bhutan. Although Padmasambhava (or "Guru Rinpoche," as he is known in Bhutan) was not the first Buddhist teacher to come to this part of the Himalayan region, his presence proved to be a defining and lasting influence on the life and culture of Bhutan.

Guru Rinpoche was an important historical figure, highly respected for his compassion and wisdom in India and Tibet before he ever traveled to Bhutan. He first arrived in central Bhutan before moving west to the Paro Valley sometime in the eighth century. According to tradition, he reached a high cliff-side cave 2,000 feet above the Paro Valley floor atop a flying tigress. For anyone who has been lucky enough to see the site today (the location of the great Taktsang, or Tiger's Nest, monastery), it is easy

to understand why this may be the only reasonable explanation of how he got there.

Bhutan's landing on the National Mall for the Smithsonian's forty-second annual Folklife Festival may be understood as another flight of the tigress. And the "tigress" arrives just when Bhutan's Gross National Happiness (GNH) measure of development is inspiring important thought and discussion about what makes a good society. GNH, which is not unlike Thomas Jefferson's "pursuit of happiness" in the U.S. Declaration of Independence, will be celebrated during the Festival.

The Smithsonian is very happy to host Bhutan at the 2008 Folklife Festival, the ceremonial heart of the capital city of the United States. The event provides a very special opportunity for American and international audiences to experience firsthand the remarkable life and culture of the place traditionally known as Druk Yul (Land of the Thunder Dragon).

Bhutan is a small country, about the size of West Virginia, with a population of fewer than a million people. Although bordered by only India and China (the world's two most populous countries), its geographically isolated location, high up in the rugged eastern Himalayas, has kept it unknown to most of the world.

Few places on Earth have such great natural beauty or have such a rich cultural heritage as Bhutan. Its vertical landscape rises abruptly from the steamy lowland plains of Assam in northeastern India to some of the world's highest peaks along Bhutan's northern border with the Tibetan region of China. Its diverse ecosystems—representing most of the climatic zones found on the planet—provide refuge to thousands of species of birds, plants, insects, and mammals. Pristine habitats support a dazzling variety of orchids and rare plants, including the legendary blue poppy. There are rare birds and mammals such as yak, takin, snow leopards, blue sheep, red pandas, and black-necked cranes in the highlands, as well as elephants, tigers, rhinos, and golden monkeys in the southern lowland jungles. Sometimes called the “Land of Medicinal Plants,” Bhutan also has a rich traditional

pharmacopoeia that draws from the country's rich biodiversity. Bhutan is one of the most treasured biodiversity hot spots in the world.

The history of Bhutan is closely associated with the development of Buddhist culture throughout the Himalayas, and it is one of the last places on Earth where the Vajrayana form of Mahayana Buddhism is practiced. It is the home of the Drukpa (People of the Thunder Dragon), who have lived in its isolated high valleys without occupation or colonization for more than a thousand years. Its geography has protected and defined its cultural heritage and traditions. Indeed, the first road to the outside world (India) was constructed only in the early 1960s. The total number of tourists has averaged below 20,000 annually.

The Bhutanese have worked very closely with their colleagues at the Smithsonian to showcase as many of their traditions as possible. Because Bhutan is so remote, the 2008 Smithsonian Folklife Festival offers what may be a once-in-a-lifetime opportunity for most people to experience the rich cultural life of the Bhutanese people. It will provide visitors the chance to witness or participate in Bhutan's many music and dance traditions, which are very rarely performed outside of the kingdom. In fact, some of Bhutan's highly symbolic, mystical masked dances will be performed for the very first time in the United States. Audiences will learn from the dancers themselves about the meaning of their elaborate costumes, complex steps, rhythmic chants, and music.

They will see in one place all of Bhutan's thirteen traditional arts (*zorig chusum*). Bhutan has taken steps to ensure that the arts of *zorig chusum* continue to be taught and practiced throughout the kingdom, and many of Bhutan's finest artists and craftspeople will be on the Mall to share their artistic skills and insights. Examples of their work will be displayed throughout the Festival site to show how Bhutanese traditional arts are incorporated into the daily lives of Bhutanese people.

Visitors will also encounter examples of Bhutan's architectural heritage and have the chance to meet some of its finest builders. Representatives



Bhutanese masked dances reflect highly sophisticated symbolic understandings of life in a complex universe. Photo courtesy Bhutan Department of Tourism

from Bhutan's religious communities will share a unique, ten-day cycle of Bhutanese ritual life, while practitioners of Bhutan's traditional medicine and some of its most celebrated cooks will explain how contemporary Bhutanese continue to rely on the land for much of their daily sustenance, health, and well-being. Elsewhere on-site archers will demonstrate the national sport, which colorfully punctuates virtually every village celebration in Bhutan.

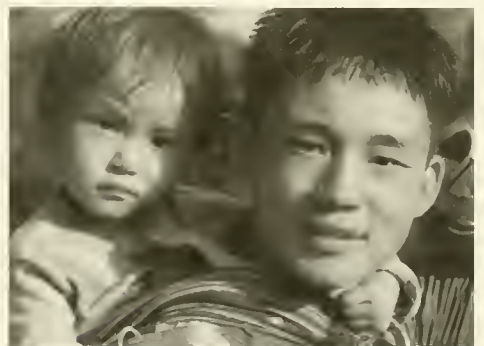
A popular Bhutanese tale—one that is portrayed throughout the kingdom in homes as well as in sacred and public places—is the story of “The Four Friends.” The characters include a peacock, a rabbit, and a monkey who stand on an elephant beneath a high tree abundant with fruit. According to the story, the peacock finds and plants a seed, which is watered by the rabbit and fertilized by the monkey. After the seed sprouts and the young plant starts to grow into a tree, the elephant protects it. Once the tree matures, however, its fruit is so high that it cannot be reached by any of the four animals. However, by standing on top of each other and combining their strengths, they are all able to reach the fruit and enjoy the reward of their cooperation.

In much the same way that the “Four Friends” work to achieve something that none of them could alone, the 2008 Smithsonian Folklife Festival's celebration of the life and culture of the people of Bhutan represents the fruit of cooperation among many people—participants, friends, and supporters—from opposite sides of the planet. For two weeks, the people of Bhutan will share their life and culture with the people of the United States and the world. It will be an intellectually and spiritually exciting experience that will surely spark a sense of discovery, adventure, and renewal.

བུ་ལྷོ་ལོ་བའི་ལོ་གསལ།

Tashi delek! (Good wishes!)

Preston Scott is on the curatorial committee of the 2008 Folklife Festival program Bhutan: Land of the Thunder Dragon. He has served as an advisor to the Royal Government of Bhutan on several environmental and cultural conservation projects and has traveled frequently to the eastern Himalayas. As a legal advisor and consultant to many international organizations, he has participated in environmental conflict resolution initiatives in more than twenty-five countries.



Most Bhutanese people have two proper names—a first and a second—although the “second” is not a “family” name as it is in many other cultures. In addition, most Bhutanese names are interchangeable and not gender specific. Accordingly, Bhutanese names are presented and used at the Festival and in Festival-related publications as they are known in Bhutan, while the names of others are presented alphabetically by “last” name.

(Upper) Pictures of “The Four Friends”—the peacock, rabbit, monkey, and elephant—decorate homes and important public buildings throughout Bhutan. They capture the ideal of harmony with nature and the importance of cooperation to social well-being. Photo by Preston Scott

(Lower) The Bhutanese people's approach to the concept of Gross National Happiness is rooted in a deep, abiding respect for the country's important resources and traditions, as well as in caring for the needs of present and future generations in a sustainable way. Photo copyright Michael Tobias



Treasures of the
Thunder Dragon

Her Majesty the Queen of Bhutan, Ashi Dorji Wangmo Wangchuck



Its spectacular natural beauty and pristine environment, its rich cultural heritage, and its unique culture, and its monarch's approach to governance, which measures the country's progress and development by Gross National Happiness, is the stuff of which legends are made.

For more than forty years, the Smithsonian Institution's annual Folklife Festival has afforded peoples around the world the opportunity to share their living cultures and traditions in the most open, interactive, and personal ways possible. Coming from one of the world's smallest and least known countries, we Bhutanese especially look forward to presenting many aspects of our life in the eastern Himalayas to people from the United States and other nations at this summer's Festival on the National Mall in Washington, D.C. We are very happy to be a living part of this wonderful, yearly tradition and are mindful of the great stage the Festival provides. We know that the outside world's reactions to Bhutan tend to swing between two extremes. It is perceived either as a paradise on earth or as a country completely isolated from the rest of the world and trapped in a time warp. Neither image is true. But it *is* true that Bhutan is like no other place in the world. Its spectacular natural beauty and pristine environment, its extraordinary architecture and living spiritual culture, and its monarchs' approach to governance, which measures the country's progress and development not by Gross Domestic Product but by Gross National Happiness, is the stuff of which legends are made.

Bhutan is one of the world's smallest, most remote, and least known countries, but is also one of its most environmentally pristine and culturally rich. Photo by Julia Brennan

For centuries until the 1960s when roads made the country accessible to the outside world, Bhutan was known as a forbidden land. Its isolation was not a deliberate political or historical choice but a consequence of its geography. Compared to its neighbors, Bhutan's population density is quite low—about sixteen persons per square kilometer. Bhutan is still a predominantly agrarian country, with 79 percent of the population dependent on agriculture for its livelihood and all Bhutanese owning their own land. However, because of geography, only about 8 percent of the land is arable. Forest covers approximately 72 percent of Bhutan's territory, and perpetual snows cover nearly 20 percent.

Bhutan's topography has to a large extent shaped the history and way of life of the Bhutanese people. The country can conveniently be divided horizontally into three geographic areas. The foothills of the south, which rise from the Indian plains to an altitude of 1,500 meters, have thick broadleaf evergreen forests,



fertile farmland, and a relatively high population density (at least by Bhutanese standards).

The central temperate zone—cut off from the foothills by the high ranges of the Inner Himalayas—has a succession of valleys at altitudes ranging from 1,500 to 3,500 meters. The hillsides are thickly forested with blue pine and other conifers, oak,



magnolia, maple, birch, and rhododendron. Farmers grow rice, millet, wheat, buckwheat, and maize, as well as cash crops like asparagus, mushrooms, potatoes, strawberries, apples, peaches, mandarin oranges, and cardamom. The capital Thimphu and most of Bhutan's major towns and monastic communities are located in this zone.

Above the temperate zone—at elevations ranging from 3,500 to 5,500 meters—there are subalpine and alpine highlands that are ringed by the towering snow-clad peaks of the Greater Himalayas, which include Chomolhari (7,300 meters) and Bhutan's highest peak Gangkar Puensum (7,541 meters). They are Bhutan's sacred mountains and most have never been climbed. In the summer months, the pastures are dotted with herds of yak and the distinctive black tents of the yak herders.

Several elements of Bhutan's culture bring together its diverse, sometimes-isolated peoples. Bhutan's official language is Dzongkha, which is spoken mainly in western Bhutan. However, in addition to English, there are two other major languages—Sharchopkha (spoken mainly in eastern Bhutan) and Nepali (spoken mostly in southern Bhutan). There are also up to nineteen major dialects, which have survived in isolated valleys and villages cut off from neighboring areas by high mountains.

Most Bhutanese continue to wear the traditional national dress—the *kira* for women and the *gho* for men. The *kira* is a rectangular piece of cloth about the size of a single bed sheet. The art of weaving,

which is done almost exclusively by women, is highly developed; an elaborate *kira* can take a whole year to weave. A *kira* is wrapped around the body and secured at the shoulders by a pair of silver clasps called *koma* and at the waist by a tight belt, a *keyra*. A *wonju* (an inner blouse with long sleeves) and a *tyoko* (an outer jacket) complete a woman's outfit. Unlike most Asian women, most Bhutanese have short-cropped hair cut in a fringe across the forehead (although some young women in Bhutan's emerging urban centers prefer longer hairstyles).

The man's *gho* is a one-piece costume rather like a kimono with broad white cuffs. The *gho* is pulled up to knee length and fastened at the waist with a tight-fitting belt that forms a deep pouch across the chest. This pouch is like a huge pocket and is used to carry all sorts of things—money, important papers, a wooden bowl for drinking tea, some hard cubes of dried cheese for snacking, and perhaps a little round box for carrying *doma* (betel nut, wrapped in a *paan* leaf smeared with lime paste).



(Above left) In Bhutan's agrarian society, people live very close to the land that sustains them. Photo courtesy Bhutan Department of Tourism

(Below left) Wedged between two of the world's largest countries (China and India) in the isolation of the eastern Himalayas, Bhutan's geography has allowed its people to live independently for more than a thousand years and has provided protected habitat for a dazzling diversity of rare plants and animals. Map courtesy National Geographic

(Right) The traditional *kiras* worn by Bhutanese women feature complex designs and take many months to weave by hand.

Photo courtesy Bhutan Department of Tourism

The most important events in the Bhutanese calendar are religious festivals. The major ones, which attract enormous crowds, are the *domchoes* and *tsechus*, held annually at the big monasteries and *dzongs* (enormous fortresses) all over the country. The dates vary from year to year, but most *tsechus* are held in autumn, which is a leisure period for farmers (although the very famous *tsechu* in the Paro Valley in western Bhutan is held in the spring). The highlight of a *tsechu* is the religious dances performed by monks and laymen in fabulous costumes and masks. Clowns known as *atsaras*—often carrying large wooden phalluses—entertain the crowds with their slapstick routines in between the dances. Many individual households hold their own private annual prayers, or *choku*, followed by a feast for the whole village.

Archery, or *dha*, is undoubtedly Bhutan's most popular sport. It is traditionally played with bamboo bows and arrows and two small targets placed approximately 145 meters apart at opposite ends of a field. (In international archery competition, the target is at a distance of only fifty meters.) Every village has an archery ground, and at important matches, the two competing teams are supported by lively groups of women "cheerleaders." On holidays, several archery matches can be underway at once. More and more common are expensive imported bows with pulleys that increase the speed and force of the arrows. They are coveted status symbols among Bhutanese archers, although traditional archers continue to use bamboo bows and arrows with great skill. *Khumi*, or darts, is another favorite sport played outdoors with the target placed at a distance of twenty meters.



A Meditation in Dance

by Lopen Lugtaen Gyatso

The *drametse ngacham* is a dance form that originated in Bhutan five centuries ago. Today, the Institute of Language and Cultural Studies is documenting the dance. The following is a rare insight into the tantric Buddhist teachings of this meditation in dance.

"If you know the purpose of the dance and what the dancers are visualizing, it is a very powerful experience," said a teacher at the Institute of Language and Cultural Studies. "Even the hair on my arm stands up as the trumpets, music, and intensity of the dance increase."

The *drametse ngacham*, one of Bhutan's best-known masked dances, was conceived in a powerful moment of intensive meditation. During a retreat, the dance came as a vision to a grandson of one of Bhutan's revered saints, Pema Lingpa.

In his vision, Khedup Kuenga Gyaltsen saw three beautiful, celestial women (*dakinis*) dressed in silken gowns and adorned with garlands of precious stones. The celestial beings guided him to the abode of Guru Rinpoche, where the deities performed a dance. Guru Rinpoche, the eighth-century spiritual teacher who brought Buddhism to Bhutan, later instructed Khedup Kuenga Gyaltsen to introduce the dance to the human world for the benefit of all living beings. Khedup Kuenga Gyaltsen noted the choreography of the dance and taught it at the Thegchog Ogyen Namdroel Choeling Monastery in Drametse in eastern Bhutan.

Sixteen people perform and ten others provide musical accompaniment in the *drametse ngacham*, making it the perfect example of Bhutanese masked dance. Refined artistic skills and a flawless balance between dancers and instrumentalists result in fluid, uniform, and complex movements. *Drametse ngacham* has twenty-one parts and lasts more than two and a half hours. The dancers wear spectacular, colorful costumes and masks representing real animals and mythical beings. All the masks symbolize the wrathful and peaceful deities of the pure lands of celestial beings. The dancers become manifestations of these deities.

Time and space are instrumental in creating different versions of *ngacham*. For many years, the dance was performed in relative isolation in the Talo, Trongsa, and Gangteng

Archery, Bhutan's national sport, provides frequent opportunities for communities to gather for festive competitions. The holes found in bread box-sized targets, shot at a distance of 145 meters (approximately 475 feet), reflect the staggering accuracy of Bhutanese archers. Photo courtesy Bhutan Department of Tourism



The *drametse ngacham* is a sacred masked dance that originated in central Bhutan more than 500 years ago. Inspired, according to Bhutanese Buddhists, by celestial performances in honor of Padmasambhava (Guru Rinpoche), the dance is revered throughout Bhutan and has come to signify the nation. By witnessing the dance and listening attentively to the sound of the drums, believers may acquire some spiritual enlightenment. UNESCO recognized the dance as a masterpiece of intangible cultural heritage in 2005. Photo courtesy Bhutan Department of Tourism

monasteries in central and western Bhutan. Today, *drametse ngacham* is widely performed in Bhutan; its choreography and meaning differ slightly from place to place.

Visualization is critical to *drametse ngacham*. The dancers picture the physical world, imagining it as the Buddha's land of magnificent glory, where all sentient beings are peaceful or wrathful deities with intrinsically pure, Buddha-like qualities. They visualize endless numbers of each deity, which slowly enter them and all things mortal to transform all ordinary beings into extraordinary deities. Finally, the beings and the deities become one. All visions are seen as manifestations of deities, all sounds as divine speech beyond human understanding, and whatever appears in the mind as the great realization of ultimate reality. The dancers establish spiritual contact with the audience through this powerful visualization, which serves to transmit the awakening state of mind to all who are watching. The *drametse ngacham* is truly a meditative art form.

The dancers must undergo rigorous training to achieve the right state of mind for the dance. This explains why the dancers and the ritual master have to complete a course in *ngondra* (preliminary meditation practice) and, if possible, a class in *losum chogsurn* (a three-year and three-month meditation retreat). The physical dance itself requires years of training in order to attain perfect synchrony among dancers.

Unlike other dances, the *drametse ngacham* transcends the physical performance to become a means of enlightenment. It is a didactic way to impart the sacred Mahayana tantric teachings that epitomize the path to liberation and victory over negative and evil forces. The *drametse ngacham* is believed to

destroy all evils and natural calamities to establish peace and harmony. Dancers cultivate a pure vision that reflects the Buddhist concept of direct liberation from *samsara* (world of suffering). The dance exudes a spiritual energy that permeates the whole atmosphere.

The *drametse ngacham* is evidence of a unique living cultural expression. Its strong impact on society is articulated through its popularity in the whole of Bhutan and its dominance at most religious and secular ceremonies. The Bhutanese believe that this dance has the power to cleanse all defilements and negative mental actions of the dancers and the audience.

Bhutanese find the *drametse ngacham* spiritually empowering. They believe that a person has to see the dance at least once in life in order to be able to recognize the deities in the *bardo*—the intermediate state between life and death, where all the deities that appear in the *ngacham* are present to lead the deceased person to higher realms. The sacred texts state that, just by watching this dance, people can be liberated from rebirth or avoid rebirths in lower realms.

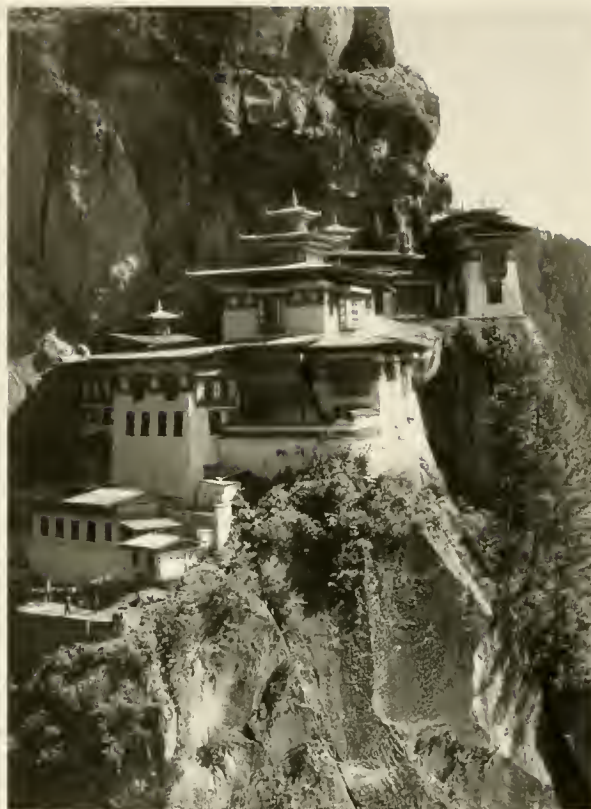
Lopen Lugtaen Gyatso is the director of the Institute of Language and Cultural Studies (ILCS). Under his stewardship, the ILCS has produced research on *drametse ngacham* (*the Drum Dance from Drametse*), which was designated by UNESCO in 2005 as a masterpiece of intangible cultural heritage. *Lopen Lugtaen Gyatso*, a scholar and monk, obtained a master's degree in Sanskrit from the University in Varanasi before joining the civil service of Bhutan.

Bhutanese call their country Druk Yul (Land of the Thunder Dragon). According to legend, nearly a thousand years ago, a Tibetan monk heard thunder during the consecration of a monastery. He believed it was the voice of a *druk* (dragon), loudly proclaiming the Buddha's teachings.

Little is known about the early history of Druk Yul, although archeological evidence suggests that Bhutan was inhabited as early as 2000 B.C.E. Oral tradition indicates that at the beginning of the first millennium, the country was inhabited by semi-nomadic herdsman who moved with their livestock from foothills to grazing grounds in higher valleys in the summer. Like other inhabitants of the Himalayan region, they were animists, many of whom followed the Bon religion, which held sacred trees, lakes, and mountains.

By the eighth century C.E., with the advent of Buddhism in the eastern Himalayas, Bhutan's history became closely entwined with religious figures and the myths and legends associated with them. In the early seventh century, the Tibetan Buddhist king Songtsen Gampo built the first temples in Bhutan. But another century passed before Buddhism actually took hold in Bhutan. In 747, the Indian saint and teacher Guru Padmasambhava first came to Bhutan. Legend says that he manifested himself riding a flying tigress and stayed in a meditation cave in a cliff in the Paro Valley in western Bhutan (now the site of the famous monastery of Taktsang, or Tiger's Nest).

Guru Padmasambhava—or Guru Rinpoche, as he is more commonly known in Bhutan—was a historical figure, one still highly revered in Bhutan. He was born in Uddiyana in the present-day Swat Valley of Pakistan and became a renowned sage in India and Tibet. He visited many parts of Bhutan during his lifetime, performing miraculous feats and winning people over to Buddhism. During this period, many local deities became assimilated into the Bhutanese Buddhist pantheon (usually as the protecting deities of a particular village or valley). Many Bon practices, particularly those that hold nature sacred in its many manifestations, have been integrated into the Mahayana Buddhism practiced in Bhutan. But there are still some isolated pockets in the country where the Bon religion, with its shamanistic practices, lives on. Bhutanese



In the eighth century C.E., the Indian Buddhist Padmasambhava (popularly known as Guru Rinpoche) traveled to many places in Bhutan while teaching Buddhism. He later meditated in a cave high above Paro Valley, arriving (it is said) on the back of a flying tigress. The magnificent Taktsang, or Tiger's Nest, monastery, which clings to the rock face thousands of feet above the valley floor, now memorializes the site of the cave. Photo by Preston Scott

culture remains both deeply spiritual and robustly earthly, owing much to the religious traditions that have influenced the country for more than a thousand years.

Today, more than 2,000 temples and monasteries throughout Bhutan and the ubiquitous presence of red-robed monks indicate the important role that Buddhism continues to play in almost every aspect of Bhutanese life. Every district in the country has a *dzong*, which houses the official local monastic community, and several temples. And every village has a temple, around which the life of the community revolves. People of Nepali origin, who live mainly in southern Bhutan, follow Hinduism, the other major religion in the country.

Three Marks of Faith

by Karma Ura

Bhutan is a deeply spiritual country, where religious customs strongly influence people's values. Three marks of faith shape the Bhutanese personality.

The first is prayer. Prayer includes short, daily individual acts and liturgies led by monks or lay priests that continue for days. The purpose and duration of prayers vary greatly. Typically, prayers concern what people desire in this life, but they may stretch into the next life. Rituals and petitioning prayers are conducted frequently to solicit gracious and compassionate actions from protector deities. Prayers may consist of mantras or sutras (the Buddha's teachings). They may be profoundly lyrical and non-sectarian or philosophical. Prayers may represent narrow interests. But traditionally, most feature soul-lifting wishes for justice and the well-being of all life-forms—the path that will lead them to happiness. As teachings, prayers should stimulate reflection and practice of the central values of Buddhism, such as compassion. Their function is ultimately to shake off the believer's convoluted and cloudy conscience, which so easily relapses into individualistic self-centeredness. At a more sophisticated level, prayers help believers discover what Buddhist philosophers have described as the "wisdom mind," which can distinguish between the ultimate reality of things and the mental constructions people take to be real.

Another mark of faith, or shared trait among the Bhutanese, is the spirit of volunteerism in the construction of community temples and the installation of spiritual offerings in temples. A 2004 national survey confirmed that no infrastructure activity required more communal labor than that required for construction and maintenance of temples. The annual labor contribution of each household to large and complex temples surpassed the voluntary labor spent in building community schools and suspension bridges and safeguarding sources of drinking water. And it explains the profusion of temples all over the country.



There are about 2,000 temples in Bhutan, which means that people are never too far away from their objects of veneration. Serene statues are the centerpieces of temples. These statues contain scriptural teachings of the Buddha and body relics of eminent Buddhist masters. Thus, temples signify the presence and representations of the Buddha and help to project Buddhist insights.

Stupas (Buddhist memorials that usually house holy relics) remind Buddhists to open their minds to understanding the interdependence of everything, as explained by the teaching of Interdependent Origination. They should realize that every person can contribute to others' happiness and well-being and that each person needs contributions from others to achieve happiness. Happiness depends on sustaining a pattern of giving in meaningful relationships.

The third shared trait, or mark of faith, is the strong Bhutanese belief in the wrongness of killing any life-form, including livestock and wildlife. In the ideal Buddhist world, even flies or rats, which can spread disease, should not be killed. Poultry, swine, fish, and beef cattle should not be raised to feed human beings. In the real world, however, Bhutanese consume an increasing amount of meat as income rises. But they seem to feel morally more comfortable if the meat is imported or if others slaughter the animals. The future demands of an urban society may well clash with the very strong belief in not taking life, one of the virtues taught by the Buddha.

Human behavior is a delicate, dynamic balance between the ideal and the pragmatic, between individual pursuits of happiness and social justice. Lay Buddhist ethics include constraints on individual behavior and demands for social action. Together, they can shape the basic relationship not only between individuals (as a respect for human rights does), but also between individuals and other sentient beings (which human rights do not guarantee).

Dasho Karma Ura is the director of the Centre for Bhutan Studies, a prolific writer, and an aficionado of fine art. Karma Ura studied at Magdalen College, Oxford, and the University of Edinburgh where he earned a master's degree in economics.

A silk scarf (*katah*) is worn as a sign of respect while polishing a statue of Guru Rinpoche in Gangtey Monastery. Guru Rinpoche is depicted holding a *dorje* (thunderbolt), which symbolizes the energy and strength required to defeat ignorance. Photo by John Berthold

While much of the history of Bhutan's medieval period has been lost, because many historical records were destroyed in a series of fires and earthquakes, enough is known to provide an outline of major events. For most of the medieval period, Bhutan had no dominant authority figure. A number of local chieftains ruled the different valleys, and there was a great deal of conflict.

In the early seventeenth century, Zhabdrung Ngawang Namgyel, an important Tibetan lama, unified the country for the first time. He exercised his authority through a series of *dzongs* he built across the country, established a code of laws, and helped institutionalize many cultural and religious traditions that helped shape Bhutan's identity. He is widely regarded as the founder of modern Bhutan. In 1907, an assembly of people's representatives, high officials, and important lamas unanimously elected Ugyen Wangchuck the first hereditary king of Bhutan, and he was given the title Druk Gyalpo. His coronation day (December 17) is now Bhutan's National Day.

His great grandson came to the throne in 1972. The young Fourth King's coronation two years later focused the world's attention on Bhutan. It brought the international media to the country for the first time. Photographs and articles published in international journals projected Bhutan as a fairy-tale kingdom ruled by a dazzlingly handsome young king. Soon after his coronation, King Jigme Singye Wangchuck announced his philosophy for the future development of his country. He declared that Bhutan's growth and progress

would be guided, as well as measured, not by its Gross Domestic Product but by its Gross National Happiness (GNH). It was a revolutionary concept and one that initially invited much skepticism from economists and other development experts. GNH was a nice catchphrase, many of them said, but on what index do you measure happiness? Today, the success of his Gross National Happiness theory is widely recognized and has become a model for economists and planners the world over.

Put very simply, GNH is based on the conviction that material wealth alone does not bring happiness or ensure the contentment and well-being of the people; economic growth and "modernization" should not be at the expense of the people's quality of life or traditional values. To promote GNH, the Bhutanese government has given priority to several policy areas—equitable socio-economic development in which prosperity is shared by every region of the country and every segment of society; conservation and protection of the environment and the country's pristine natural resources; the preservation and promotion of Bhutan's unique cultural heritage; and providing good, responsive governance in which the people participate.

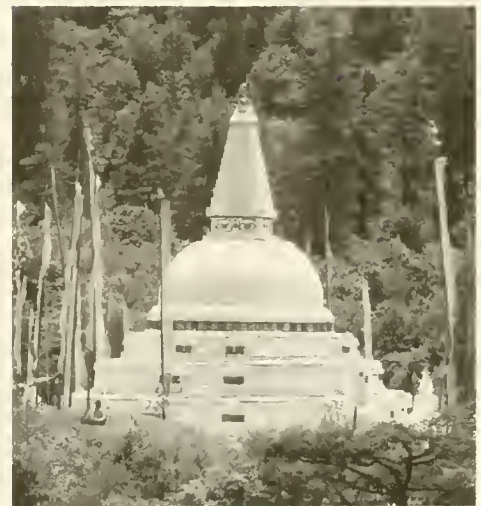
The highest priority has been given to rural development by making health care and education accessible to all, including those living in the most remote villages; building roads and telecommunications networks; launching livestock and agricultural development plans and their associated industries;



and promoting traditional handicrafts. All of these endeavors aim to improve rural livelihoods and create new job opportunities.

When Bhutan created its environmental protection program, it kept in mind mistakes made by other countries in the neighborhood. Laws ensure that forest cover in Bhutan never drops below 60 percent and that industrial and commercial activities do not cause environmental deterioration or threaten wildlife. All of Bhutan's hydroelectric projects are run-of-the-river—no large dams cause ecological damage or submerge habitats. Such stringent eco-sensitive measures have not affected the profitability of Bhutan's power projects. Instead, they now provide more than 40 percent of the country's revenue and help ensure Bhutan's continuing economic prosperity and independence. Environmental and cultural concerns have also resulted in the decision to discourage unlimited mass tourism and to prevent exploitation of many of the country's rich natural resources (such as copper), which would destroy human and natural habitats.

Laws preserve the cultural traditions that give Bhutan its distinct identity. They encourage all Bhutanese to wear traditional dress in public (which helps keep alive important weaving traditions) and strictly regulate the preservation and practice of Bhutan's superb architecture and traditions. Regular government and monastic patronage and large projects for the restoration and renovation of *dzongs*, monasteries, and other historic structures guarantee that traditional artists and craftspeople maintain the highest standards.



GDP is based on the conviction that material wealth alone does not bring happiness or ensure the contentment and well-being of the people; economic growth and "modernization" should not be at the expense of the people's quality of life or traditional values.

(Left) Paro Dzong, which was built in the 1640s, houses a monastic community and serves as the administrative seat of the Paro district in western Bhutan. The seventeenth-century *dzong*, a few miles from the national airport, is surrounded by the natural splendor of the Eastern Himalayas. Some scenes from the 1995 film *Little Buddha* by Bernardo Bertolucci were filmed here. Photo courtesy Bhutan Department of Tourism

(Upper right) Bhutan's Fourth King His Majesty Jigme Singye Wangchuck speaks with a young boy. The king was the world's youngest monarch when he ascended to the throne in 1972 at age sixteen. He is credited with setting Bhutan on the path to democracy before voluntarily retiring in December 2006. Photo courtesy Bhutan Department of Tourism

(Lower right) The Bhutanese people developed their own cultural identity when Buddhism came to the region more than a thousand years ago. They also incorporated important cultural traditions from Tibet, Nepal, and India (as reflected by this Nepali-style stupa in central Bhutan).

Photo courtesy Bhutan Department of Tourism

Bhutan's spiritual culture permeates every aspect of life, including the government. Even in the twenty-first century, about 3,000 privately supported monks and other religious teachers continue to play an essential role in the life of the community by presiding over festivals and rites of passage and by providing guidance, advice, and solace. Bhutan also has lay monks, or *gomchens*, who live with their families but have acquired the religious knowledge that allows them to conduct prayers and other religious ceremonies. They play a particularly important role in eastern Bhutan, where they travel from village to village to provide services. Because monks are highly educated, greatly respected in Bhutanese society, and influential in shaping opinion, they now play an important new role in national life: they are very effective agents of social change in family planning, AIDS awareness and prevention, and other fields of public health.

For twenty-five years, providing responsive and participatory governance has been a priority of Bhutan's Fourth King. For example, in 1981 he began the process of decentralization and democratization by giving each *dzongkhag* (district) in the country the power to determine its own development priorities. In 1991, he extended this decision-making power to

the villages. Then, in 1998, he divested himself of his executive powers and transferred them to a council of ministers. To protect the future well-being of the country, he also advanced a new law that gave the National Assembly the power to call for a vote of confidence in the king. In 2001, he called for a new constitution that would give Bhutan a two (or more)-party democratic electoral system, with an independent judiciary and other important safeguards. In late 2005, the king began visiting the districts to hear the people's opinions about the new draft constitution, allay their doubts, and personally explain to them why he believed the new constitution would give them greater control over their own lives and destinies for the benefit of the country.

Despite the initial skepticism that GNH first drew from economists and other development experts (perhaps not unlike some of the reactions that Thomas Jefferson must have received when he inserted the words "pursuit of happiness" into the U.S. Declaration of Independence), there is now concrete evidence of its relevance in Bhutan. From 1985 to 2007, life expectancy rose from forty-seven to sixty-six years. Literacy increased from 23 to 59.5 percent, and enrollment in primary schools reached 90 percent. There are now thirty hospitals in the country and 176 basic health units. Bhutan has been named one of the ten most important biodiversity hot spots in the world and has been recognized for its exemplary management of natural resources.

In 2008, the country will complete its transition to democratic governance under the new constitution and will celebrate 100 years of the monarchy with the coronation of Bhutan's Fifth King (and first constitutional monarch). Bhutan does not want to keep the outside world or the twenty-first century



Bhutan's many monastic communities remain vital centers of learning and cultural life and provide important links between Bhutan's past, present, and future. Photo by Preston Scott



at bay. Like people everywhere, the Bhutanese also want prosperity, but not at the expense of cherished traditions and culture. Bhutan wants to introduce modern technology at its own pace and according to its own needs. This is why Bhutan waited until 1983 to build an airport and start regular air services to Bhutan, why it gradually increased the number of foreign tourists from only 200 in 1974 to over 17,000 in 2006, and why television was not introduced until 1999.

People often wonder how long, in this age of information technology and an increasingly globalized economy, Bhutan can retain its distinct identity and deeply spiritual culture. One only has to see how adeptly a Bhutanese monk uses the computer to prepare a scroll of 100,000 prayers to put inside a prayer wheel to realize that Bhutanese society is both vibrant and deeply rooted in tradition—that it has an extraordinary capacity to appreciate, absorb, and adapt new ideas and effortlessly make them a part of the Bhutanese way of life.

Since Bhutan's Fourth King came to the throne as the world's youngest monarch at the age of sixteen in 1972, Bhutan has enjoyed unprecedented progress.

The 2008 coronation of His Majesty King Jigme Khesar Namgyel Wangchuck, the Fifth Druk Gyalpo, will complete the transition to democratic governance under Bhutan's new constitution and mark 100 years of the monarchy. Photo courtesy Kuensel Corporation

His Majesty Jigme Singye Wangchuck, the Father of Bhutan's Democracy, retired in December 2006, entrusting his responsibilities to his beloved son and able heir, His Majesty Jigme Khesar Namgyel Wangchuck. His Majesty the Fifth King, will guide the nation toward greater peace and prosperity and into a new era in Bhutanese history.

Her Majesty the Queen of Bhutan, Ashi Dorji Wangmo Wangchuck, was born in 1955 in Nohgang, western Bhutan, and was educated in the Darjeeling district of West Bengal, India. She heads the Tarayana Foundation, which provides medical, educational, and social support to people and communities living in the most remote areas of Bhutan.

This essay was adapted from Her Majesty's book, *Treasures of the Thunder Dragon: A Portrait of Bhutan*.

Zorig Chusum: Bhutan's Living Arts and Crafts

by Dorje Tshering and Thinley Wangchuk

The artistic traditions of Bhutan have been kept alive, promoted, and further developed because they are useful, ennobling, and inspirational. In fact, Bhutanese life and culture remain robust and richly colorful due in large part to the continued teaching and practice of *zorig chusum* (thirteen traditional arts).

Zorig chusum include the following arts: *yigzo* (calligraphy), *lhazo* (painting), *jimzo* (sculpture), *lugzo* (metal casting), *troezo* (gold- and silversmithing), *shingzo* (carpentry), *tshemzo* (tailoring and tapestry), *tsharzo* (bamboo and container work), *shagzo* (wood turning and lacquering), *thagzo* (weaving), *dzazo* (pottery), *chakzo* (blacksmithing), and *dozo* (masonry). *Shogzo* (paper making) and *poezo* (incense-stick making) are closely tied to and often practiced with the traditional arts of *zorig chusum*.

Many Bhutanese arts and crafts have been practiced for centuries and, since the seventeenth century, have been fostered by great builders of *dzongs* (fortresses). Historian Lam Nado wrote that the great unifier of Bhutan, the Zhabdrung, invited artists from neighboring countries to refine the arts of clay sculpturing, painting, and calligraphy; build the Punakha, Trashichodzong, and Wangdiphodrang *dzongs*; and set a formal curriculum for



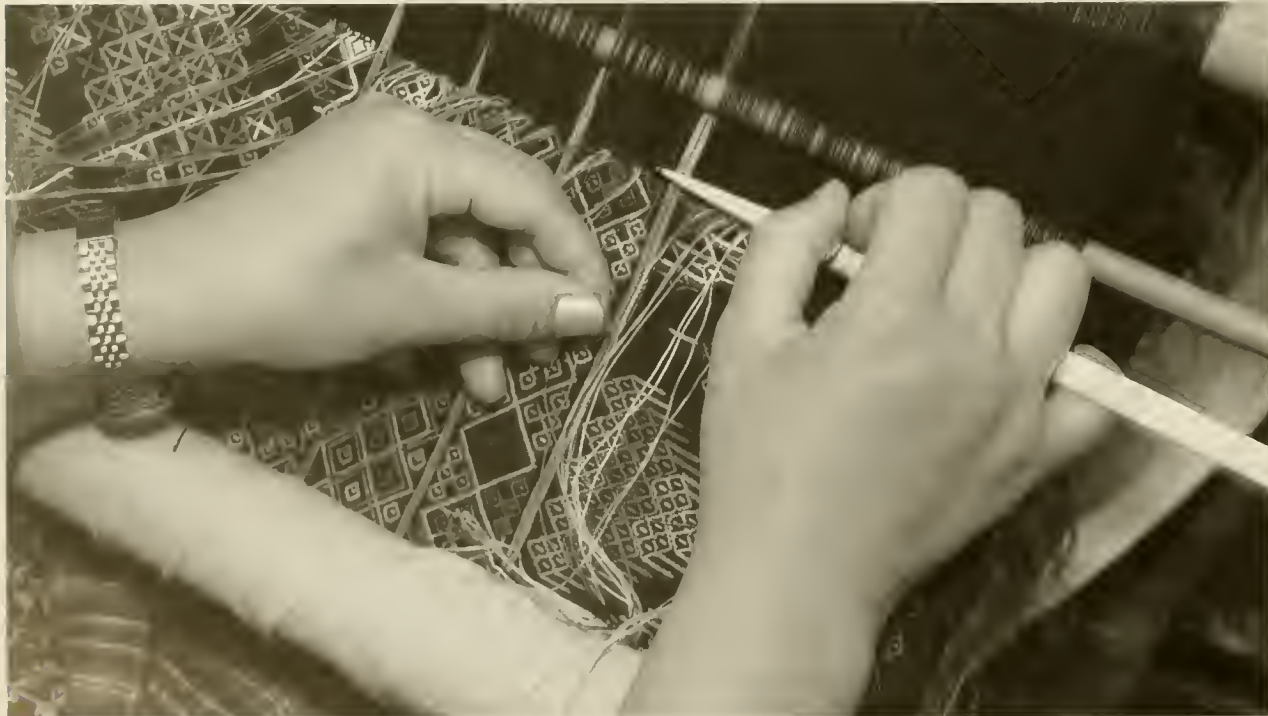
The art of carving in Bhutan dates back many centuries. Artists engrave wood or slate with images and texts to help communicate the Buddha's teachings. Photo by Preston Scott

monastic studies. Bhutan's fourth *desi* (secular ruler) established a school of arts and crafts in the seventeenth century that institutionalized *zorig chusum*. Since then, the visual arts have been carefully cultivated as the primary means for expression of Buddhist teachings, even in secular daily life.

In contrast to many artistic traditions elsewhere, the visual arts of Bhutan were never considered merely decorative. While beauty is clearly cultivated and appreciated, the fundamental purpose of the arts in Bhutanese society is to express Buddhism and convey genuine life experiences.

Bhutanese textiles are some of the most coveted in the world. Each region of Bhutan has its own specialties, passed down through generations. Weavers still obtain dyes from locally available vegetables and minerals. Pieces include complex symbols and may take more than six months to weave.

Photo courtesy Bhutan Department of Tourism



Throughout Bhutan today, you can see houses, temples, monasteries, government, and other public buildings that include elements of *zorig chusum*. Buildings typically require masonry, carpentry, and carving expertise. They feature stone foundations, rammed-earth walls, and elaborately carved wooden structures, windows, doors, pediments, and stylized architectural embellishments. Because most Bhutanese buildings are wooden, they are easily painted with designs that symbolize harmony and good fortune. Important religious and government buildings usually feature murals, wall paintings, and sculptures that portray major religious and political figures from Bhutanese history and Buddhism. They often display complex mandalas, richly designed compositions, and designs that represent understandings of the cosmos, life, and death.

All around Bhutan, one can see *zorig chusum* in the colorful, intricate weaving of garments—women’s *kiras* and men’s *ghos*. The threads and dyes that color them are produced by hand from local and prized remote sources. Because most cloth in Bhutan was traditionally made by hand and woven (or stitched) thread-by-thread, textiles and related products have always been highly valued. Like the building arts, they have an important role in ritual life. For example, huge embroidered religious tapestries are hung outside on the final morning of the annual masked dance festivals in the country’s many valleys.

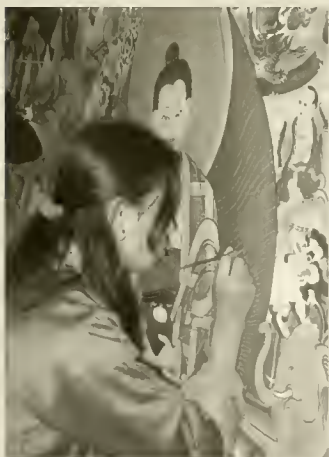
While many, if not most, *zorig chusum* have their origins in the monastic communities of Bhutan, they have been thoroughly

incorporated into all aspects of Bhutanese society. In order to preserve and promote the thirteen arts and crafts, the Royal Government of Bhutan established the Institute for Zorig Chusum in Thimphu in 1971. Another campus was subsequently opened in far eastern Bhutan in Trashiyangtse. The campuses create meaningful job opportunities for a new cadre of highly trained Bhutanese artisans and craftspeople.

Thanks to the students who have received formal training in *zorig chusum*, Bhutan’s rich cultural heritage enhances the lives of new generations of Bhutanese, as well as the experiences of people who visit the kingdom. Some artists are beginning to explore other forms of artistic expression not traditionally practiced in Bhutan. These include filmmaking and other recently introduced visual arts. Bhutanese appreciate the artistic gifts and traditions of their visionary leaders and work to keep the arts alive and healthy for the benefit of all.

Dorjee Tshering became the director of the Department of Culture under the Ministry of Home and Cultural Affairs for the Royal Government of Bhutan after working for many institutions of higher education in Bhutan and directing the National Library. He is on the curatorial team for the Festival’s Bhutan program.

Thinley Wangchuk is the director of the National Institute for Zorig Chusum. He has extensive knowledge of Bhutanese crafts and trained in sword smithery in Germany. He is helping curate the arts and crafts component of the Bhutan program.



(Left) *Thangkas* are traditional Bhutanese paintings on cloth that are displayed during important ceremonies. They also occupy places of honor in homes, temples, monasteries, and even contemporary offices. The artist initially draws a complex grid of geometric lines on the cloth to organize the overall composition. *Thangka* geometry is taught according to very strict artistic principles from which there is little deviation. For centuries, the visual arts have played an important role in teaching basic Buddhist traditions in Bhutan. Photo by Preston Scott

(Center and right) Bhutan’s *zorig chusum* (thirteen traditional arts), which include clay sculpting (*jimzo*), still decorate major public structures, such as fortresses (*dzongs*) and temples, as well as houses. Photo (center) by Sean Riley Photo (right) by Preston Scott

Reinforcing Culture: Tourism in Bhutan

by Siok Sian Pek Dorji

From explorers to mountaineers, from environmental specialists to trekkers, from culture-hungry adventurers to seven-star jetsetters—Bhutan's tourism continues to evolve. Today, tourism planners want to ensure that the kingdom's \$18.5 million industry benefits not only the tour operators, but also the people.

In 2007, just over 20,000 tourists visited Bhutan—a record. But Bhutan looks beyond numbers. Tourism is more than a source of hard currency. It is part of Bhutan's journey toward development, change, and the enlightened goal of Gross National Happiness. "We see tourism as a means by which we can strengthen our values and our identity," said Lhatu Wangchuk, director general of tourism. "We've become more aware of the value of our own culture and our uniqueness because of the positive feedback from tourists."

Based on evaluations from tourists and the experience of the past four decades, the tourism department plans to involve the people, especially those from remote communities. In the past, cultural enthusiasts and trekkers came into contact only with tour operators. The average Bhutanese citizen, apart from the operators and a few handicraft manufacturers, benefited little from the industry. Lhatu Wangchuk talks about "community-based tourism." Even though tour operators have started taking tourists to smaller rural *tsechus*, because travelers complain that the larger festivals have become too "touristy," the department plans to do more. In a promising initiative, it has started to develop new trekking routes and areas in remote Zhemgang and Kheng. Staff are training local people to manage campsites, guide, and cook for trekkers. The communities will also provide cultural entertainment for tourists and sell local handicrafts.

The department is marketing Nabji Korphu, a pristine portion of the Jigme Singye Wangchuck National Park. The trail passes through small mountain villages (like Monpa) and broadleaf forests that are home to endangered wildlife, including the golden langur and Rufous-necked hornbill. With clear conservation regulations that restrain forestry activities, tourism is an environmentally sensitive, ideal source of income for the people. "Our people have always depended on the forest for their livelihood," said a village elder from Jangbi village. "With the area declared a national park, many of the inhabitants have to look for new ways to survive. I hope that tourism will give the people additional income to support their daily life." Camping fees and other revenue will support a "community development fund" that will finance local irrigation channels, renovation of monasteries, and organization of *tsechus*. The fund will spread the earnings in a meaningful way.



Bhutan's National Museum is housed in the historic Ta Dzong (watchtower), which is nestled in the hills above Paro Dzong. Its rounded, shell-shaped walls are an impressive accomplishment of seventeenth-century Bhutanese architects and builders. Photo copyright Michael Tobias

Feedback from tourists has inspired the department to issue guidelines for the development of infrastructure, facilities, campsites, and viewpoints. They will be built with traditional aesthetics in mind, use local materials and skills, and offer modern comforts. "The challenge is getting greater," said Thuji Nadik, a tourism planner. "Today, we have close to 250 tour operators, and many more people are building tourism infrastructure with very little understanding of what is required." Progressive planning, training, and education are essential to the new tourism policy. The Hotel Management and Tourism Training School, which will open in 2008, and several other government initiatives will guarantee high-quality service and promote Bhutan's magical aura. The Tourism Act will protect the country's age-old spiritual, environmental, and cultural heritage.

"We will not try to be someone or something else," said Lhatu Wangchuk. "If we lose our culture, our identity, our uniqueness, what do we have?"

Tourism is not just a business. It is a part of the kingdom's journey on the middle path to progress. Tourists are guests of the Bhutanese people. They are asked to come to share, as well as to preserve what Bhutan has to offer.

Siok Sian Pek-Dorji is a journalist who works independently on media and communication projects in Bhutan and is a member of the board of directors of the Bhutan Broadcasting Service Corporation.

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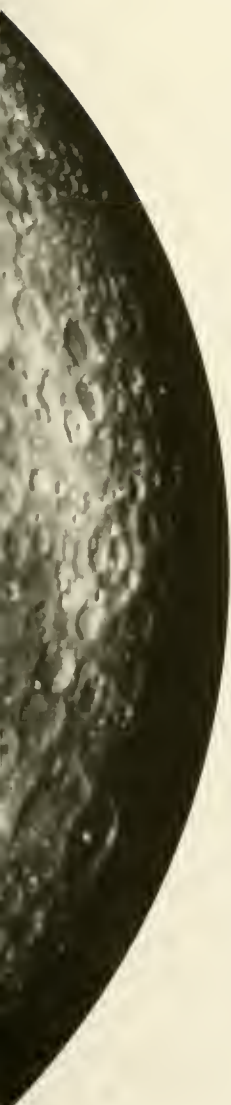
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NASA

Steven J. Dick, Stephen J. Garber and James I. Deutsch

Fifty Years and Beyond





Jeff Hamilton was born in 1958—the same year that the National Aeronautics and Space Administration (NASA) was created—and grew up on a small farm outside Huntsville, Alabama. Fifteen miles away was NASA’s Marshall Space Flight Center, where engines for the Saturn V rocket were being tested. When these tests took place, Hamilton recalled, “The ground would shake, the house would shake, the windows would rattle. I would run out into the yard, and you could feel it as a rumbling, you could feel it as a low-frequency thump in your chest, and you could see the smoke billowing up on the horizon. That was real cool, for a kid growing up on a chicken farm.” Listening to the thundering roar of those rockets in the mid-1960s, Hamilton dreamed that one day he might get to work on those engines himself. He studied electrical engineering at the University of Alabama in Huntsville and joined the University’s Cooperative Education Program in 1979. That allowed him to take classes one semester and work the following semester for NASA’s Marshall Center. As luck (or fate) would have it, Hamilton’s very first assignment was to work in the exact same place where the Saturn V engines had roared. “By then they had converted it for testing the Space Shuttle’s external fuel tank,” Hamilton explained. “But there I was, climbing around on the very same test stand that had called me to NASA as a young boy.” Thirty years after he started, Hamilton is still with NASA, having worked primarily as an aerospace engineer, but also in areas of administration and management.

The Saturn V rockets were the most powerful launch vehicles ever used by NASA and first saw service on November 9, 1967, when the unmanned *Apollo 4* lifted off from the Kennedy Space Center.

All images in this article courtesy NASA, unless otherwise indicated



The 2008 Smithsonian Folklife Festival program *NASA: Fifty Years and Beyond* presents these and other occupational traditions from the National Aeronautics and Space Administration, an organization now celebrating its first fifty years. Approximately 100 participants are on the National Mall to share their skills, experiences, and traditions with members of the public. They include administrators, aeronautical engineers, analysts, archaeologists, astrobiologists, astronauts, astronomers, astrophysicists, atmospheric scientists, and avionics technicians—not to mention the occupational groups from the remaining twenty-five letters of the alphabet.

NASA: Fifty Years and Beyond builds upon previous Folklife Festival programs that have examined occupational traditions, such as *American Trial Lawyers* in 1986, *White House Workers* in 1992, *Working at the Smithsonian* in 1996, *Masters of the Building Arts* in 2001, and *Forest Service, Culture, and Community* in 2005. Every occupational group—including actuaries, biologists, cowboys, dishwashers, engineers, firefighters, gaffers, and haberdashers—has its own set of skills, specialized

knowledge, and codes of behavior that not only distinguish it from other occupational groups, but also meet its needs as a community.

The engineers, scientists, and administrators who work at NASA may be surprised to find themselves regarded as bearers of tradition and thus the subject of study by folklorists. After all, NASA generally perceives itself as a paragon of progressive science, continually breaking new ground rather than conserving its culture. But another way of looking at occupational culture is to see it as distinctive to a particular agency, company, or organization. As sociologist James Q. Wilson has observed, “Every organization has a culture, that is, a persistent, patterned way of thinking about the central tasks of and human relationships within an organization. Culture is to an organization what personality is to an individual. Like human culture generally, it is passed on from one generation to the next. It changes slowly, if at all.” The fiftieth anniversary of NASA in 2008 provides a wonderful opportunity for understanding and appreciating its organizational and occupational cultures.



(Upper) The first Space Shuttle external fuel tank rolled off the assembly line on September 9, 1977, at the Michoud Assembly Facility in New Orleans, Louisiana. The tanks for the first two Shuttle missions were painted white but were thereafter left unpainted, reducing the weight by approximately 600 pounds.

(Lower) Onboard the Space Shuttle *Endeavour* in September 1992, crew members representing NASA's diverse occupational culture pose for their traditional portrait in space. Pictured front row, left to right, are Payload Commander Mark Lee and Payload Specialist Mamoru Mohri (from Japan's National Space Development Agency); middle row are mission specialists Jan Davis, Jerome Apt, and Mae Jemison; and back row are Commander Robert Gibson and Pilot Curtis Brown.

NASA's Origins

Undoubtedly, NASA is one of the U.S. government agencies with the highest name recognition. Not many Americans know much about the General Services Administration or the Office of Government Ethics, but they are likely to know of and have strong opinions about the Internal Revenue Service, the Social Security Administration, and the National Aeronautics and Space Administration. What the public may know about NASA is that its astronauts have circled the world, walked on the moon, piloted the first winged spacecraft, and constructed the International Space Station. Less well known is that NASA's robotic spacecraft have studied the Earth's climate, oceans and land masses, visited all the planets (except for the dwarf planet Pluto, which will be visited by the New Horizons mission in 2015), captured images of the universe at many wavelengths, and peered back to the beginnings of time. Its scramjet aircraft have reached the aeronautical frontier, traveling 7,000 miles per hour, ten times the speed of sound to set a world record.

Few people might have predicted all these achievements when NASA was first created. On July 29, 1958, President Dwight D. Eisenhower signed the National Aeronautics and Space Act to support research into the problems of flight, both within the Earth's atmosphere and in space. The act created NASA, which became operational on October 1, 1958. NASA's birth was directly related to the pressures of international political and military competition and in particular to the Soviet Union's launch of Sputnik. After World War II, the United States and the Soviet Union were engaged in the Cold War, a broad contest over the ideologies and allegiances of nonaligned nations. During this period, space exploration emerged as a major disputed area and became known as the "space race."

NASA began by absorbing the earlier National Advisory Committee for Aeronautics (NACA), including its 8,000 employees, an annual budget of \$100 million, and three major research laboratories—Langley Aeronautical Laboratory (Hampton, Virginia), Ames Aeronautical Laboratory (Moffett Field, California), and Lewis Flight Propulsion Laboratory (Cleveland, Ohio). These three facilities are now known as the Langley, Ames, and Glenn research centers.



(Upper) On the evening of October 4, 1957, a 183-pound beach ball-sized aluminum sphere, known as *Sputnik*, was launched from the Soviet Union's rocket test site near Tyuratam, Kazakhstan.

(Center) Test pilot Lawrence A. Clousing climbs into his Lockheed P-80 aircraft for a test flight at the Ames Aeronautical Laboratory, Moffett Field, California.

(Lower) Technicians at the Kennedy Space Center prepare the *Pioneer 10* spacecraft for operation prior to liftoff in March 1972. In December 1973, it became the first spacecraft to fly by Jupiter. Although researchers hoped for seven years of service, the *Pioneer 10* continued to send signals back to Earth for twenty-four years as it became the first human-built object to leave the solar system.

(Left) With its twin solid rocket boosters and three main engines churning at 7 million pounds of thrust, the Space Shuttle *Atlantis* thunders skyward from the Kennedy Space Center on March 24, 1992.

(Right) On its way to the moon in April 1970, the *Apollo 13* spacecraft was crippled by an explosion in one of its oxygen tanks. Shortly before that occurred, Astronaut Fred W. Haise Jr. (shown on the screen) spoke with the Mission Operations Control Room in Houston, Texas.



Today, NASA is run by personnel at its headquarters in Washington, D.C., and has ten major field centers spread around the country. Headquarters personnel broadly oversee the direction of NASA's programs at the field centers, where employees actually perform specific engineering tasks and conduct scientific research. In addition, NASA headquarters personnel liaise with other government personnel in Washington, such as White House and Congressional staff. NASA is an independent, civilian agency whose top official, the administrator, reports directly to the president. While NASA cooperates closely with the various military services, it was set up as and remains a civilian agency.

Over 18,000 civil servants and more than 43,000 on-site contractors work at headquarters, the ten field centers, and other smaller facilities. In general, civil servants oversee research, coordinate programs,

and handle inherently governmental tasks, while the contractors manufacture new hardware, perform operational tasks, and carry out a variety of other support functions. In addition, this workforce is backed up by the broad-based national aerospace industry.

Some of NASA's facilities—such as the Kennedy Space Center (KSC) near Cape Canaveral, Florida, and the Johnson Space Center (JSC) in Houston—are well known, due to their very visible roles in human spaceflight. Many Americans are aware that astronauts and rockets are launched into space from Florida's KSC and that astronauts talk directly to Mission Control at the JSC—as in “Houston, we've had a problem.” Astronauts are clearly the figurative and literal faces of NASA, which is the only U.S. government organization able to send people into space. The United States is one of only three nations able to do this; the others are Russia and China.



Another NASA facility is the Marshall Space Flight Center in Huntsville, Alabama. When it opened in 1960, Wernher von Braun (who had developed the V-2 rocket for Germany during World War II) became its first director. Von Braun's "German rocket team" was instrumental in developing the large Saturn rockets used in the Apollo missions to the moon. Engineers at Marshall have continued developing launch technologies such as the Space Shuttle main engine and its solid rocket boosters. In neighboring Mississippi, the Stennis Space Center is where engineers test rocket engines on gigantic stationary stands. Stennis employees also engage in other research such as Earth science (See page 46).



Mementos in Time: Crew Patches Help Piece Together NASA's Spaceflight History

by Catherine E. Borsché and Brad Thomas

The most highly identifiable symbol for each NASA mission is the crew patch, which adorns the crew's flight suits and personalizes the mission. Because each patch is designed by crew members themselves, it "tells a story about the mission and is often a peek into the personalities of the people onboard," according to Steve Robinson. Robinson should know because he designed the patch for STS-114, on which he served as mission specialist in July–August 2005. STS-114 was the first Space Shuttle mission to fly after the tragic *Columbia* accident in February 2003.

Robinson personally crafted the initial elements. "The initial concept took shape over two days in my home studio. I roughed out three to four different concepts using pencil, colored felt pens, and watercolor," he recalls. "I worked for years as a graphic designer as a side job, and I always wondered what it would be like to design a mission patch."

Once the crew members formulate a concept, they bring it, sometimes as a sketch, to a NASA graphic artist. Before the switch to computers, it took a graphic artist up to 300 hours to create a patch. Now that time has decreased to no more than twenty hours. The results become an indelible part of NASA history.

Five rocket pioneers pose in 1956 with models of missiles they created. Clockwise from center are Hermann Oberth, a German-born physicist who first used the term "space station" to describe a wheel-like facility for space travel; Ernst Stuhlinger, a German-born electrical scientist who designed a solar-powered spacecraft; Major General Holger Toftoy, who recommended that German scientists be sent to the United States to work in the rocket program after World War II; Wernher von Braun, one of Oberth's students in Germany and the first director of the Marshall Space Flight Center; and Robert Lusser, a German-born aircraft designer and engineer.

Human Spaceflight

More NASA personnel work on human spaceflight efforts—such as the Space Shuttle, International Space Station, and the planned Constellation program—than on robotic spacecraft missions, such as the well-known Mars Rovers and Earth science satellites. By its nature, human spaceflight is more risky and complex than sending robotic craft into space. While some space scientists decry the greater funding given human spaceflight, there is no doubt that human spaceflight captivates the public's attention and imagination and that without this intangible support, NASA would likely not even exist. As a result, human spaceflight dominates the agency's organizational culture.

NASA's human spaceflight initiatives began with project Mercury, a single astronaut program (flights during 1961–1963) to ascertain if a human could survive in space. Project Gemini (flights during 1965–1966) proceeded with two astronauts to practice space operations, especially docking of spacecraft and extravehicular activity (or spacewalks).

These early missions culminated in project Apollo (flights during 1968–1972) to explore the moon. Apollo became a NASA priority on May 25, 1961, when President John F. Kennedy announced the goal of landing a man on the moon and returning him safely to Earth by the end of the decade. Despite a deadly fire in 1967, which took the lives of three astronauts, the Apollo program recovered and on a memorable Christmas Eve in 1968, the Apollo 8 crew went into orbit around the moon and broadcast live images of the moon's forbidding surface to



a worldwide audience on Earth. On July 20, 1969, the Apollo 11 mission fulfilled Kennedy's challenge by successfully landing Neil Armstrong and Edwin E. "Buzz" Aldrin Jr. on the lunar landscape known as the Sea of Tranquility. Five more successful lunar-landing missions followed, leading to a total of twelve Apollo astronauts conducting brief (up to three days) exploratory missions on the lunar surface. The final three missions (Apollo 15, 16, and 17) undertook more extensive activities, aided by lunar rovers that could travel at speeds up to eight miles an hour.



(Upper) Alan Shepard was the first American and the second human (after Yuri Gagarin) to fly in space. Here he is being inserted into the tight confines of the Mercury capsule for a flight simulation test in early 1961.

(Left) The imprint of Buzz Aldrin's boot—left when he and Neil Armstrong became the first humans to walk on the moon in July 1969—has become one of the iconic images of human exploration in space.



On June 3, 1965, Edward H. White II became the first American to step outside his spacecraft and let go, effectively setting himself adrift in the zero gravity of space—though attached to the spacecraft by a 25-foot umbilical line and a 23-foot tether line.

The Apollo program continued in a different form with the Skylab "orbital workshop" missions (1973–1974). As an indicator of or perhaps a contributing factor to the superpower détente of the time, NASA worked with Soviet counterparts on the Apollo-Soyuz Test Project of 1975, with its famous handshake in space between astronauts and cosmonauts.

After a break of six years, NASA returned to human spaceflight in 1981 with the advent of the Space Shuttle program. The Shuttle's first mission, which was launched on April 12, 1981, demonstrated that it could take off vertically and glide to an unpowered airplane-like landing. During its early missions, the Shuttle proved useful for placing communications and other satellites in Earth orbit, for launching robotic missions toward their planetary targets, and for conducting microgravity research. On January 28, 1986, however, a leak in the joints of one of two solid rocket boosters attached to the Shuttle orbiter *Challenger* caused the main liquid fuel tank to explode seventy-three seconds after launch, killing all seven crew members. In 1988, the Shuttle successfully returned to flight, and NASA then flew eighty-seven successful missions before

tragedy struck again on February 1, 2003, with the loss of the orbiter *Columbia* and its seven astronauts during reentry. Three Shuttle orbiters remain in NASA's fleet: *Atlantis*, *Discovery*, and *Endeavour*.

In 1984, Congress approved President Ronald Reagan's proposal for NASA to build a space station as a base for further exploration of space. After many revised plans, the International Space Station finally emerged. Permanent habitation of the ISS began when the Expedition One crew arrived in 2000.

In 2004, President George W. Bush announced a Vision for Space Exploration that entailed sending humans back to the moon and on to Mars by retiring the Shuttle in 2010 and developing the Constellation program. The latter includes a new, multipurpose Orion crew exploration vehicle, as well as new crew and cargo launchers, known as Ares I and Ares V. Robotic scientific exploration and technology development were also integrated into the Vision, as was the completion of the ISS in 2010.

This fish-eye view of the Space Shuttle *Atlantis* was taken from the Russian *Mir* Space Station in 1995. The *Mir* station was operational from 1986 to 2001.



(Upper) Astronauts Leland Melvin (left) and Stanley Love, both in space for the first time, float from the Space Shuttle *Atlantis* to the International Space Station in February 2008.

(Center right) Continuously inhabited since November 2000, the International Space Station orbits the Earth every ninety-one minutes at an altitude of 250 miles.

(Center left) This conceptual image shows the Ares I crew launch vehicle during ascent. The Ares I will carry crews of up to six astronauts in the Orion capsule (seen here with flag decal) into Earth orbit. Photo courtesy NASA Marshall Space Flight Center



Jennifer Heldmann: In the Footsteps of Galileo

by Ruth Dasso Marlaire

In 1609, Galileo Galilei made his first major discovery with the telescope when he observed that the moon was mountainous and pitted, much like the Earth. Almost four hundred years later, the same discovery was made by ten-year-old Jennifer Heldmann.

"I had a small telescope at home," recalls Heldmann. "One night, my mom and I pointed it at the moon, and I couldn't believe I could see craters and mountains! Right there, so close to us, was a whole other world."

Today, Heldmann is a research scientist at NASA's Ames Research Center, where she works on the Lunar Crater Observation and Sensing Satellite (LCROSS) project, an

important precursor mission to humans returning to the moon. The LCROSS mission objective is to search for water on the moon to prepare for a future lunar outpost. In early 2009, LCROSS will crash two vehicles on the moon's surface to kick up a plume of dust. A sensing satellite will then pass through the plume, trying to detect water. Heldmann enjoys "studying the world and universe because there are so many mysteries to unravel. It helps us understand our context in the grand scheme of the cosmos."

Space Exploration

The robotic exploration of space has also long been a significant part of NASA's mission, particularly with scientific probes that explored the moon, the planets, and other areas of Earth's solar system. The 1970s, in particular, heralded the advent of a new generation of scientific spacecraft. For example, *Pioneer 10* and *Pioneer 11* were launched in 1972 and 1973 to study the composition of interplanetary space and thus became the first human-built objects to leave the solar system. Several years later, *Voyager 1* and *Voyager 2* began to explore the outer reaches of the solar system and beyond; they are both still providing scientific data and have established new records for distance from Earth. In 1976, NASA landed two Viking spacecraft on Mars where they searched for evidence of life, but neither mission found convincing evidence for past or present biological activity. However, shortly after the *Spirit* and *Opportunity* rovers landed separately on different parts of Mars in January 2004, they analyzed rocks and were able to demonstrate, to much scientific and popular acclaim, that liquid water had existed on Mars. Other NASA missions—such as Magellan, Galileo, and Cassini—have sent robots to explore Venus, Jupiter, and Saturn, respectively.

The Goddard Space Flight Center in Greenbelt, Maryland, is the nexus for much of NASA's robotic space work. In concert with personnel in Baltimore, Goddard scientists and technicians control the Hubble Space Telescope and also operate Earth science and remote sensing satellites such as Landsat. Delivered into Earth orbit in 1990, the Hubble Space Telescope has provided a wealth of scientific data, made possible by four shuttle servicing missions. Hubble is the first of NASA's "Great Observatories" (or powerful telescopes based in space) and operates in the optical portion of the spectrum, i.e., that which can be seen by the human eye. It was followed by the Compton Gamma Ray Observatory (launched in 1991), the Chandra X-ray Observatory (1999), and the Spitzer Space (infrared) Telescope (2003).

Holding even more promise is the James Webb Space Telescope (JWST), which is scheduled to launch in 2013. Like the Spitzer telescope, the JWST will make observations in the infrared portion of the spectrum, utilizing a mirror that is 21.3 feet in diameter (by comparison, Hubble's mirror is only 7.8 feet in

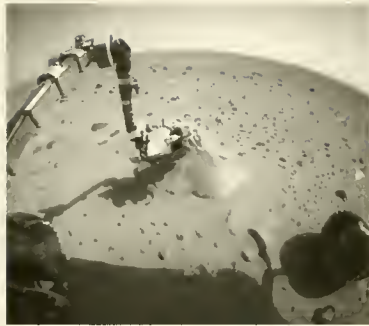


This composite image—taken by two of Hubble's telescopes—shows pillar-like structures that are actually columns of cool interstellar hydrogen gas and dust, which serve as incubators for new stars.

Photo courtesy NASA, European Space Agency, Space Telescope Science Institute, and Arizona State University

Dave Redding: Telescope Optical System Designer

by Franklin O'Donnell



(Upper) Taken by NASA's Exploration Rover *Spirit* on Mars, this photograph shows its robotic arm extended to the rock called Adirondack in January 2004, with a spectrometer used for identifying possible minerals. Photo courtesy NASA Jet Propulsion Laboratory

(Lower) Astronaut F. Story Musgrave, anchored on the end of the Space Shuttle *Endeavour*'s mechanical arm, is about to install protective covers on the Hubble Space Telescope's magnetometers as part of the first servicing mission in December 1993.

diameter). The JWST will reside in an orbit roughly one million miles from Earth (versus the Hubble's position only 366 miles away). NASA scientists are hoping that the JWST will be able to locate the very first galaxies that formed in the Universe, thereby connecting the Big Bang to our own Milky Way.

The Jet Propulsion Laboratory (JPL) in Pasadena, California, is a unique NASA Field Center because it is operated by the California Institute of Technology. Before it was part of NASA, JPL personnel contributed to the first successful launch of a U.S. orbital spacecraft, *Explorer 1*, which discovered the Earth's Van Allen radiation belts. JPL is widely recognized for its key roles on major robotic scientific spacecraft that go beyond Earth orbit, such as the Viking, Spirit, and Opportunity missions to Mars.

You might call Dave Redding the Jet Propulsion Laboratory's optician to the stars, literally. When NASA's Hubble Space Telescope proved to have a defective mirror after its launch in 1990, Redding was part of the JPL team brought in to create a fix. The optics they devised for Hubble were successful, enabling the space telescope to make a comeback and proceed to a mission that dazzled the world with scores of magazine cover images.

Since then, Redding has gone on to shape and deploy ever more sophisticated technologies for optical systems, both in space and on Earth. He was one of the original architects of the optical system for NASA's planned James Webb Space Telescope, which will launch in 2013 to study star-forming regions in the distant universe.

What excites Redding today are futuristic space telescopes using precision-made composite mirrors that actively control the surface to adapt to observing conditions. "These can be made quickly and relatively inexpensively and can be assembled in segments to create a telescope on orbit that wouldn't fit in a launch vehicle," he notes.

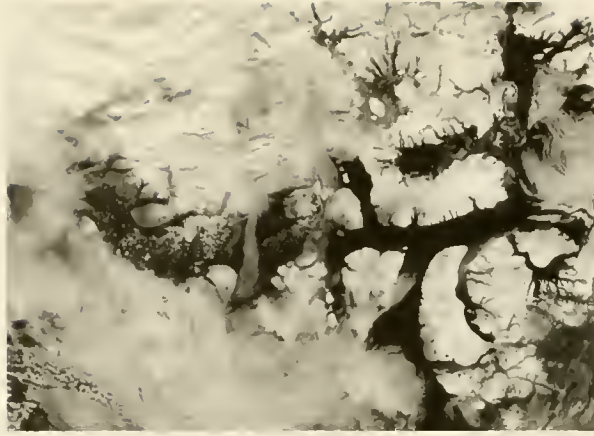
Redding not only has his eyes on the stars but, clearly, on new ways of seeing them.



Earth Science

Not all of NASA's ventures are out of this world. For example, in the 1970s, NASA's Landsat program literally changed the way humans looked at our own planet. Landsat data became used in a variety of practical commercial applications, including crop management and fault line detection. They were also helpful in tracking many kinds of weather and phenomena such as droughts, forest fires, and ice floes. Since then, NASA has engaged in a variety of other Earth science efforts, notably the Earth Observing System (EOS) of spacecraft and data processing that have yielded important scientific results in such areas as tropical deforestation, global warming, and climate change.

Over the coming years, NASA and its research partners will be analyzing EOS data to better understand the complex, dynamic system that is our Earth. As far as we know, Earth is the only planet that is capable of sustaining life. Given that the world's population doubled from 3 to 6 billion in just thirty-eight



NASA's Terra satellite captured this image of the Arctic Sea in September 2007. It shows the Northwest Passage free of ice for the first time since satellite records began in 1979.

years (from 1961 to 1999), and is expected to reach 7 billion by 2011, it is vital that Earth scientists—at NASA and elsewhere—help us understand whether the Earth can continue to sustain this type of growth in the future, as well as what effect a changing climate may have on the inhabitants and surface of the Earth.



"Antarctica is Earth's largest reservoir of fresh water. Understanding the behavior of the ice sheets has important societal and economic impacts."

Isabella Velicogna: From Italy to Ice Sheets

by Franklin O'Donnell

When Isabella Velicogna was growing up in northern Italy, physics didn't sound like a promising career to her mother. "She tried to get me to do something else," Velicogna recalls of the time her interest in math and physics was blossoming in high school. "She didn't think I could get a job."

Fortunately, her mother's fears proved to be unfounded. Several college degrees later, including a doctorate in applied geophysics from the University of Trieste, Velicogna has recently joined NASA's Jet Propulsion Laboratory and has plenty of work. Her specialty: studying the loss of ice in polar regions as Earth's climate warms, with the aid of the Gravity Recovery and Climate Experiment, or GRACE—two satellites that make extremely accurate measurements of Earth's gravity as they circle the planet.

In the future, Velicogna—who paints abstract art in her spare time—hopes to combine data from more satellites and ground studies to create a more complete portrait of ice around the planet, or Earth's cryosphere.

Aeronautics

Although NASA may now be known primarily as a “space agency,” the first “A” in NASA stands for aeronautics. Indeed, the agency’s roots go back to 1915, when its predecessor the National Advisory Committee for Aeronautics (NACA) was formed. Moreover, during NASA’s earliest years, most of its engineers and scientists had only aeronautics training because astronautics had not yet been established as a discipline.

Building on these roots, NASA has continually conducted research on aerodynamics, wind shear, and other important topics using wind tunnels, flight testing, and computer simulations. In the 1960s, NASA’s X-15 program involved flying a rocket-powered airplane above the atmosphere and gliding it back unpowered to Earth. The X-15 pilots helped researchers gain useful information about supersonic aeronautics, and the program provided data for development of the Space Shuttle.

NASA has also conducted significant research on high-speed aircraft flight maneuverability that was often applicable to lower-speed airplanes. NASA scientist Richard Whitcomb invented the “super-critical wing,” which was specially shaped to delay and lessen the impact of shock waves on transonic military aircraft and had a significant impact on civil aircraft design. From 1963 to 1975, NASA conducted a research program on “lifting bodies” (aircraft without wings). This paved the way for the Space Shuttle to

glide to a safe unpowered landing, for the later X-33 project, and for a crew return-vehicle prototype for the International Space Station. In 2004, the X-43A airplane used innovative scramjet technology to fly at ten times the speed of sound, setting a world record for air-breathing aircraft (i.e., those that require the intake of air for fuel combustion).

NASA’s aeronautical research heritage continues at some of its lesser-known facilities. For instance, the Langley Research Center (1915) in Hampton, Virginia, is the original “mother center.” Its staff is not only still a leader in aeronautical wind tunnel research, but also includes scientists in atmospheric science research and engineers who tackle other problems of spaceflight.

Another early NASA center for aeronautics was what is known today as the Dryden Flight Research Center in California’s Mojave Desert. The center traces its origins to 1946, when NACA researchers came to the Muroc Army Air Base, now the Edwards Air Force Base, to test the first supersonic flights by the X-1 rocket plane. The facility was ideally suited for this type of research because it contains the Rogers Dry Lake—at forty-four square miles, the largest dry lakebed in the world. Here, the test pilots demonstrated that they had “the right stuff,” what Tom Wolfe described in his best-selling book by that title. As he observed, the world of the test pilots “was divided into those who had it and those who did not.”



(Left) Future astronaut Neil Armstrong stands next to the X-15 rocket-powered aircraft, which set unofficial records for speed and altitude. Before entering astronaut service, Armstrong worked as a test pilot at what later became the Dryden Flight Research Center.



(Right) The Dryden Flight Research Center has served as the testing grounds for a variety of innovative aircraft. The smallest aircraft at center is the radio-controlled Mothership; from there clockwise are the X-36, X-31, F-15, SR-71, F-106, F-16XL, and X-38.

Today, Dryden's flight engineers continue to enjoy the sunny, clear weather and vast expanses of dry lakebed there to test fly unusual and high-speed aircraft.

Several hundred miles further north, on the south end of San Francisco Bay, employees at NASA's Ames Research Center are also involved in aeronautics and space efforts. Building on pioneering aerodynamic work in the 1950s, researchers at Ames developed the blunt body shape for the Mercury, Gemini, and Apollo capsules. More recently, they have tackled such diverse space research areas as advanced spacesuit development and astrobiology, the search for life beyond Earth. In addition to cutting-edge work on air traffic control, aircraft simulators, and tiltrotor aircraft (i.e., those with propellers that tilt for both lift and propulsion), Ames personnel also take advantage of their location in Silicon Valley to cooperate with computer companies and "push the envelope" in supercomputing.

Engineers and scientists at the Glenn Research Center outside Cleveland also conduct aeronautics and space research. Experts at its unique Icing Research Tunnel analyze the historically persistent and potentially catastrophic problem of airline travel in cold weather. Scientists at Glenn also conduct research in the behavior of materials and fire in the microgravity of space. Glenn engineers are also known for their work on spacecraft and launch vehicle propulsion, especially for testing and developing propulsion systems using liquid hydrogen and liquid oxygen.



(Upper) A refrigerated wind tunnel at NASA's Glenn Research Center creates realistic icing conditions for models and airfoils on the ground. Photo courtesy NASA Glenn Research Center

(Lower) NASA's Future Flight Central, the world's first full-scale virtual airport control tower, opened in December 1999 at the Ames Research Center in California. The facility is designed to test ways to solve potential air and ground traffic problems at commercial airports under realistic airport conditions.



Kim Hambuchen: A Passion for Robotics

by Amiko Nevills

Robots like R2D2 of *Star Wars* and the obedient female replicas of *The Stepford Wives* have long intrigued us. Fascination in these non-human but intelligent forms brought Kim Hambuchen to the Johnson Space Center, where robots are born, or rather built, to help us in space.

Hambuchen first came to NASA by way of a research fellowship award to work with Robonaut, the humanoid designed at the Johnson Space Center to demonstrate a robotic system that could function as a spacewalker. "I chose NASA because there is literally no other place on Earth where I could be doing what I do now," Hambuchen explains. Today, she works for the Robotics Systems and Technologies branch in Engineering, where as a robotics engineer, she develops software in the area of Human-Robot Interaction. Robots are created to do one of two jobs: jobs that a robot could do better than a human or jobs that a human could do better than a robot, but are too dangerous. Working side by side with humans or going where the risks are too great for people, the robots Hambuchen helps develop will expand our ability to explore in space.

NASA's Organizational Culture

While many people think correctly of NASA as a technical organization, its organizational culture is primarily one of engineers, although scientists have important roles at the agency. In general, engineers are practical-minded people who develop tools and technologies to build specific structures and to solve specific technical problems. Scientists, on the other hand, tend to focus on gaining fundamental knowledge to help them understand how the natural universe works and how specific systems within it are structured.

Because NASA's culture has been dominated by human spaceflight, more engineers than scientists have been needed to design and oversee construction of safe, reliable, "human-rated" rockets and spacecraft. Accordingly, many observers point out that NASA's best-known human spaceflight programs, such as Apollo, the Space Shuttle, and the ISS, have been engineering, rather than scientific, achievements.

Thus, although the job title of "rocket scientist" has entered the popular lexicon—as in "you don't need to be a rocket scientist" to understand such-and-such—the term is really a misnomer. NASA does not employ any "rocket scientists" per se. NASA engineers design rockets; technicians build them; and scientists learn about our universe from the spacecraft that rockets launch into space.

NASA engineers and scientists have been responsible for cutting-edge research achievements in virtually every major technical discipline; some of them seem only peripherally related to space. Going beyond fields such as astrophysics, rocket propulsion, and aerodynamics, NASA personnel have had a significant hand in such wide-ranging fields as archaeology, biology, chemistry, computer science, information technology, materials science, physics, and planetary geology. There are at least two reasons for this success: NASA attracts exceptional scientists and engineers, and like some other government agencies, such as the National Science Foundation, it does a good job of planting research seeds by providing grants and contracts to leading scientists and engineers around the country and the world.

Engineers make up by far the largest single professional cadre at NASA, with approximately ten times more engineers than scientists working as NASA civil servants and about twice as many engineers as people with business backgrounds. Nevertheless, many people

without technical backgrounds do work for NASA as budget analysts, educators, historians, legislative affairs liaisons, procurement specialists, public affairs officers, and in many other administrative and professional pursuits. Moreover, because NASA employs so many engineers, many of them work as administrators rather than in their fields. Some NASA administrators, like the current agency head Michael Griffin, have had technical backgrounds and some, like James Webb (administrator during the Apollo effort) have had non-technical, policy backgrounds. In other



Technician Pat Klose leans over an edge in order to repair one of the protective thermal tiles on the Space Shuttle *Columbia*, prior to its fourth launch in 1982.

words, you don't need to be an engineer to work at NASA, but having had some kind of technical background will help open doors to employment.

Even though NASA is often regarded as a large bureaucratic and hierarchical organization, it has an intellectually nimble and flexible workforce. Several factors may explain this. One is that NASA's civil servants and contractors tend to be highly educated. Moreover, because NASA cooperates on space and aeronautics projects with many other nations and international organizations, its staff is exposed to different ways of doing research. Likewise, NASA's cooperation with many other U.S. government agencies, as well as with for-profit companies, nonprofit organizations, and academic institutions—all with very different goals—fosters creative problem-solving by NASA personnel.

Michele Perchonok:
Why Isn't Pizza Served on the Space Shuttle?

Food is essential to today's astronauts, providing them with both nutrition and a comfort from home. It's important also to Michele Perchonok. As the shuttle food system manager, she is responsible for making space food taste good and be good for the crews.

Seven months prior to spaceflight, Perchonok works with NASA astronauts to develop personalized food menus. She conducts taste tests with shuttle crews in the Space Food Systems Laboratory, located at the Johnson Space Center in Houston.

While in space, astronauts eat many of the same foods they enjoy on Earth, with a few exceptions—such as pizza. "Pizza is difficult," Perchonok explains. "Foods in space have to be stored at room temperature. It's difficult when you have too many components, like a pizza—where you have the crust and sauce and the cheese. Each component requires different processing conditions."

Perchonok said some of the more common items astronauts choose are shrimp cocktail and barbecued beef brisket.



"Each person is different, so we really don't have a lot of favorites," she observes. To add variety, NASA food scientists develop two to three new products each year. Some of the newest space foods are chocolate pudding cake and apricot cobbler with pieces of crust.

Tracy Drain:
The Play-by-Play Voice of Mars Exploration

by Franklin O'Donne



Since joining NASA's Jet Propulsion Laboratory in 2000, Tracy Drain has worn many hats in the Mars Reconnaissance Orbiter project, from building command sequences to supporting readiness tests to serving as the voice of mission control for major spacecraft events. During the spacecraft's insertion into orbit around the red planet, Drain appeared on television screens as the mission's spokesperson, explaining the orbiter's play-by-play maneuvers to the viewing public. Many mission events later, the orbiter has now settled into routine science operations, and Drain likewise has shifted hats. She has joined an on-the-job training program for systems engineers that will pair her with senior mentors such as Viking veteran Gentry Lee.

Which of her roles has been the most memorable? "The one with the most immediate cool factor was serving as an 'ace' because I got to actually send commands to the spacecraft," she observes. "It's an important function, and it taught me a lot about the Deep Space Network (NASA's tracking network for planetary spacecraft). But a lot of people don't like to do it because it involves strange hours. It's the kind of job you either hate or you love."

A Diverse Workforce

NASA's efforts to increase the diversity of its workforce started as early as 1961 under Administrator James Webb. Indeed, Webb fought to enable African Americans to work at the Marshall Space Flight Center in the 1960s at a time when racial tensions were high. In 1983, Sally Ride became the first U.S. woman and Guion Bluford became the first African American astronaut to fly into space. Since that time NASA has made considerable strides in achieving diversity, especially in its upper-level management; by 1993, women and minorities made up half the incoming class of NASA Senior Executive Service leaders. Overall, NASA now employs about 12,000 men and 6,500 women as civil servants, and at headquarters, the ratio is roughly even. Of those 18,500 civil servants, approximately 14,000 are white; 2,100 are African American; 1,000 are Hispanics; 1,100 are Asian or Pacific Islanders; and 150 are Native Americans. The percentage of African Americans at NASA is 11.4 percent, compared to 12.3 percent of the U.S. population (according to the 2000 census). Asian/Pacific Islanders repre-

sent 5.9 percent of NASA's workforce, compared to the national 3.7 percent. The percentage of Hispanics is 5.4 percent, well below the 12.5 percent recorded in the 2000 census. And the percentage of Native Americans at NASA is 0.8 percent, which is just below the census count of 0.9 percent.

When asked to assess NASA's efforts at achieving greater diversity, Julian M. Earls, the grandson of a sharecropper and former director of the Glenn Research Center, observed, "I think we've made considerable progress. . . . Put it this way: We're making progress; we have a long way to go, but the intent is there, and people are not being promoted because they are [people] of color [or] because they are female. Everyone that has been chosen for those positions has paid his or her dues and is extremely competent."

NASA's diversity also extends to geography. Its ten field centers draw employees from all fifty states and the District of Columbia. In virtually every congressional district of the country, there are aerospace workers at NASA-contracted firms.

(Left) In 1983, astronaut Sally K. Ride became the first American woman to reach outer space. As a mission specialist on the Space Shuttle *Challenger*, she monitored control panels from the pilot's chair on the flight deck. Floating in front of her is a flight procedures notebook.

(Right) In space, there is no up or down and there is no gravity. As a result, astronauts are weightless and can sleep in any orientation. Seen sleeping here on *Challenger's* mid-deck in September 1983 are astronauts Guion Bluford (left) and Richard Truly.



Whither NASA?

American popular culture is very much fascinated with technology and in particular with NASA, which has a strong reputation as a high-tech organization. However, some critics have observed that NASA engineers have a predilection for overly complex technologies, rather than scientific goals. For example, the Space Shuttle, while relatively graceful, is a very complicated means of transportation. The fact that it does not fly very often reflects its complexity and delicacy (or its creators' unrealistic expectations). The Russian/Soviet approach to space was generally more rugged and utilitarian, as well as somewhat less elegant.

Hundreds of technologies developed by NASA have already benefited U.S. industry and society. Among the technology spin-offs from the Space Shuttle alone are a miniaturized heart pump (based on the shuttle's fuel pumps), a handheld infrared camera used to find forest fires (based on the camera that observes the blazing plumes from the shuttle), and a new material for making prostheses (derived from the foam insulation used to protect the shuttle's external fuel tank).

As NASA leads the United States, if not the world, into the future of space and aeronautics, its workforce will continue to serve a world-class



Molds for prosthetic devices were formerly made from plaster, which was heavy and fragile. However, the foam insulation used by NASA to protect fuel tanks from excessive heat has proven to be an excellent material for molding prostheses; it is lighter, less expensive, and stronger at high temperatures.

organization that attracts talented individuals from a wide range of professional backgrounds. Indeed, it may become even more diverse professionally, especially across the broad spectrum of scientific and engineering fields. For example, NASA may well hire more biologists as the hunt for extraterrestrial life intensifies. In addition, NASA will need the skills of psychologists and other "human factors" specialists as it develops plans for the difficult, long human flight to Mars.

Should NASA continue to explore the outer limits of aeronautics and the furthest reaches of outer space? Admittedly, there are many reasons not to explore, and the vast scope of NASA's work inevitably raises questions about motivation, sustainability,



Jen Keyes: Planning for Humans on the Moon and Mars

by Rachel Samples

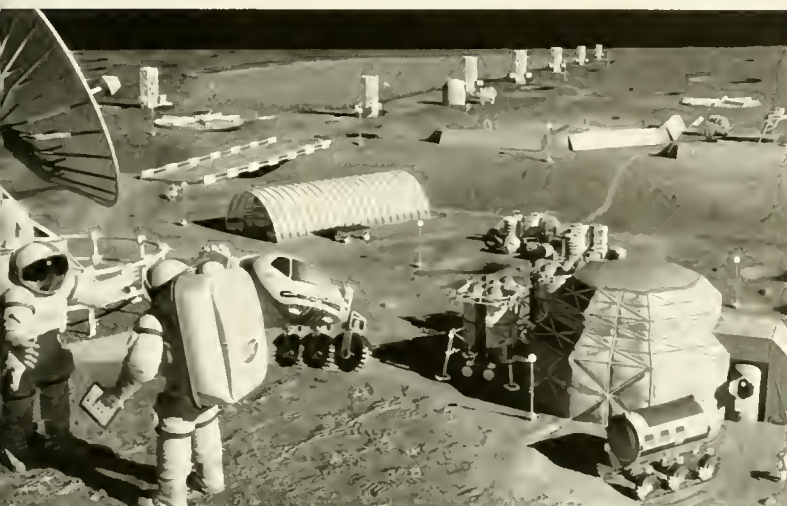
More than fifty years separate their ages, but fifty-year NASA employee Bill Scallion and Jen Keyes have one thing in common—they like to solve problems.

Scallion worked with each of the original Mercury 7 astronauts on simulations and practice runs before the first U.S. trips into space. "We simulated a four-orbit mission in real time. It takes four and a half hours to do that," recalls Scallion. "It's like producing a television show. You have to write scripts and send them out."

Keyes, an aerospace leader working at NASA's Langley Research Center, is building upon the achievements of Scallion and his colleagues. One assignment is to explore upcoming opportunities for human spaceflight, including what to do on the moon once humans return there. "It will be great to see someone land on the moon again, even if it cannot be me right away," Keyes notes. She has also worked on the objectives that address the goal of preparing for long-term, sustained human exploration of Mars. Keyes and Scallion both agree that although the past is important, it is more useful to prepare for the future. Keyes is a good example of what young minds and ingenuity are bringing to NASA.

and financial costs in a world fraught with many problems. Americans tend to think of space as a “new frontier,” but whether the Space Age will actually usher in a new Age of Exploration remains to be seen.

Perhaps the question should be seen in its larger historical context, rather than in that of passing politics or cultural whims. If so, we should remember what the British writer H.G. Wells said many years ago, “Human history becomes more and more a race between education and catastrophe.” We are still in that race today. And space exploration may express one of humanity’s loftiest aspirations.



Steven J. Dick is the chief historian for NASA. He worked as an astronomer and historian of science at the U.S. Naval Observatory in Washington, D.C., for twenty-four years before coming to NASA headquarters in 2003. Among his books are Plurality of Worlds: The Origins of the Extraterrestrial Life Debate from Democritus to Kant (1982), The Biological Universe: The Twentieth Century Extraterrestrial Life Debate and the Limits of Science (1996), Life on Other Worlds (1998), and The Living Universe: NASA and the Development of Astrobiology (2004).

Stephen J. Garber also works in the NASA History Division. He has written on a wide variety of aerospace topics, including President Kennedy’s Apollo decision, the Congressional cancellation of NASA’s Search for Extraterrestrial Intelligence Program, the design of the Space Shuttle, and the Soviet Buran Space Shuttle.

James I. Deutsch is the curator of the 2008 Folklife Festival program NASA: Fifty Years and Beyond. He previously curated the National World War II Reunion in 2004 and Festival programs on the Forest Service in 2005 and (as co-curator) the Mekong River in 2007. He is also an adjunct faculty member in George Washington University’s American Studies Department.

Hoping to send humans back to the moon by 2020, NASA is also designing concepts for a permanent base for scientific research at one of the lunar poles. Photo courtesy NASA Glenn Research Center

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Texas

Pat Jasper and Dawn Orsak



A Celebration of Music, Food, and Wine

(Far left) Polka dances are standard at Texas Czech, German, and Polish community events. This costumed duo probably performed in a song or dance troupe earlier in the day. Photo by Lori Najvar (Second from left) Narciso Martinez (on right), considered the founder of the contemporary conjunto style, made the genre's first truly popular recording with "La Chicharronera" in 1935 on the Bluebird label. Photo by Al Rendon (Third from left) An employee at the hugely popular Güero's Taco Bar on South Congress Avenue in Austin makes fresh tortillas throughout the day. Tortillas (made from either ground corn or flour) are a traditional accompaniment to almost every Mexican-American meal. Photo courtesy Texas Tourism (Right) At Flat Creek Estate near Marble Falls in the Texas Hill Country, volunteers, friends, and family hand pick the grapes that will be pressed for the winery's award-winning vintages. Photo courtesy Flat Creek Estate



This program celebrates the music, food, and wine of every region of Texas. The National Mall will host demonstrations, performances, and famous Texas talk about the Lone Star State's proud history and its contemporary traditions. Visitors will hear Texas blues, swing, conjunto, country and western, gospel, and Tejano (Texas Mexican) music; see demonstrations of wine making; and enjoy diverse culinary traditions—old and new—from barbecue to tamales, from chicken-fried steak to Vietnamese specialties.

Food and music have a special relationship to each other in the Lone Star State. Most Texans consider them the two most important ingredients in successful community celebrations and traditional family events. In fact, it would be unthinkable to have a crawfish boil without a band playing in the background or a watermelon festival without live music. Rodeos feature

livestock and canning displays and present jam-packed lineups of musicians. When the Texas Czech ensemble, the Vrazels Polka Band, celebrated their fiftieth anniversary in 2003, women in the small surrounding communities cooked for days to feed the hundreds and hundreds of people who turned out for the special dance the band hosted.

Texas wine is a newer part of the equation, but its roots run deep into agricultural traditions brought to the state by Spanish, Italian, Czech, and other European immigrants. In contemporary Texas, a full-fledged, statewide industry relies on skill and the state's *terroir* (climate, soil, and unique characteristics) to create some of the country's finest wines. These days in the Lone Star State, you can find yourself enjoying the ultimate combo: a big glass of red, a plate of barbecue, and a blues band. Yep, that's Texas. That's heaven!

Texas Music: A Living Legacy

"You can't hear American music without hearing Texas." That's the official motto of the governor's Texas Music Office, and it is a startlingly true statement. This simple truism speaks to the diversity of Texas music, to its reach into the American musical landscape, and to its tremendous influence on blues, jazz, rock and roll, and country and western—music considered quintessentially American. Texas has a breathtaking sonic landscape: in part this is due to its unparalleled size among the forty-eight contiguous states, to the diversity of its early and newly arrived communities, to its shared 1,200-mile border with Mexico, and to its unique history as a republic. All of these elements contribute to the contemporary musical traditions of the Lone Star State.

With close to 25 million inhabitants, it is common sense that plenty of music making goes on throughout the small and large towns. Add to this the fact that Texas is home to more true urban centers than any

other state in the country—yet boasts a significant rural population—and you know music styles will be bountiful. There are blues in Dallas, *corrido* traditions in small towns along the Texas–Mexico border, and fiddle bands at ranch dances in West Texas and the Panhandle.

But Texas is not just about largeness and largesse. While we Texans enjoy feeling as if we are a separate nation, the cultural and geographic reality of Texas is anything but self-contained. It is, in fact, a region of regions—a place where the arid Southwest, the spacious Central Plains, the verdant Upper and Deep South, the wetlands of the Gulf Coast, and the spare landscapes of Northern Mexico come together. In Texas, these different landscapes are home to distinct cultural communities and local industries. Early waves of immigration to the state, especially from Central

Historic dancehalls are sprinkled all over the Lone Star State. Many are still in use. Photo by Krista Whitson



Creole fiddler and accordionist Ed Poullard crafts accordions in his home workshop. Photo by James Fraher

and Eastern Europe, have made for a heady ethnic mix. In Southern Anglo, African American, Tejano, German, Polish, and Czech communities, people still follow or adhere to traditional occupations and religious beliefs that inform the music Texans enjoy.

Without doubt, East Texas shares a Southern agricultural legacy built by Anglo landowners and African American slaves and laborers. South Texas—defined by the legendary Rio Grande River, which flows from Southern Colorado through El Paso and into the Gulf of Mexico at Brownsville—has a history in Greater Mexico. As you move into the vast stretches of arid land across West Texas, the Southwest's ranching culture is noticeable in all aspects of life. Dallas is often characterized as a business town in contrast to its western neighbor Fort Worth, which champions its ongoing connection to cowboy culture and cattle drives. The culture and geography of the Gulf Coast, where piney woods meet wetlands, extend west of Houston well into Louisiana and Mississippi.

Thus, Texas's music defies stereotypes. In fact, the closer you listen to the earliest Texas country, blues, or Tejano music, the more you hear the harmonies of the state's different cultural and ethnic communities. The cross-pollination continues in contemporary Texas music in which conjunto artists play and sing classic country tunes in Spanish, country artists hit unexpected blues notes, rock and rollers cop the vibrancy of ethnic accordion licks to rev up their sound, and Texas singer-songwriters draw on it all to enliven their lyrics. This is the history of Texas music. This is the current state of Texas music. And this is exactly why people talk with presumptuous casualness about "Texas Music" in a way that no one speaks about the music of other states.

Pieces played from sheet music provided a popular diversion for family and friends in early Texas. Songs about Texas were always a favorite.

Photo courtesy Texas Music Museum



Accordions According to Texas

When it comes to naming the Texas state musical instrument—be it guitar, fiddle, harmonica or mandolin—you should never take sides. But facts are facts; it is the accordion that dominates music performed by and for communities that draw from distinctive and frequently non-English-language repertoires, including Czech and German polka music, Tejano, conjunto, Cajun, zydeco, and Creole music. In smaller and often more rural communities where resources are limited, a full band isn't on hand, or the piano is poorly tuned, the accordion offers a versatile, available, and loud alternative.



COWBOY DANCE - SPURRA

As such, a stroll through the musical landscape of the Lone Star State turns out to be anything but. In fact, a stroll in Texas usually becomes a waltz, a *schottische*, or a two-step when music is involved. This is telling because most Texas music incorporates dance, which sets it apart from other traditions. In the Lone Star State, social dance (where men and women dance together and usually touch) was historically far more common than it was in the American South. Most Texas music, with the exception of sacred music, was, and continues to be, spawned as dance music in informal locales, like ranches and church halls, or in entrepreneurial ones, like *salones de baile* and juke joints. Whether country, Tejano, polka, or the blues—dancing and dancehalls complete the Texas musical equation.

Even in small communities throughout Texas, it is not uncommon to find multiple musical and dance venues, each hosting a specific ethnic clientele and their preferred genre of music. On a Saturday night, in a town of 5,000, there could well be a zydeco dance at the church hall, a country and western dance at a local club, a Czech polka dance at a fraternal lodge, and a popular conjunto cranking out *cumbias* and *redouas* for a swirling crowd of hundreds in a salon or cantina. These dancehalls and juke joints allow Texas musical traditions to influence each other; Texas musicians often say that their love of music flowered at an early age in these places. Frequently, when a club or venue was restricted through custom, prejudice, overt segregation, or the cost of admittance,



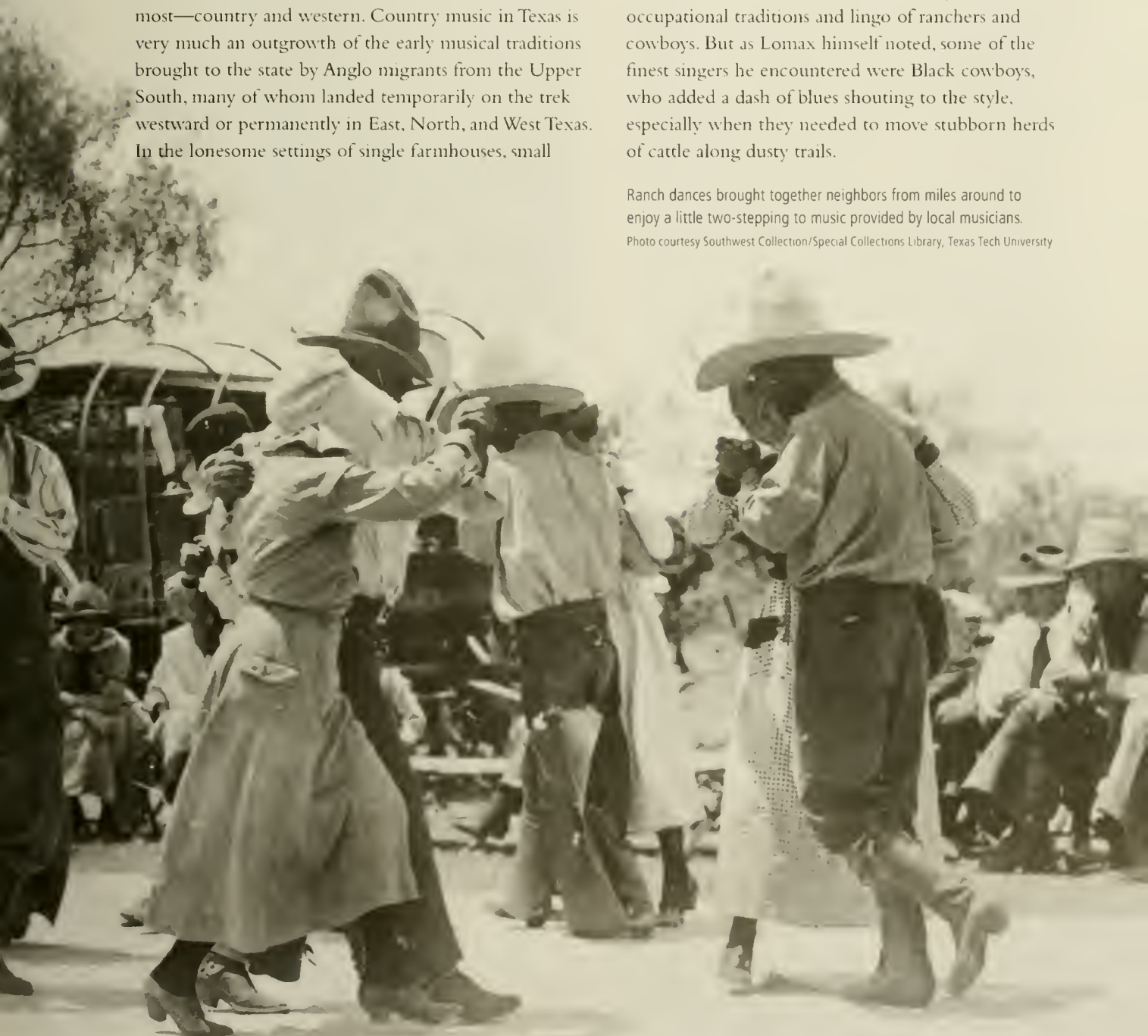
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young musicians-in-the-making strained to listen outside a window or a backstage door. Through these cross-cultural and cross-generational sneak attacks, the many musical communities of Texas absorbed each other's repertoires, rhythms, and voices.

The musical story of Texas is multi-layered and many-faceted, and where you end up is usually determined by where you start. But let's be bold and begin with the type of Texas music best known to most—country and western. Country music in Texas is very much an outgrowth of the early musical traditions brought to the state by Anglo migrants from the Upper South, many of whom landed temporarily on the trek westward or permanently in East, North, and West Texas. In the lonesome settings of single farmhouses, small

ranches, bunkhouses, and open-air trail drives, the tunes, songs, and traditional melodies that entertained an isolated family or a handful of cowboys became a country music legacy. Some of the earliest, most familiar expressions are cowboy songs originally collected by John Lomax in his youth and published years after during his stint at Harvard. Cowboy songs say a lot about Texas's musical roots because they combine the British tradition of balladry with the occupational traditions and lingo of ranchers and cowboys. But as Lomax himself noted, some of the finest singers he encountered were Black cowboys, who added a dash of blues shouting to the style, especially when they needed to move stubborn herds of cattle along dusty trails.

Ranch dances brought together neighbors from miles around to enjoy a little two-stepping to music provided by local musicians.

Photo courtesy Southwest Collection/Special Collections Library, Texas Tech University



COWBOY DANCE - SPUR RANCH, 1918.

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Photo courtesy Southwest Collection/Special Collections Library, Texas Tech University



Fiddle music was also part of the musical frontier in Texas. As Bill C. Malone notes in *Country Music, U.S.A.*, the fiddle was "...most favored by rural folk, for a long time the fiddle [was] virtually the defining instrument in country music." In the early days, fiddlers, like the casual cowboy singers, performed for family, friends, and small gatherings. The fiddle was central to the ranch dances so prevalent in West Texas, where there were few nonchurch-related social and musical enjoyments. Out of this fiddle tradition comes Texan Eck Robertson, who is generally credited with the first commercial country music recording, a version of "Sally Gooden" released by the Victor Talking Machine Company in 1922. Over time, the fiddle became the centerpiece of early Texas country—from the romping and wide-ranging repertoire of the Light Crust Doughboys to the adventuresome Western swing of Bob Wills and the Texas Playboys, and Milton Brown and the Musical Brownies. Masters like Wills would sometimes pack the band with fiddlers, and the "twin fiddle" sound was de rigeur. The instrument's presence in Texas country music still flourishes today in contest fiddling, swing, honky-tonk, or straight-ahead country. As the song (ironically by the non-Texas group Alabama) says, "if you're gonna play in Texas, you gotta have a fiddle in the band."

As a result of the world wars of the twentieth century, country music, like much of life in the state, began to change. People moved about, and families broke up due to the demands of military service and the concomitant shifts in the economy. Rural life gave way to jobs in cities and industries that offered greater financial promise. In a sense, modern life caught up with Texas country music. Towns like Houston, Dallas, and Fort Worth became hubs of Texas life and introduced an urban edge to the music, an edge that spoke, not to the nostalgia of the home place or the

(Above) An important bridge between the western swing and honky-tonk traditions, Hank Thompson's music spanned decades and produced dozens of country hits. Photo courtesy Hank Thompson

(Below) Willie Nelson is the wizard of Texas music—a staggeringly talented songwriter, an artist of unparalleled depth and breadth, and a performer whose music is rooted in tradition yet beloved by mass audiences. For many, he is the personification of the Texas sound.

Photo courtesy Texas Tourism



lonesome life of the heartsick cowpoke, but to the crushing realities of separation, working on someone else's clock, and partying hard after the clock stopped. As early as 1936, East Texan Al Dexter had a hit with "Honky-Tonk Blues," the first song to use the term "honky-tonk" to describe hard living, hard drinking, and hard loving in a tough, modern world.

This is not to say that western swing didn't address its share of contemporary and primal issues. Both styles shared the stage for a good period; the western swing repertoire was fluid enough to include pop and blues tunes just as readily as western ones. But the advent of honky-tonk really marked the shift to contemporary music. It also elevated individual artists who sang songs (often of their own composition) that came straight from their own experiences. The cheating, truck-driving, drinking songs that characterize this style originate in cowboy ditties and murder ballads, but their power lies in substituting the timelessness of the latter for the immediacy and urgency of the so-called "honky-tonk life." From such heyday greats as Lefty Frizzell, Floyd Tillman, and George Jones to today's Dale Watson and Junior Brown—honky-tonk lives in Texas country.

And this is due to the simple fact that Texas's hefty country music history is one of innovation and renovation. Since the 1970s, movements as variously described as "progressive country," "cosmic cowboy," "outlaw" or "renegade," and "alternative country" have attracted veteran artists and young upstarts, who have embraced, expanded, retained, and reinvented the representative genres. Examples include Willie Nelson's sampling of traditional folk songs, Asleep at the Wheel's update of western swing, George Jones's return to hard-core honky-tonk, the Dixie Chicks' acoustic offerings, and The Little Willies' swinging renditions of classic country.

Whose/Who's Country?

Some say that Texas put the "western" in "country and western music." And while much of early country music in Texas has roots in the Southern United States, such as a shared repertoire of British folk songs and an affection for Anglo fiddling, there are important differences. In fact, Texas's contributions to country often go unrecognized. For example, cowboy songs, swing fiddle, and early honky-tonk styles were developed in the Lone Star State and have had an impact on country music across the board. And more than any other place, the Lone Star State borrows from its diverse ethnic communities to create a new sound. Mexican songs were turned into popular Anglo fiddle tunes; African American blues styles became ready parts of jazzy Western swing; and European polkas were regularly translated into country music dance standards.

"For the Sake of the Song"

"For the Sake of the Song" comes from a song by Townes Van Zandt, one of Texas's finest songwriters. While many think the contemporary singer-songwriter phenomenon is a product of popular music, a different case can be made for songwriting in the Texas tradition. From early cowboy singers to contemporary guitar-toting troubadours, music in Texas has largely been defined by its lyrics. To reflect conditions of life on the range, ranch workers recast ancient tunes and familiar stories in new language to mirror their experience. With hindsight, we understand that the hard-drinking, heart-breaking, and truck-driving songs of Al Dexter, Lefty Frizzell, Floyd Tillman, Ted Daffan, and Cindy Walker chronicled the lives of Texans as the state's population increasingly moved from rural to urban settings and from agricultural to nerve-wracking industrial jobs. Like Van Zandt in his time, today's Texas tunesmiths transform life-driven stories, old and new, into song.

Austin: Are There No Limits?

In the popular imagination Austin is, without a doubt, the center of contemporary Texas music. The city doesn't hesitate to spread this idea with a Texas-size boast, calling itself the "Live Music Capital of the World." While other cities in the Lone Star State may legitimately debate the claim, there's no denying that a town that gave birth to the "Cosmic Cowboy" scene of the mid-1970s and hosted the *Austin City Limits* television show for over thirty years has plenty of ammo for making such an assertion. The perception was cemented in folks' minds with the institution in 1987 of South By Southwest, the single most successful music conference in the country. It attracts equal numbers of industry personnel and avid fans but always acknowledges its roots by including Texas talent and expertise in all of its showcases and presentations.

Of equal weight in Texas music is the blues tradition, which African American slaves and laborers brought to the state from the American South. Based on work songs, shouts, and hollers, blues expanded over the decades from a rural to an urban, from an acoustic to an electric, and from a guitar- to a piano-based tradition. To make a living, blues artists—sharecroppers and migrant workers among them—moved with their music from community to community. As the “race record” industry developed, the Texas blues tradition spread throughout the state and the nation, and Houston artists heard those in Dallas on the radio and the phonograph. Many blues artists and African American songsters shared their music in person through minstrel and tent shows that traveled the state, the South, and the Southwest.

This is especially notable because Texas was the birthplace or longtime residence of an awesome, perhaps unparalleled lineup of the most prestigious blues players and performers. One of the earliest and easily one of the most celebrated performers (then as now), was Blind Lemon Jefferson, who started by playing on street corners and in brothels. He recorded extensively during the late 1920s and may have been the most popular blues artist of the time. He influenced country and urban blues performers alike; his repertoire contained both sacred and very, very profane material. In a sense, his career presaged the diversity of Texas blues styles. Occasionally, he performed with Huddie Ledbetter (better known as Lead Belly) in the Deep Ellum district of Dallas. Lead Belly drew on Jefferson’s acoustic range and rural tradition. However, because Lead Belly was a younger artist who lived longer and

found many important sponsors and promoters over the course of his career, contemporary music audiences tend to know him better.

A second generation of Texas blues artists included Lightnin’ Hopkins and Mance Lipscomb, whose very different careers embodied the diverse directions a musical tradition can take. Houston-based Lightnin’ Hopkins was clearly a fan of Jefferson’s style. He recorded prolifically and played for years on the so-called chitlin’ circuit of Black clubs and juke joints, which were standard venues for early blues artists. Hopkins started on acoustic guitar but switched to electric to reflect his own and his audience’s change in taste. Until Whites became interested in the blues, his audience was largely a Black one, and he had a substantial following. Mance Lipscomb of Navasota, Texas, on the other hand, played music in strictly informal settings for most of his life; only later was he “discovered” by blues aficionados. Though Lipscomb did not have a “professional” career in the blues until well into his sixties, his repertoire was no less wide-ranging and impressive. He performed mainly before White audiences who discovered the blues through the festival and folk club circuits.

Jefferson also had an enormous impact on T-Bone Walker. He encountered the younger musician when T-Bone was growing up in the Oak Cliff area of Dallas. At one time, Jefferson enlisted T-Bone to lead him to the street corners where the older artist plied his trade for spare coins. Walker cleverly combined what he learned from Jefferson’s aggressive guitar strumming with amplification techniques he learned from his onetime partner, the legendary jazz musician Charlie Christian (also a Texan). It proved a mighty recipe for popularizing the electric guitar in blues circles. Walker became one of the founders of urban electric blues and spread the sound through his successful recording career and his move from Texas to the West Coast. His innovations inspired a generation of remarkable Texas blues guitarists such as Pee Wee Crayton, Clarence “Gatemouth” Brown, Z.Z. Hill, Albert Collins, Freddie King, and Johnny Clyde Copeland—all nationally known musicians. But almost every town in Texas



In cities like Houston, Texas, there are still local clubs that serve up live blues for largely Black audiences. Photo by James Fraher



In the 1940s, Texas native T-Bone Walker revolutionized blues guitar playing by amplifying the instrument. Photo by Amy van Singel, courtesy BluEsoterica Archives

with a sizeable African American community had one or more local Black guitar heroes, who held down gigs in popular Black venues and often backed big acts when they came through town. Today, such artists include I.J. Gosey of Houston, W.C. Clark of Austin, and left-handed Barbara Lynn of Beaumont, Texas.

Texas is home not only to a blues guitar tradition, but also to a formidable crew of blues pianists based in cities such as Austin, Houston, and Dallas. For a while, there was even an itinerant tradition known as “the Santa Fe circuit.” Artists like barrelhouse piano player Robert Shaw jumped trains to play gigs in towns along the Santa Fe Railroad. Shaw had stylistic followers, such as Lavada “Dr. Hep Cat” Durst and fellow rail rider The Grey Ghost. These artists played in local settings and had limited recording careers, while pianists such as Sippie Wallace of Houston and Charles Brown, originally from Texas City, carried Texas piano blues to national audiences. Wallace turned her church-bred licks into a straight-ahead shouting style which was heard nationwide on recordings, and Brown forwarded a smooth R&B-type sound. Like T-Bone Walker, Brown was a Texas artist who performed on the West Coast for much of his career.

Blue Dallas

by Alan Govenar

The blues came to Dallas in the 1890s, brought by itinerant African American musicians fleeing the blighted cotton fields of East Texas. Of these musicians, the most seminal guitarist and vocalist was Blind Lemon Jefferson, born in 1893 in rural East Texas and discovered on a Dallas street corner. Considered one of the first folk blues singers on record, Jefferson made eighty recordings between 1926 and 1929 and was a profound influence on the blues musicians who followed him. From Lead Belly and Aaron “T-Bone” Walker to Stevie Ray Vaughan and Anson Funderburgh, Dallas has offered a hotbed of blues activity. Barrelhouse blues pianist Alex Moore, who made his first recordings in 1929, received a National Heritage Fellowship in 1987. Today, the House of Blues brings nationally known acts to the city, while R.L. Griffin’s Blues Palace in South Dallas still nurtures the blues in the African American community.

Alan Govenar is the author of the forthcoming Texas Blues: The Rise of a Contemporary Sound (Texas A&M University Press, 2008).

Houston's House of Hits: Sugarhill Recording Studios

by Andy Bradley

The oldest continuously operating recording studio in Texas is nestled in a southeast Houston neighborhood that has over time been home to legendary producers, record labels, and artists, with staggeringly important releases. To kick things off in 1946, musician Harry Choates and producer Bill Quinn laid tracks for the Cajun classic “Jole Blon” for Gold Star Records. Blues icon Lightnin’ Hopkins recorded with the label soon thereafter. For Pappy Dailey’s D label, George Jones cut “Why Baby Why?” in 1955; in 1958, the Big Bopper recorded “Chantilly Lace.” Willie Nelson, Bobby Bland, and Arnett Cobb have all used the studio. In 1965, the Sir Douglas Quintet made the classic “She’s About A Mover.” In the mid-1960s, Clifton Chenier recorded his first album there, and in the mid-1970s, Crazy Cajun producer Huey P. Meaux introduced Freddy Fender to the studio. Since the 1980s, Sugarhill has hosted Tejano artist Little Joe, country greats Johnny Bush and Ray Price, and urban powerhouse Beyoncé.

Andy Bradley is a co-owner and company historian at Sugarhill Recording Studios.

Despite the longstanding debate about the relationship of the blues to gospel music within the African American community, many Texas artists performed both. And the Texas African American gospel tradition certainly had its share of soloists, including Blind Lemon Jefferson, Sippie Wallace, and the lesser known but electrifying Blind Willie Johnson. However, the state's Black gospel scene has always been more noted for its quartet sound. The early vocal quartets often performed a cappella, while later ensembles preferred a feisty vocal style and relied on amplification to spark the Holy Spirit in church, concert, and record audiences. In the 1940s and 1950s, the center of Texas Black gospel was Houston, where the early Soul Stirrers and The Pilgrim Travelers sang. During this era, even the Austin-based Paramount Singers and the still-active Bells of Joy traveled to Houston to record on the Duke-Peacock label, which was owned by the first Black recording entrepreneur, Don Robey. Personal and family connections kept the Texas gospel sound alive, even in places like California, where many early Texas groups and individual artists moved and continued to perform. The Los Angeles-based Mighty Clouds of Joy were cofounded by Austin's Junior Franklin, whose father was one of the founders of the Paramount Singers, who now reside in Oakland, California.

The storied and still vibrant Texas Mexican tradition also distinguishes the musical riches of the Lone Star State from those of other parts of the South and urban America. A large, long-resident population of Mexican descent has influenced every aspect of Texas culture, including music. After all, the story-song style of the *corrido* is not that different from the cowboy ballad. And don't the twin fiddles of western swing evoke and in some ways echo the big violin sound of mariachi music? Isn't a polka still a polka, even if its lyrics are in Spanish and not in Czech or Polish? Somehow, however, the Tejano musical traditions have remained outside the mainstream and have been less appreciated than African American genres by the commercial recording industry. Clearly, this is largely the result of discrimination and linguistic



Lydia Mendoza performed for years with her family in *carpas*, Spanish-language traveling shows. When records and radio became popular, her fame flourished. Photo courtesy Arhoolie Productions, Inc

difference. Still, whether you speak of the corpus of *canciones* and *corridos*; the styles of *orquesta* and conjunto; the more contemporary, straight-out Tejano sound; or the politically oriented music of the *movimiento*, Tejano music both expresses and maintains a coherent cultural identity and community.

Tejano music comes from the banks of the Rio Grande, which forms the “border” between Texas and Mexico. Now so often thought of as a dividing line, it was, in fact, a meeting place for the Texas Mexican community. Women vocalists and instrumentalists played a large part in developing the repertoire from the 1920s through the 1950s. Lydia Mendoza, for example, was known for accompanying herself on twelve-string guitar. Artists, such as Lydia Mendoza, Chelo Silva, and Carmen y Laura popularized border music through performances, radio appearances, and recordings. Tejanas still follow in the footsteps of their female forebears; singers and songwriters such as Shaelly Loves and Tish Hinojosa keep alive this vocal tradition.

Men (often with women as vocalists) dominate conjunto and *orquesta*, which were born and bred in Texas and the Southwest, respectively. Conjunto’s beginnings are generally associated with the 1936 recording of “La Chicharronera” by accordionist Narciso Martínez. The style combines two-row button accordion with the *bajo sexto* (a twelve-string guitar), an instrument that provides the rhythmic accompaniment unique to conjunto and replaces the bottom-sounding bass keys of the accordion. The conjunto repertoire is made up of an extraordinarily wide range of song styles and rhythms—including *rancheras*, polkas, waltzes, *redovas*, *huapangos*, *schottisches*, and *cambias*. They reflect the Mexican and Central European traditions blended by Tejano accordionists from South Texas. Conjunto is always called *la música de la gente* (the people’s music); its roots in rural life and farmwork are understood. Yet even the early style had an urban version, which was pioneered by artists such as San Antonian Santiago Jiménez Sr. Like so many other forms of Texas music, conjunto is dance music. Every Friday and Saturday night, there are dozens of conjunto dances in towns all over the Lone Star State. They feature artists such as Don Jiménez’s sons, Flaco and Santiago Jr., Mingo Saldivar, Eva Ybarra, Joel Guzmán, and Sonny Saucedá—to name just a few.

Border Ballads: The *Corrido* Tradition

The ballad is a story-song that puts poetry to music. Ballads exist in many cultural and linguistic traditions, but the Texas Mexican *corrido* is one with a special history in the Lone Star State. The publication of *With His Pistol In His Hand: A Border Ballad and Its Hero*, by Tejano scholar Américo Paredes, recognizes the *corrido* as a vibrant musical tradition that offers an alternative history and perspective on the struggles of the Texas Mexican community. Whether it is the story of an unjustly accused ranch hand seeking vindication, the exaggerated exploits of border smugglers, or the brags of a winning South Texas football team, the *corrido* carries news to the community.



For many Tejanos, mariachi music expresses the essence of Mexican identity. School-based instructional programs and ensembles, like this group of young musicians from Roma High School in the Rio Grande Valley, have especially fueled the genre’s prevalence in the state.

Photo by Scott Newton

Orquesta, like conjunto, is dance music, but it requires, as its Spanish name indicates, a larger ensemble, driven by strings, reeds, and horns. It weds Mexican- and Latin American-inspired rhythms, such as the rumba, bolero, and cha-cha, with mainstream American dance-band styles, such as the foxtrot and boogie-woogie. The great masters of the genre Beto Villa and Isidro López, bandleaders in the “big band” sense of the word, understood that *orquesta*’s appeal lay equally in conventional American musical culture and the Tejano community’s *ranchera* roots. And while *orquesta* was considered a more sophisticated, or *jaitón* (high tone) musical tradition than conjunto, it remained a very important vehicle for Texas Mexican identity, even as the genre became less elitist with the advent of straight-out, politically aware Tejano groups like Little Joe y La Familia, and Rubén Ramos and the Texas Revolution. This second and third generation of musicians combined big-band *orquesta* with consciousness of the Chicano movement. Consider Little Joe’s treatment of the traditional Mexican song “Las Nubes,” which is about a desperate young man who gazes at the approaching clouds and hopes for rain—and a new day. This well-worn song became an anthem of cultural empowerment for the Texas Mexican community. Tejano music, like all Texas music, renews itself while holding close its beloved heritage.

Perhaps more important than claims of “influences,” “firsts,” and “innovations” of Texas music is a far subtler point: Texas music has always served to bridge the complex cultural identities of the region’s

many residents. In the Lone Star State, if you are an Anglo, a Tejano, a Czech, or an African American—or even if you are a rancher, an oil worker, or a Southern Baptist—there are specific styles of music that entertain, articulate, and celebrate your heritage and experience. In contemporary Texas, the polka dance is alive and well. There are soul-riveting gospel services in countless communities every Sunday. Dancehalls throughout the state are filled with the sounds of Western swing and hard-core honky-tonk on Saturday night. And Texans take advantage of them all, often in direct relation to and as an expression of, a singular cultural identity that attaches to specific genres like conjunto, country, gospel, or polka.

Yet, through an affection for music that unabashedly embraces combinations of all of these styles, Texans also rejoice in being Texan and in their shared regional identity. You hear it in Tejano’s nod to country and in Texas country music’s fascination with jazzy, swingy elements that first arose in African American styles. You especially find it in completely contemporary styles of pop and rock—from Doug Sahm to Lucinda Williams to Los Super Seven to Norah Jones. That is simply because music in Texas has always been a means for diverse communities to communicate with each other—even communities that have not interacted directly with each other for decades or sometimes centuries because of physical distance, social difference, or, downright discrimination. By circulating tunes, passing on licks, exchanging genres, and borrowing stylings, the music has fostered an understanding of being Texan that transcends the time, the region, and the individual. And, you can dance to all of it!

Pat Jasper is a folklorist and the founding director of Texas Folklife Resources, a statewide nonprofit dedicated to preserving the folk arts and folklife of the Lone Star State. Since 2002, she has worked as an independent consultant, curator, and project director for a wide range of nationally noted festivals, museums, and documentation projects. She lives in Austin, Texas.

The longest-running concert series on national television, *Austin City Limits*, presents a broad spectrum of artists and celebrates homegrown music. The legendary Flatlanders performed on the show in 2002 for its twenty-seventh season. Photo by Scott Newton





Vineyard workers and volunteers bring in the harvest at Messina Hof Winery near Bryan. Photo courtesy Texas Tourism

From Cattle Drives to Winery Trails: Food and Wine Traditions in the Lone Star State

Dawn Orsak

I was born in the months preceding the 1968 Smithsonian Folklife Festival, which featured my home state of Texas. Raised in the Houston area, I'm a fifth-generation Texan with a Czech and Polish background, who grew up eating *kolaches* (sweet pastries), strudels, sausage, and noodles at family reunions, church picnics, and holiday gatherings. I also spent countless weekends during junior high and high school at cook-offs where my dad's cooking team won awards for everything from barbecued brisket, chicken, and sausage to pots of chili, beans, and sauce. My parents were adventurous eaters and took my siblings and me to Kim Son and other Vietnamese restaurants owned by hardy, determined people who rode a wave of immigration to the Texas Gulf Coast in the 1970s. The very first Landry's Seafood House (now a national chain) opened on the edge of my suburban Katy neighborhood when I was thirteen. It introduced me to the joys of boiled crawfish and *boudin* (a spicy Cajun sausage) and reminded me just how close we were to Louisiana.

I ate whatever Texas bounty my modern hunter-gatherer family brought home, including the deer, quail, dove, duck, blue crabs, and flounder my father hunted or fished and the cucumbers, squash, tomatoes, beets, loquats, mustang grapes, dewberries, and persimmons my mother and grandmothers canned, pickled, or made into jams and jellies. I served as executive director of one of the state's oldest and largest wine and food festivals, which gave me a first-class education on the Texas wine industry. And, of course, we go through more tortillas at my house than loaves of bread because Tex-Mex is so delicious, accessible, and integrated into Texas cuisine that it feels like comfort food even to Texans with absolutely no Mexican heritage.

I give this glimpse of my very fortunate personal culinary history to illuminate the diversity of foods enjoyed every day in communities all over the Lone Star State. My experience reflects what many Texans eat. The question, "What is traditional Texas food?" has become more complex and interesting in 2008 than it was in 1968, due to cultural and demographic changes in the last forty years.

In 1968, the Festival focused on Texas barbecue, chili, tacos, and German horseshoe sausage. They well represented Texas's long, intertwined history with Mexico; the culture of the sizable German communities in Central Texas; and the state's dominance in cattle production. But the Festival only touched the surface of what Texans eat today. This huge state encompasses high plains, desert, gulf coast, mountains, and blackland prairies and produces foods as varied as grapefruit, shrimp, wheat, onions, pecans, oysters, rice, grapes, corn, and beef. Significant Mexican, African American, German, Cajun, Italian, Asian, East European, and Middle Eastern populations contribute to the flavors of Texas. The ranching, shrimping, fishing, wine, and technology industries likewise influence the Texas table.

Aficionados know Texas is blessed with many variations of barbecue, but they all require meat, smoke, and heat. Beef brisket may still be king, but plenty of other meats are barbecued. There are also differences in rubs, woods used for smoking, types of cooking pits, and kinds of sauces (if any) served. A visitor might find pulled pork cooked in



Members of the extended Morkovsky family gather annually to make up to 1,000 pounds of Czech pork sausage. Photo by Valentino Mauricio

a pit loaded with hickory at an African American family reunion in East Texas; pork, beef, and venison sausages in Central Texas Czech and German meat markets; *barbacoa* (cow head smoked in a pit dug into the ground) in South Texas; or beef ribs cooked on open pits on a West Texas ranch. Even traditional sides of pinto beans, potato salad, coleslaw, bread, tortillas, and sauce reflect regional and personal tastes.

All barbecue styles can be sampled at the state's hundreds of annual cook-offs. Texans also compete for the best gumbo, steak, *pan de campo* (or "cowboy bread," the official bread of Texas), chicken noodle soup, *kolaches*, and, especially, chili. Part cooking contest, part fundraiser, and part performance, cook-offs cross ethnic, regional, and gender boundaries. In the late 1960s, "Bowl of Red" became another nickname for the dish because of the color chili powder imparts to the stewed beef. Some of the best-known names in chili, such as chili-seasoning manufacturer Wick Fowler and columnist and chili promoter Frank X. Tolbert, were associated with the Original Terlingua International Championship Chili Cookoff. The championship, the "granddaddy" of cook-offs, started in 1967. The Chili Appreciation Society International sanctions more than 500 statewide cook-offs every year.



Pit manager Roy Perez slices barbecued brisket at the historic Kreuz Market, which was established in 1900 in Lockhart, Texas.

Photo by Valentino Mauricio

Venison Black Bean Chili with Goat Cheese Crema and Slang Jang

From Stephan Pyles's cookbook *New Tastes from Texas*

CHILI

- 4 tablespoons olive oil
- 1 pound venison leg, well trimmed of fat and finely chopped
- 6 garlic cloves, finely chopped
- 1 onion, chopped
- 1 jalapeño, seeded and chopped
- 4 tablespoons ancho puree
- 2 chipotles in adobo, chopped
- 4 medium tomatoes, blanched, peeled, seeded and chopped
- 2 teaspoons ground cumin
- 1 quart chicken stock or vegetable stock, or more as needed to cover in cooking process
- 1 12-ounce bottle dark beer, such as Shiner Bock
- 1 cup black beans, soaked overnight and drained
- 1 teaspoon epazote
- 1 tablespoon masa harina
- 1 tablespoon chopped fresh cilantro
- salt and freshly ground black pepper to taste

Heat the oil in a heavy stockpot or casserole until lightly smoking. Add the venison, garlic, onion, and jalapeño; cook over medium heat until the meat has browned, about 15 minutes. Add the ancho puree, chipotles, tomatoes, and cumin; cook for 10 minutes longer.

Add the stock and beer; bring to a boil. Add the black beans and epazote. Reduce the heat and let simmer for 1½ to 2 hours or until the meat and beans are perfectly tender, stirring occasionally. Add more stock throughout the cooking process, if necessary, to keep meat and beans covered. Whisk in the masa harina and cilantro. Season with salt and pepper to taste and garnish with Goat Cheese Crema and Slang Jang.

Yields 4 to 6 servings.

GOAT CHEESE CREMA

- 1 cup heavy cream
- 6 ounces fresh goat cheese, crumbled
- 2 tablespoons roasted garlic puree

Heat the cream in a small saucepan until just boiling. Place in a blender and slowly add the goat cheese and garlic, blending 2 to 3 minutes or until smooth. Serve at room temperature.

SLANG JANG

- 1 ear of corn, in husk
- 2 ripe tomatoes, seeded and diced into ¼-inch pieces
- 1 medium-size green bell pepper, seeded and diced into ¼-inch pieces
- 1 small onion, minced
- 2 stalks celery, peeled and diced into ¼-inch pieces
- 1 jalapeño, seeded and minced
- 2 teaspoons sugar
- ½ cup cider vinegar
- 2 tablespoons olive oil
- salt and freshly ground black pepper to taste

Preheat the oven to 325°F.

Roast the ear of corn in its husk for 20 minutes. Let cool to room temperature and cut the kernels off the cob.

Combine corn and the remaining ingredients in a medium bowl; chill for 2 to 3 hours before serving. Serve chilled or at room temperature.



At hundreds of chili cook-offs all over the state, proud cooks offer passersby samples of their concoctions. Photo by Andy Reisberg

This one-dish meal was popularized in San Antonio—the veritable heart and soul of Tex-Mex cooking—in the late nineteenth and early twentieth centuries, when Mexican women, dubbed “chili queens,” sold it at their street stands. Houston food writer and cookbook author Robb Walsh calls Tex-Mex “America’s oldest regional cuisine.” By including meats and other ingredients more available in Texas and by catering to non-Mexican patrons of restaurants that started opening in the early 1900s, Mexican Americans shaped a unique, informal, and nourishing fare. It is now the state’s most influential cuisine; even dishes generally assumed to be Mexican, such as fajitas and nachos, are actually Tex-Mex creations. From simple breakfast tacos of scrambled eggs and chorizo sausage made by a grandmother for her family in Refugio to fried oyster nachos served at Nuevo Tex-Mex restaurants in Austin or Dallas, Tex-Mex’s prevalence cannot be overstated. Patricia Sharpe, food editor of *Texas Monthly*, wrote in a December

Pedernales River Chili

From Mrs. Lyndon B. “Lady Bird” Johnson

4 pounds chili meat (coarsely ground round steak or well-trimmed chuck)
1 large onion, chopped
2 garlic cloves
1 teaspoon ground oregano
1 teaspoon ground cumin
6 teaspoons chili powder (more, if needed)
1½ cups canned whole tomatoes and their liquid
2 to 6 generous dashes liquid hot sauce
2 cups hot water
salt to taste

Place the meat, onion, and garlic in a large, heavy pan or Dutch oven. Cook over medium-high heat until light in color. Add the oregano, cumin, chili powder, tomatoes, hot sauce, and 2 cups hot water. Bring to a boil, lower the heat, and simmer for about 1 hour. Skim off the fat during cooking. Salt to taste.

2004 article, “Once upon a time, we were part of Mexico, and if you look at what we like to eat, you would think we still are.”

In contrast to the seminal influence of Mexican cooking, Vietnamese cuisine is recent in its effect on the Texas table. After the fall of Saigon in 1975, a wave of refugees escaped to Texas, with another following in the late 1970s. Some found work in urban centers like Austin, Dallas, and, especially, Houston. Others settled in coastal areas, where the shrimping industry was similar to that of their homeland. Through ethnic shopping centers, restaurants, and celebrations of holidays and ceremonies, these communities maintain their traditional foods and heritage. Fresh vegetables and herbs, noodle soups, stir-fry dishes, and soy and fish sauces epitomize Vietnamese cuisine. Restaurants like Kim Son and Mai’s in Houston, frequented by non-Vietnamese diners, have fused traditional dishes with popular “Texan” items to create specialties like Vietnamese fajitas and fish tacos.

From the 1960s through the 1980s, many Cajuns (descendants of French-speakers who were expelled from Nova Scotia in the late 1700s) left southern Louisiana to take oil industry jobs on the upper Texas coast, especially in the “Golden Triangle” area of Beaumont-Port Arthur-Orange. Cajun cooking consists largely of stewed meats, seafood, and gravies combined with rice. Sharing a coastline, state line, and love of fresh seafood, Texans embraced Cajun specialties like crawfish étouffée, blackened snapper, and seafood gumbo. The online dining guide b4-U-eat.com lists more than seventy Cajun restaurants in the Houston area alone. Hurricane Katrina recently blurred the boundary between the two states even more—thousands of Louisiana refugees relocated to Texas and reinvigorated Cajun culture in the Lone Star State.



(Upper) The Vietnamese-owned Donut Palace in Port Aransas caters to the multicultural community of the Texas Gulf Coast by offering Czech *kolaches* (pastries), Mexican American breakfast tacos, southern donuts, and croissants, which reflect the French influence on traditional Vietnamese cuisine. Photo by Steve Orsak

(Lower) In Dripping Springs in the Texas Hill Country, the Reyes family gathers a week or two before Christmas to make dozens of tamales for their Christmas Eve dinner. In the past, the family made pork tamales only, but as tastes changed, they added corn, cheese, and *rajas* (poblano peppers) tamales for vegetarian relatives. Photo by Ella Gant, courtesy Texas Folklife

Deb's Hot Rod Chili

From Debbie Ashman
2007 Terlingua International Chili Champion

2 pounds coarsely ground beef
8-ounce can tomato sauce
5-ounce can of beef broth

Mix the following spices for Step 1

1 teaspoon onion powder
2 teaspoons garlic powder
2 teaspoons beef crystals
1 teaspoon chicken crystals
1 tablespoon paprika
1 tablespoon Mexene Chili Powder
½ teaspoon cayenne
¼ teaspoon black pepper
1 package Sazon Goya

Mix the following spices for Step 2

1 tablespoon Mexene Chili Powder
1 tablespoon Hatch Mild Chili Powder
2 tablespoons light chili powder
1 tablespoon dark chili powder
¼ teaspoon white pepper

Mix the following spices for Step 3

1 teaspoon onion powder
1 teaspoon garlic salt
¼ teaspoon cayenne
¾ tablespoon Mexene Chili Powder
1 tablespoon cumin
"Original" Louisiana Brand Hot Sauce to taste

Cooking the chili:

1. Cook the meat over medium-high heat until light in color and drain the grease.
2. Slow boil the meat in the beef broth and one equal can of distilled water for 10 minutes.
3. Add Step 1 and medium boil for 60 minutes.
4. Add Step 2 and medium boil for 45 minutes.
5. Add Step 3 and medium boil for 15 minutes.

In last five minutes, taste for spiciness and adjust as required.

Although the modern Texas wine industry emerged in the last forty years, the state has a rich and colorful wine heritage that goes back 300 years. In the late seventeenth century, one hundred years before Californians or Virginians, Spanish missionaries planted grape vines near present-day El Paso to produce sacramental wines. Texas is perhaps the oldest wine-producing state in the Union.

European settlers from countries with well-established wine-making traditions brought their own grapevine rootstock in the 1800s. For many years, their small vineyards produced wine solely for home or local use. Later, under their influence and that of Texan T.V. Munson, a world-renowned horticulturist and authority on grapevines, grape culture expanded into a fledgling industry. By the early 1900s, the state boasted more than twenty commercial wineries.

The enactment of Prohibition in 1919 forced all but one winery to close, effectively wiping out the industry until the repeal of the Eighteenth Amendment in 1935. The lone holdout, Val Verde Winery in Del Rio, is now the oldest Texas winery. Established in 1883 by Italian immigrant Frank Qualia and still family-owned and operated, Val Verde is stronger than ever. But the state wine industry has continued to feel the effects of Prohibition; many of Texas's 254 counties still enforce dry laws that inhibit the ability of growers to sell their wine or set up tasting rooms.

The revival of the Texas wine industry began in the 1970s with the founding of the Llano Estacado and Pheasant Ridge wineries in the High Plains, where farmers turned from cotton to grapes because they required less water and yielded more. By 1975, Lubbock, Fredericksburg, Fort Worth, and



Fort Stockton were centers of viticulture. Grapes were grown throughout the state by the early 1980s; wineries naturally followed. Fueled by a long tradition of viticulture and experimentation, the Texas Agricultural Experiment Station and the University of Texas identified appropriate varieties and regions most conducive to growing grapes.

The worldwide interest in wines inspired some Texans to change careers in the late 1960s and early 1970s. Susan and Ed Auler became the first to plant vines in the Hill Country west of Austin and San Antonio, where they converted their cattle ranch into a vineyard after an eye-opening trip to the Bordeaux region of France. Initially, grape growers felt compelled to emulate France and California by importing vines and producing commercially accepted wines, such as Chardonnay and Burgundy. But much of Texas was not suited to the popular French and California wine varieties. By trial and error, Texas wine growers gradually began



(Upper) Brennan Vineyards in Comanche, Texas, grows Cabernet, Syrah and Viognier grapes, among others, for their award-winning wines. Photo by Bob Daemrich, courtesy Texas Department of Agriculture

(Lower) Second- and third-generation owners of Val Verde Winery, Louis and Tommy Qualia, pose in the winery's cellar in the 1970s. Frank Qualia founded Val Verde in 1883. It is the oldest winery in Texas and is still family-owned. Photo courtesy Val Verde Winery

Texas wines reflect "wide open places, a love of tradition, independence, and the joy that comes from being larger than life."

to make the most of the state's unique terrain and weather conditions. They focused in some areas on Mediterranean-style varietals similar to those of Italy, Spain, and southern France.

Today, the state has eight federally approved wine grape-growing regions, or "appellations," from the Panhandle to the Gulf Coast. The Hill Country has become America's second-largest viticulture area, while the High Plains and Far West regions have proved most productive. (Other areas have battled Pierce's disease, black rot, and severe weather conditions.) Each region has its own *terroir* (climate, soil, and unique characteristics), enabling Texas, as a whole, to produce an unusually diverse group of varietals with unique flavors and vintages. Joshua Coffee of Llano Estacado Winery in Lubbock says Texas wines reflect "wide open places, a love of tradition, independence, and the joy that comes from being larger than life."

Though many come from wine-making families, Texas grape growers and winemakers are generally considered mavericks, who stubbornly confront the

elements, government regulations, and consumer tastes. They judge their success by sales, national attention to the industry, satisfaction with their own product, and the awards that Texas wines increasingly garner. Texas is now the fifth-leading wine-producing state in the nation; the industry employs about 8,000 people and contributes more than \$1 billion annually to the state's economy. With their tasting rooms and picturesque atmospheres, wineries have become tourist destinations. Along with new immigrant communities, they are changing the culinary landscape of the state. They add a new dimension to the Texas dinner table and help expand the perception of Texas cuisine.

Dawn Orsak has spent the last fifteen years working in the areas of food and culture, first for Texas Folklife Resources and most recently as executive director of the Texas Hill Country Wine & Food Festival. She has curated over fifty foodways presentations and has been a presenter at the Smithsonian Folklife Festival and the Louisiana Folklife Festival, among other events.

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BHUTAN: LAND OF THE THUNDER DRAGON

This program is produced in partnership with the Royal Government of Bhutan. Major Donors to the program are the Bhutan Department of Tourism and the Dancing Star Foundation. Donors include the Bhutan Foundation and an anonymous donor. Contributors to the program are the Frank W. Hoch Trust, the Shelley & Donald Rubin Foundation, Lawrence Small, and the Summit Fund of Washington. Additional support is provided by the Himalayan Youth Foundation, Eva and Yoel Haller, Friends of the Royal Textile Academy of Bhutan, Exclusive Resorts, Francis and Kathleen McNamara, New Tourism & The Harmony Project, the Sager Family Foundation, Butterfield & Robinson, The University of Texas at El Paso, and Aman Resorts.

Special Thanks

Individuals

Prime Minister Jigmi Y. Thinley, Her Majesty Ashi Dorji Wangmo Wangchuck, Marcia Aaron, Tom Abraham, Marlene Adler, Warren Amason, Francine Berkowitz, John Berthold, David Bidwell, Angel Braestrup, Julia Brennan, Bruce W. Bunting, Allen Carroll, Jonathan Coddington, Andrew Connors, Brian Corbett, Carina Courtright, Daphne Hoch Cunningham, Dawa Sherpa, Ambassador Daw Penjo, Deki Wangmo, Karine Dinev, Dorjee Tshering, Dorji Gyeltshen, Dorji Wangchuk, Pamela Ebsworth, Steve Evans, Michael Faulkner, Shaun Faulkner, William Fischer, Patrizia Franceschinis, Robert Freling, Eva Haller, Yoel Haller, Jane Hancock, Brad Handler, Danielle Harsip, Mark Hassenberg, Janet Herman, Leonard Hirsch, Lisina Hoch, Roland Hoch, Steven Hoch, Linda Howard, David Inouye, Jigme Yezer, Peter Kaestner, Karma Letho, Karma Ura, Kesang Wangdi, Phil Kline, Richard Kurin, Alix Laager, Harriet Lankford, Tom Lankford, Caryl Levine, Ambassador Lhatu Wangchuk, Hans Li, Joseph Lo, Lopen Lungten Gyatso, Michael Mars, Glenda Martin, Jim McClelland, Kathleen McNamara, Bill McNulty, Hemanta Mishra, Jane Morrison, Diana Myers, Nangze Dorji, Diana Natalicio, Daniel Nestel, Nyintob Pema Norbu, Mark Ormond, Bruce Payne, Penden Wangchuk, Paula Perlis, Mansir Petrie, Courtney Petrov, Francoise Pommaret, Leslie Prosterman, Anita Randall, Sean Riley, Walter Roder, Donald Rubin, Shelley Rubin, Michael Rutland, Bobby Sager, Lyonpo Sangay Ngedup, Victoria P. Sant,

Kay Sawyer, Ann Shaftel, Cynthia Sharpe, Sherub Gyaltshen, Raja Siddiqi, Kevin D. Simmons, Siok Sian Pek-Dorji, Sithey, Lawrence Small, Robin Smilie, Sonam Dorjee, Sonam Dorji, Mark Spaulding, Nevzer Stacey, Rozann M. Stayden, Larry Stuebing, Lee Talbot, Marty Talbot, Marilyn Tam, Tandin Namgyel, Tashi Zangmo, Tenzing Namgyal Namda, Thinley Wangchuk, Tobgay Sonam Namgyal, Michael Tobias, Tsering Dem, Tshering Wangmo, Tshewang Dendup, Lyonpo Ugyen Tshering, Ugyen Tshewang, K. Vinod, Adrienne Vittadini, Rebecca Winsor, Sandra S. Wright, Yeshey Norbu, and Bradford Zak

Organizations

Aman Resorts, Association of Bhutanese Tour Operators, Bhutan Department of Tourism, Bhutan Post Corporation, Bhutan Tourism Council, Butterfield & Robinson, Choki Traditional Art School, Dancing Star Foundation, Druk Air Corporation, Folk Heritage Museum, National Geographic, Permanent Mission of the Kingdom of Bhutan to the United Nations, Rand Construction, Royal Bhutan Army, Royal Bhutan Police, Royal Body Guards, Royal Bhutanese Embassy in New Delhi, Royal Textiles Museum, Rubin Museum of Art, The Art League School, The Blue Poppy Nursery, The Spice House, United Nations Development Program, United States Embassy in New Delhi, University of Maryland Department of Biology, University of Maryland Department of Plant Science and Landscape Architecture, and the World Foundation for Environment and Development

NASA: FIFTY YEARS AND BEYOND

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Special Thanks

Ames Research Center, Dryden Flight Research Center, Goddard Space Flight Center, Glenn Research Center, Jet Propulsion Laboratory, Johnson Space Center, Kennedy Space Center, Langley Research Center, Marshall Space Flight Center, Stennis Space Center; Aeronautics Research Mission Directorate, Exploration Systems Mission Directorate, Science Mission Directorate, Space Operations Mission Directorate; NASA Office of the Administrator, Office of Education, Office of Communications Planning, Office of Legislative and Intergovernmental Affairs, Office of Public Affairs, Office of the General Counsel; Coalition for Space Exploration, Delaware North Companies Parks & Resorts, Harvard-Smithsonian Center for Astrophysics, Innovative Partnership Program, Kansas Cosmosphere and Space Center, NASA Edge, NASA TV, National Federation of the Blind, U.S. Astronaut Hall of Fame, U.S. Space & Rocket Center; Kira Blackwell, Jacobs Technology; Kate Kronmiller, United Space Alliance; Jacqueline Leggett, Strategy Bridge International; Tim McElyea, Media Fusion; Carmina Mortillaro, and Space Center Houston

Other Smithsonian Units

National Air and Space Museum
National Museum of
Natural History
Smithsonian Astrophysical
Observatory

TEXAS: A CELEBRATION OF MUSIC, FOOD, AND WINE

This program is produced in partnership with the Texas Office of the Governor, Economic Development and Tourism. The Major Donor to the program is the Texas Commission on the Arts. Contributors to the program include the Texas Department of Agriculture, the City of El Paso, Houston Endowment Inc., the San Antonio Convention & Visitors Bureau, and the City of San Antonio Office of Cultural Affairs. Additional support for this program is provided by the Music Performance Fund, with major in-kind support provided by Southwest Airlines.

Special Thanks

Individuals

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Clay Shorkey, Brad Smyth, Emily Todd, Lance Webb, John Wheat, Scott White, Laura Wiegand, Jo Ann Williams, and Roger Wood

Organizations

Automobile License Plate Collector's Association, Sharp's at Waterford Farm, Tarara Winery, Trilog Glass & Packaging

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Festival Participants

Bhutan: Land of the Thunder Dragon

RELIGIOUS TRADITIONS

Zhung Dratsang (Monastic Body)

Venerable Tsheney Lopen Tandin Tshewang, Thimphu District, ritual chief

Rinzin, Wangdue Phodrang District, chant master

Gyeltshen, Wangdue Phodrang District, choepen (shrine person)

Kinzang Tshering, Chukha District, dhung (long horn) player

Namgay Wangchuk, Punakha District, mandala maker

Tazi, Chukha District, torpa (ritual cake) maker

Yangka, Paro District, astrologer

Chimi, Wangdue Phodrang District, masked dancer

Kado, Punakha District, jaling (wind instrument) player

Kencho, Thimphu District, nga (drum)/kangdung (horn)/ dhungka (conch) player

Kinley Penjor, Wangdue Phodrang District, nga (drum)/kangdung (horn)/ dhungka (conch) player

Kinley Penjor, Punakha District, masked dancer

Pema Dorji, Thimphu District, dancer

Shokey, Punakha District, masked dancer

Penpa, Paro District, dhung (long horn) player

Tashi Wangchuk, Thimphu District, jaling (wind instrument) player

Tshering Dorji, Thimphu District, chief leader

Tshewang Rigzin, Haa District, masked dancer

MUSIC AND DANCE TRADITIONS

Royal Academy of Performing Arts (RAPA)

Apa Dodo, Wangdue Phodrang District, masked dancer

Dengo, Trongsa District, dancer

Dorji Dakpa, Samdrup Jongkhar District, dancer

Dorji Norbu, Samdrup Jongkhar District, masked dancer

Kencho Wangdi, Paro District, dancer

Khandu, Paro District, masked dancer

Kinley Penjor, Trongsa District, dancer

Lhaden, Bumthang District, dancer

Nim Dem, Paro District, dancer

Pema Lhamo, Bumthang District, dancer

Pema Tenzin, Mongar District, dancer

Pema Wangdi, Dagana District, musician

Penjor, Paro District, masked dancer

Phub Lham, Punakha District, dancer

Rinchen Wangdi, Mongar District, dancer

Sangay Wangmo, Trashigang District, dancer

Sherab Dorji, Trashigang District, masked dancer

Sonam Chogyel, Zhemgang District, masked dancer

Tashi Lhamo, Paro District, dancer

Tashi Phuentsho, Pema Gatsel District, musician

Thinley Pemo, Trashigang District, dancer

Tshering Dorjee, Haa District, masked dancer

Tshering Wangdi, Trashigang District, masked dancer

Ugyen Tshewang, Pema Gatsel District, masked dancer

Wangchuk, Wangdue Phodrang District, dancer

Wangchuk, Trashigang District, masked dancer

Wangchukla, Zhemgang District, musician

Yeshe Wangchuk, Paro District, masked dancer

ZORIG CHUSUM**(THIRTEEN TRADITIONAL ARTS)**

*Chimi Pelmo, Thimphu District,
incense maker*

*Dawa Gyeltshen, Mongar District,
wood carver*

*Dawa Penjor, Wangdue Phodrang
District, incense maker*

*Debu Zangmo, Mongar District,
bamboo weaver*

Deki, Trashi Yangtse District, weaver

*Dung Dorji, Bumthang District,
calligrapher*

*Karma Sonam Yuden, Mongar
District, wood carver*

*Kinzang Wangdi, Trashigang District,
painter*

*Kinzang Wangmo, Bumthang
District, potter*

*Kumbu, Wangdue Phodrang District,
painter*

*Namgyel Dema, Trashigang District,
weaver*

*Nim Dorji, Paro District, clay
sculptor*

*Pelden Dorji, Trashi Yangtse District,
wood turner*

Phajo, Paro District, blacksmith

*Ponyala, Mongar District, bamboo
weaver*

*Rada, Wangdue Phodrang District,
embroiderer*

*Rinchen, Punakha District, gold-
and silversmith*

*Rinzin Wangmo, Bumthang District,
weaver*

*Sangay Tenzin, Wangdue Phodrang
District, painter*

Seldon, Lhuntse District, weaver

*Singay Karmo, Punakha District,
embroiderer*

Tashi, Thimphu District, silversmith

*Tenzin Thinley, Trashi Yangtse
District, wood carver*

Thinley, Paro District, painter

*Thinley Dorji, Haa District,
slate carver*

*Tshering Dorji, Trashi Yangtse
District, wood turner*

ARCHITECTURE

*Karma Wangchuk, Trongsa District,
building engineer*

Karma, Punakha District

Khandu, Punakha District

Lhendup, Punakha District

Namgay Tshering, Punakha District

*Nim Dorji, Wangdue Phodrang
District*

Pem Tshering, Lhuntse District

Phurpa Tshering, Punakha District

*Tshewang Dorji,
Wangdue Phodrang District*

Zeko, Punakha District

FOODWAYS

Phurpa Lhamo, Trashigang District

Tashi Dorji, Mongar District

Tandin, Mongar District

PEOPLE AND ENVIRONMENT

Karma Wangdi, Punakha District

*Kencho Zam, Thimphu District,
Layap farmer*

Singye Wangmo, Punakha District

Sonam Choden, Thimphu District

*Tshering, Gasa District, Layap
farmer*

TRADITIONAL MEDICINE

*Dorji Uden, Bumthang District,
doctor*

Sonam Dorjee, Trongsa District

*Sonam Tobgay, Mongar District,
doctor*

Festival Participants

NASA Fifty Years and Beyond

AERONAUTICS

Tom Benson, Glenn Research Center, Cleveland, Ohio

Tom is a senior research engineer, who for thirty-five years has built, tested, verified, and applied large computer programs that model the flow of gases through high-speed airplane engine components. He is also the author of *The Beginner's Guide to Aeronautics*, an educational Web site that describes the math and science associated with airplanes, turbine engines, model rockets, and kites.

Glenn Brehm, Langley Research Center, Hampton, Virginia

Glenn has thirty-four years of experience as an aerospace technician operating and maintaining subsonic, transonic, and hypersonic wind tunnels and aero-acoustic facilities. He has tested models of aircraft, Space Shuttles, hypersonic propulsion engines, reentry vehicles, and aircraft noise-reduction concepts. He supported tests of a hypersonic scramjet engine that flew at Mach 10 and set a Guinness World Record.

Thomas Burns, Langley Research Center, Hampton, Virginia

Thomas works as the section head in the Fabrication Technology Development Branch where he is responsible for the development of test-article prototypes using rapid prototyping, materials casting, composite materials, and laser ablation technologies. He is a recipient of the NASA Exceptional Service Medal.

Lawrence Cooper, Langley Research Center, Hampton, Virginia

Larry is a quality assurance specialist and certified metallurgist who inspects materials for aircraft, spacecraft, and wind tunnel models. These materials have been used on Earth- and Mars-observing satellites, a rocket-powered aircraft designed to fly on Mars, a cryogenic wind tunnel, and models of Orion, which will return humans to the moon.

Rich Coppenbarger, Ames Research Center, Moffett Field, California

Rich has been with NASA since 1988 and has undertaken a pivotal role in transferring critical technologies—developed under NASA's Airspace Systems Program—to the Federal Aviation Administration for near-term deployment. Rich has a BS in aerospace engineering from the University of Arizona and an MS in aeronautical and astronautical engineering from Stanford University.

Luci Crittenden, Langley Research Center, Hampton, Virginia

Luci, a senior flight operations engineer, knew from childhood that she wanted to be involved in aviation. She is an expert on guiding scientists from ideas to proof of concept in flight tests and has conducted flight operations in many states. She also has a background in flight simulation, aging aircraft, and runway friction studies.

Johnny Ellis, Langley Research Center, Hampton, Virginia

Johnny is a technical team lead with more than twenty-five years of experience in hypersonic aerothermodynamics, wind tunnel operations, data acquisition, and model setup. He is a recipient of the NASA Exceptional Service Medal.

Robert Everett, Glenn Research Center, Cleveland, Ohio

Bob, a senior mechanical engineering technician, has twenty-eight years of extensive experience using a variety of aerospace materials to help design and manufacture prototype and spaceflight hardware. He has a broad background working with industry, aerospace manufacturers, and academia. Bob is often consulted for his expertise in electro-discharge machining processes.

Greg Gatlin, Langley Research Center, Hampton, Virginia

As an aerospace engineer at Langley, Greg has conducted wind-tunnel investigations on various aircraft for twenty-five years. These investigations have included advanced fighters, the National Aero-Space Plane, and subsonic transports. He has examined the effects of engine power, high-lift systems, control surface deflections, and variations in configurations, with results often leading to improvements in vehicle designs.

Frank Jones, Langley Research Center, Hampton, Virginia

Frank is an aerospace engineer who manages flight and simulator services, which support lunar flight and science missions to study how atmospheric pollution contributes to climate change. Frank has helped develop technologies that reduce aviation accidents and protect today's air travelers. He also worked on an early configuration of the International Space Station.

Parimal Kopardekar, Ames Research Center, Moffett Field, California

Parimal works as a principal investigator for the NextGen Airspace Systems Project. He previously conducted research and development activities in the area of air traffic management for the Federal Aviation Administration. He holds MS and PhD degrees in industrial engineering and a Bachelor of Engineering in production engineering.

Herbert Lawrence, Glenn Research Center, Cleveland, Ohio

Herb began his NASA career in 1979 in the Wood Model Shop, designing and building research hardware for aeronautics and space research projects. Since then, Herb has used carbon-fiber materials to support jet-engine development projects and various new technologies for aeronautics research projects. He is a three-time recipient of the NASA Glenn Research Center Craftsmanship Award.

Greg Poteat, Dryden Flight Research Center, Edwards, California

Greg works in the Strategic Communications Office, where he serves as the lead in the Innovative Partnerships Office. In this role, he is responsible for coordinating the efforts of Dryden's technology transfer program, which includes identifying emerging new NASA technologies and submitting them for patent protection.

Thomas Prevot, Ames Research Center, Moffett Field, California

For the past fifteen years, Tom has been engaged in research on future air transportation concepts, especially on air traffic controller and flight-crew interaction with advanced air and ground automation. He received his doctorate in aerospace engineering from the Munich University of the German Armed Forces.

Ron Reisman, Ames Research Center, Moffett Field, California

Ron joined NASA in 1988 as one of the original members of the Center Tracon Automation System development team. Since the late 1990s, he has worked on traffic flow management and the Next Generation Air Traffic System research and development. He has a BA in philosophy and classical Greek and an MS in computer science.

Jim Sokolik, Dryden Flight Research Center, Edwards, California

Jim has worked with high-altitude life-support equipment for the last twenty-five years and is considered one of the top people in his field. Born and raised on a dairy farm in Wisconsin, Jim spent eight years in the U.S. Air Force before joining the NASA ER-2 program in 1987.

Robert D. Windhorst, Ames Research Center, Moffett Field, California

Robert serves as chief of the Aerospace Operations Modeling Branch, a position he has held for two years. He directs research on concepts for managing air traffic. He received his BS in mechanical engineering from the University of California-Davis and his PhD from Santa Clara University.

EARTH SCIENCE

Brooke Carter, Goddard Space Flight Center, Greenbelt, Maryland
Brooke is a science education specialist with a background in structural geology and science education. She currently works on the education and public outreach teams of several NASA missions, including the Lunar Reconnaissance Orbiter and Aura. In her spare time, Brooke likes to hike, bicycle, rock climb, and camp.

Lin Chambers, Langley Research Center, Hampton, Virginia
As a physical scientist in the Climate Science Branch, Lin works on understanding clouds and climate, practical applications of NASA scientific research, and ways to involve K-12 students in what NASA is doing in Earth system science.

Jennifer Collings, Langley Research Center, Hampton, Virginia
As a science writer at Langley, Jennifer specializes in communicating the research of atmospheric scientists to the public. She writes feature stories highlighting recent accomplishments and discoveries and assists in organizing community events and outreach activities.

Rory Collins, Langley Research Center, Hampton, Virginia
Currently a science writer for the Science Directorate, Rory previously worked for the Office of Strategic Communications and

Education as a public outreach specialist. She has a BA in political science and will finish her MA in international studies and professional communications in December 2008.

Roberta DiPasquale, Langley Research Center, Hampton, Virginia
Roberta works as a scientist to create practical applications of atmospheric science research and data products. She has spent six years crossing the “Valley of Death” (the time between research and commercial application) and is currently focused on climate change issues, urban communities, and sustainable architectural design.

Steven Graham, Goddard Space Flight Center, Greenbelt, Maryland
Steve is a senior outreach coordinator in the Earth Observing System Project Science Office. He previously served as the outreach coordinator and webcast moderator for a historic expedition to the North Pole and the Aqua mission. He has presented at numerous Earth science education workshops and meetings around the country.

Irene Ladd, Langley Research Center, Hampton, Virginia
Irene is a retired teacher who joined the Surface Ozone Measurements for GLOBE (Global Learning and Observations to Benefit the Environment) team to develop the GLOBE protocol and field-test instruments used for measuring surface ozone. She has developed educational materials and training for the program.

Katherine Lorentz, Langley Research Center, Hampton, Virginia
Katherine is the lead science writer for the Science Directorate at Langley. She coordinates coverage of the directorate’s research activities and field campaigns for internal NASA media and the public.

Louis Nguyen, Langley Research Center, Hampton, Virginia
As a satellite expert and research computer engineer, Louis is considered a pioneer in satellite calibration. He works with operational weather and research satellites to derive real-time cloud properties for weather applications and climate studies. He also develops interactive, scientific, Web-based applications and conducts research on aircraft icing and contrails.

Claire Parkinson, Goddard Space Flight Center, Greenbelt, Maryland
Claire, a scientist who has traveled to Antarctica and the North Pole, uses satellite data to determine changes in the Arctic and Antarctic sea ice covers and relates them to climate change. She is the project scientist for the Earth-observing Aqua satellite and has written several books, including one on the history of science.

Margaret Pippin, Langley Research Center, Hampton, Virginia
Margaret is an atmospheric scientist interested in the analysis of observational data sets to better understand the chemistry of the atmosphere, particularly the biogenic hydrocarbons and their ozone-production potential. She has been active in science education for over twenty years and enjoys working with students of all ages.

Steve Platnick, Goddard Space Flight Center, Greenbelt, Maryland
Steve's current scientific research includes theoretical and experimental studies of satellite, aircraft, and ground-based cloud remote sensing. His previous experience has included work with the Climate and Radiation Branch in the Laboratory for Atmospheres, the Joint Center for Earth Systems Technology, the Ames Research Center, Hewlett-Packard Company, and North Carolina A&T State University.

John Skelly, Pennsylvania State University, University Park, Pennsylvania
John is professor emeritus of plant pathology at Penn State. His expertise is in forest pathology and air pollution's effects on forest trees and native plants in northern temperate regions. He is a consultant on the use of ozone-sensitive plants as bioindicators.

Stephanie Stockman, Goddard Space Flight Center, Greenbelt, Maryland
Stephanie is a senior education and outreach specialist, who serves as the lead for the Lunar Reconnaissance Orbiter, Goddard Center for Astrobiology, and the MESSENGER mission to Mercury. She has more than fifteen years of experience in geoscience education and research—developing curriculum materials, designing and conducting teacher workshops, and teaching geology and chemistry at the community college level.

David Westberg, Langley Research Center, Hampton, Virginia
David is part of a team of scientists who maintain a twenty-three-year solar and meteorological dataset, which is accessible to those

who make important decisions about building design, renewable energy, and agro-climatology. He analyzes, validates, and develops ways to improve the accuracy of the meteorological dataset.

Darrel Williams, Goddard Space Flight Center, Greenbelt, Maryland
Darrel serves as project scientist for the Landsat missions currently in orbit. He has researched enhanced remote-sensing techniques for assessing forest ecosystems worldwide. He has received NASA medals for Outstanding Leadership (1997) and Exceptional Service (2000), as well as an Outstanding Alumni Award (2006) from the School of Forest Resources at Pennsylvania State University.

GREAT OBSERVATORIES

Mindy Deyarmin, Goddard Space Flight Center, Greenbelt, Maryland
In seventeen years with the Hubble Space Telescope Program, Mindy has supported all four servicing missions and now provides employees and the public with up-to-date information on the Hubble mission. She has received the Customer Service Excellence Award and the coveted Silver Snoopy Award.

Charles Diaz, Goddard Space Flight Center, Greenbelt, Maryland
As the James Webb Space Telescope integration and test manager, Charles is responsible for the integration of the telescope's three primary elements—the optical telescope, the integrated science instrument module, and the spacecraft element. Charles formerly worked on the Hubble Space Telescope and has been at NASA for sixteen years.

Hashima Hasan, NASA Headquarters, Washington, D.C.
Hashima is currently the lead for the Explorer Program and astrophysics education and public outreach. She has worked in the fields of nuclear physics, atmospheric environment, optics, and astronomy and was the telescope scientist responsible for keeping the Hubble Space Telescope in focus during its first year of operation. Hashima holds a doctorate in theoretical physics from Oxford University.

Maurice Henderson, Goddard Space Flight Center, Greenbelt, Maryland
Since he retired from the telecommunications industry five years ago, Maurice has worked in a variety of education and public outreach capacities. He was instrumental in getting the *New Views of the Universe: Hubble Space Telescope* exhibition added to the Goddard Visitor Center and into the traveling exhibit program. He also introduced the Science on a Sphere system at Goddard.

Mark Hubbard, Goddard Space Flight Center, Greenbelt, Maryland
After ten years with Westinghouse, Mark joined NASA's Hubble team as an aerospace engineer in 1991. The son of a career Navy urologist, Mark graduated from the U.S. Naval Academy in 1976 and served five years as a surface warfare officer. He enjoys playing the guitar and singing.

Anita Krishnamurthi, Goddard Space Flight Center, Greenbelt, Maryland
Anita is the lead for education and public outreach in the Astrophysics Division. An astrophysicist by training, she is deeply interested in public understanding of science. For the past ten years, she has worked on designing and implementing education and outreach programs for diverse audiences.

Renee Leck, NASA Headquarters, Washington, D.C.
Renee is a program analyst who has spent most of the past seven years supporting the Astrophysics Division, including the Hubble Space Telescope, James Webb Space Telescope, and Astrophysics Navigator Program. She is lead program analyst for the team that integrates budgets for the entire suite of astrophysics missions.

Jim Perry, Goddard Space Flight Center, Greenbelt, Maryland
Jim is a professional planner/scheduler for the design and production of spacecraft and currently serves as manager of planning and scheduling for the James Webb Space Telescope. He has lived around the world, twice in Antarctica—the first as a “winter-over” and the second to provide camp support for the successful recovery of a C-130 aircraft from an Antarctic plateau.

Benjamin Reed, Goddard Space Flight Center, Greenbelt, Maryland
As lead materials engineer for the Hubble Space Telescope, Ben has become, over the last

ten years, a leading expert on the environmental effects on materials in space. He has also supported numerous other satellites and International Space Station missions. He is the recipient of several NASA awards.

Marion Riley, Goddard Space Flight Center, Greenbelt, Maryland
As a young *Star Trek* fan, Marion was inspired by the diversity of the crew and knew that one day she wanted to work in the same type of inclusive environment. Today, she manages engineers who build and test much of the equipment installed during a Hubble Space Telescope servicing mission. She also trains astronauts to perform on-orbit equipment replacement.

Nzinga Tull, Goddard Space Flight Center, Greenbelt, Maryland
Nzinga joined the Hubble mission operations team in 1998 as an electrical power subsystem engineer and served as planning-shift lead during the last servicing mission, which was critical for power systems because the solar arrays and power control unit were replaced. She currently supports Hubble systems management for operations and is an anomaly response manager for Servicing Mission 4.

Russell Werneth, Goddard Space Flight Center, Greenbelt, Maryland
Russ has worked on all four of NASA's Hubble Space Telescope servicing missions. His areas of expertise include the development of unique astronaut tools and training of astronauts—including underwater neutral buoyancy training—for successful Hubble Space Telescope space-walk missions.

FOOD LAB

Jennifer J. Brogan, Johnson Space Center, Houston, Texas
Jennifer works as a food scientist charged with providing food for the astronauts onboard the International Space Station. She has a degree from the University of Illinois in food science and human nutrition. In her spare time, Jennifer enjoys running and helping charitable organizations, such as the End Hunger Network.

Vickie Kloeris, Johnson Space Center, Houston, Texas
As subsystem manager for the International Space Station and Shuttle food systems, Vickie's responsibilities include menu planning for crewmembers, provision of flight-food shipments, and the development of new foods for the Space Station.

Kimberly Glaus Late, Johnson Space Center, Houston, Texas
Kimberly leads the team in the Space Food Systems Laboratory at Johnson by producing the American portion of the flight food for the International Space Station. She has several years of experience in the food industry, including product development and production of wine; rice side dishes; and dehydrated, freeze-dried, and thermostabilized food products.

Sylvia Lai, Johnson Space Center, Houston, Texas

Sylvia is employed by Lockheed Martin as senior research scientist supporting NASA's Advanced Food Technology group. She is an innovative research and development professional and has assisted in the creation of numerous new food products. Her research investigates the effect of nutrients in mitigating bone loss.

Thomas Oziomek, Johnson Space Center, Houston, Texas

Tom works as a packaging engineer in the Space Food Systems Laboratory, where he manages the packaging materials used onboard the Shuttle and International Space Station. He is also researching which new packaging structures can be used on future long-duration lunar and Mars missions. In his spare time, Tom enjoys riding his motorcycle and working with computers.

Michele Perchonok, Johnson Space Center, Houston, Texas

As manager of the Advanced Food Technology Project, Michele works with food scientists and officials in academia, industry, and government to coordinate projects that will contribute to manned missions to the moon and Mars. She also manages the Shuttle Food System and is an Institute of Food Technologists Fellow.

FUTURE MISSIONS

Mitzi Adams, Marshall Space Flight Center, Huntsville, Alabama

A solar scientist, Mitzi researches the magnetic fields associated with sunspots resulting in coronal mass ejections—gigantic explosions of material that can travel through interplanetary space and affect the Earth through aurorae, loss of communication with satellites, and power-grid disruptions. Her earliest memories of astronomy are marveling at the night sky while in the back of the family's 1955 Chevrolet.

Bob Armstrong, Marshall Space Flight Center, Huntsville, Alabama

Bob is an aerospace engineer who works as the education and outreach lead in the Ares Projects Office. In an aerospace career spanning more than thirty years, Bob has worked on numerous projects, including the Space Shuttle, Space Station, X-34, X-37, and Orbital Space Plane. The son of a Navy pilot, Bob became interested as a child in aeronautics and space.

Stephan Davis, Marshall Space Flight Center, Huntsville, Alabama

Steve is currently deputy manager for the Flight Test Vehicle in the Ares I-X Mission Management Office. He has worked on and led many aerospace projects, including the Strategic Defense Initiative, Gravity Probe B, scientific instruments for the Mir space station, the International Space Station propulsion module, the Space Launch Initiative, and the Orbital Space Plane.

Brian Day, Ames Research Center, Moffett Field, California

Brian is the education and public outreach lead for the Lunar Crater Observation and Sensing Satellite, NASA's next mission to the surface of the moon. As the lead for the Education Technology Team, Brian's projects combine his experience as an astronomer, educator, and software developer.

Rajiv Doreswamy, Marshall Space Flight Center, Huntsville, Alabama

As deputy manager for program planning and control for the Ares Launch Vehicle Project, Rajiv is responsible for its budgeting, planning, and scheduling. He also serves as the project's chief operating officer, handling communications, outreach, project integration, and project reporting. Rajiv has twenty years of experience on many NASA programs, including the Hubble Space Telescope, International Space Station, and Constellation Program.

Jennifer Heldmann, Ames Research Center, Moffett Field, California

Jennifer is a planetary scientist in the Space Sciences and Astrobiology Division. Her research focuses on studies of the moon, Mars, and Earth through fieldwork, spacecraft data, and numerical modeling. She earned a BA from Colgate University in astrophysics, an MS in space studies from the University of North Dakota, and a PhD in planetary science from the University of Colorado at Boulder.

Robert Howard, Johnson Space Center, Houston, Texas

A former co-op and NASA scholar, Robert was hired in 2002 to work in Mission Control for the International Space Station's Motion Control Systems Group before transferring to the Habitability and Human Factors Branch. There, he has led habitability studies for NASA's lunar spacecraft, including the Orion Crew Exploration Vehicle, Altair Lunar Lander, Small Pressurized Rover, and Lunar Outpost.

Anthony Lavoie, Marshall Space Flight Center, Huntsville, Alabama

Tony has held significant leadership positions in science and human-related flight programs during his twenty-five years at NASA. He currently manages the Lunar Precursor Robotic Program, which is responsible for the sophisticated robotic spacecraft that will pave the way for humankind's return to the moon. As a high school freshman, Tony decided to pursue a NASA career; he has been an avid space advocate ever since.

Danielle Moran, Marshall Space Flight Center, Huntsville, Alabama

Danielle works in communications, education, and public outreach for NASA's Lunar Precursor Robotic Program. In this capacity, she informs and engages the public in the robotic missions that will lead the way back to the moon.

Keith Robinson, Marshall Space Flight Center, Huntsville, Alabama

Keith has worked with NASA for twenty-one years and is currently working on projects that will prepare facilities for developing, testing, and integrating components of the Ares launch vehicles. A graduate in industrial engineering from Auburn University, Keith has been involved with a variety of research programs conducted on Space Lab and the International Space Station.

Kimberly Robinson, Marshall Space Flight Center, Huntsville, Alabama

Kimberly is project integration manager for Ares I-X, where she assists with the mission's overall management and development. Her work includes developing and maintaining the overall mission schedule, risk assessment and mitigation plans, and configuration and data management. Previously, she had management and systems engineering roles supporting the Space Transportation Programs/Projects Office, the Marshall Space Flight Center director, and Science Directorate.

HUMAN SPACEFLIGHT

John Allen, NASA

Headquarters, Washington, D.C.

John serves as program executive for crew health and safety and as a liaison to the chief medical officer. He served for twenty-six years in the U.S. Air Force as a clinical audiologist, research scientist, and biomedical specialist, with an emphasis on hearing and balance disorders, before retiring at the rank of colonel in 2006.

Lynn Cline, NASA

Headquarters, Washington, D.C.

As deputy associate administrator for Space Operations, Lynn oversees a broad variety of capabilities across the NASA space operations programs, including the Space Shuttle, International Space Station, space communications and navigation, launch services for NASA missions, and crew health and safety. She works closely with the Executive Branch and with NASA's international partner agencies.

Pamela Covington, NASA

Headquarters, Washington, D.C.

As manager of the External Affairs and Education Office, Pam supervises and manages programs, processes, policies, and issues that affect education and public affairs. She previously directed the Equal Opportunity and Diversity Management Office at NASA Headquarters, where she advised management on all equal opportunity matters.

Richard DeLombard, Glenn Research Center, Cleveland, Ohio
Richard is an internationally recognized expert in microgravity measurement and interpretation and has demonstrated microgravity and orbital mechanics to educators and students for over fifteen years. He has measured and analyzed microgravity conditions in support of science investigations on over twenty Space Shuttle missions, Russia's Mir space station, and the International Space Station.

Dave Edwards, Marshall Space Flight Center, Huntsville, Alabama
Dave is an internationally recognized expert in space environmental effects on materials. He has designed, assembled, and operated multiple space environment test facilities and worked with numerous NASA spacecraft programs to assess spacecraft materials performance in mission-defined space environments. Presently, he leads the Natural Environments Branch at NASA's Marshall Space Flight Center.

William Gerstenmaier, NASA Headquarters, Washington, D.C.
As the associate administrator for Space Operations, Bill directs NASA's human exploration of space, with programmatic oversight of the International Space Station, Space Shuttle, space communications, and space launch vehicles. He has received numerous awards, including the Presidential Rank Award for Meritorious Executives. He previously worked at the Glenn Research Center, Johnson Space Center, and Star City in Russia.

David Haakenson, Langley Research Center, Hampton, Virginia
As a senior software engineer, David is currently managing the environmental control and life support software development for Orion, the nation's next crewed spacecraft. He has also worked on the extravehicular activity infrared camera that examines the Space Shuttle after launch.

Nancy Rabel Hall, Glenn Research Center, Cleveland, Ohio
Nancy is a research scientist in the Space Processes and Experiments Division. Her main area of research is fluid physics and how fluids behave in reduced-gravity environments. She is currently technical lead for several projects to develop environmental control and life-support system technologies. She also demonstrates the reduced-gravity environment to educators, students, and the public.

Michael Hawes, NASA Headquarters, Washington, D.C.
As deputy associate administrator for program integration in Space Operations, Mike is responsible for the transition and disposition of Space Shuttle assets in preparation for retirement of the Shuttle in 2010. He previously served as the deputy associate administrator for the International Space Station, directing the Space Station budget, establishing and implementing Station policy, and coordinating external communications and liaison activities with Congress, industry, and the Station's international partners.

William Hill, NASA Headquarters, Washington, D.C.
Bill is assistant associate administrator for the Space Shuttle Program and has led critical activities to prepare and deliver the Space Shuttle to safe flight following the loss of the *Columbia* crew and vehicle. He is currently focused on how to transition the Shuttle into retirement and help initiate the effort to return to the moon and Mars.

Carol Jacobs, Marshall Space Flight Center, Huntsville, Alabama
A mechanical engineer, Carol serves as the project engineer for the Space Shuttle Main Engine preburners, main injector, combustion chamber, and nozzle. Since joining NASA in 1983, Carol has worked on the design, development, and testing of liquid rocket-engine combustion devices hardware.

Thomas Jones, NASA Astronaut, Retired
Tom is a scientist, author, pilot, and former astronaut. He holds a doctorate in planetary sciences and flew on four Space Shuttle missions. On his last flight, Tom led three spacewalks to install the American Destiny laboratory on the International Space Station. He spent fifty-three days living and working in space. His most recent book is *Sky Walking: An Astronaut's Memoir* (2006).

Humberto Sanchez, Johnson Space Center, Houston, Texas

Humberto currently works in the Mission Operations Directorate and will soon transition to the Constellation Program's Operations Integration Office. He has broad experience in Space Shuttle and International Space Station (ISS) flight operations integration and is responsible for integrating many of the Space Shuttle and ISS program elements with mission requirements.

Timothy Ryan Tawney, NASA Headquarters, Washington, D.C.

Timothy has worked for the past six years as an international programs specialist in the Office of External Relations. He came to NASA in June 2000 as a Presidential Management Fellow and worked in the Office of Space Flight and at the Goddard Space Flight Center in the Office of Public Affairs.

Pierre Thuot, U. S. Navy, Retired

As an astronaut from 1985 to 1995, Pierre traveled 11.4 million miles and orbited the Earth 437 times. He logged over 654 hours in space, including 17.7 hours on three space walks. Pierre retired from the U.S. Navy as captain in 1998 and since then has worked in various capacities with the Orbital Sciences Corporation, Arthur Andersen, HawkEye Systems, and CMX Technologies.

Debbie Ramos Trainor, Johnson Space Center, Houston, Texas

In her twenty-plus years at NASA, Debbie has held various training positions in the spaceflight training program, including a one-year tour as the NASA training coordinator in Russia and the training manager for the first crew to fly onboard the International Space Station. She is currently the training specialist in the Astronaut Office.

Mark Uhran, NASA Headquarters, Washington, D.C.

As assistant associate administrator for the International Space Station in Space Operations, Mark evaluates practical applications and research capabilities of orbital space stations. In the private sector and at NASA, he has held management positions related to strategic planning for operations and utilization of the Space Station.

Ron Woods, Kennedy Space Center, Brevard County, Florida

Ron has worked in various capacities, as space-suit technician, support technician, and insertion technician and has had the honor of assisting the crews of Apollo 8, Apollo 11, Apollo 15, three Skylab missions, the Apollo-Soyuz Test Project, and the first two Shuttle missions. Since 1982, Ron has processed the flight crew equipment before its installation into the Space Shuttle Orbiter.

INTERNATIONAL SPACE STATION

Patrick Buzzard, Johnson

Space Center, Houston, Texas

After living and working for seven years in Russia to support NASA's International Space Station (ISS) Program, Patrick returned to the United States. As the ISS strategic outreach and partnerships specialist, his duties include enhancing internal communications within the ISS Program, promoting and supporting educational and outreach efforts, and facilitating the development of collaborative efforts with industry, academia, and U.S. government agencies.

Gary Kitmacher, Johnson

Space Center, Houston, Texas

Gary is a manager in the International Space Station (ISS) Program Office. He developed the ISS Interactive Web Guide on nasa.gov and wrote the award-winning *ISS Reference Guide*. Gary also designed the modules of the Space Station and moon bases in the 1980s and, while working in Russia, Kazakhstan, and the United States, managed the Spacehab and Mir Shuttle missions in the 1990s.

Sam Ortega, Marshall Space Flight Center, Huntsville, Alabama

Sam has worked as a structural analyst, microgravity scientist, and solid rocket propulsion engineer. Although Sam graduated from high school in Texas, he attended nine different schools from first grade through college and claims a majority of the United States as his hometown. Moving around the United States provided him a rich background and a desire to experience new things.

KIDS' SPACE

Bill Anderson, NASA Headquarters, Washington, D.C.
Bill manages all NASA education projects, including higher education opportunities, elementary and secondary school projects, and informal education experiences. A former schoolteacher from Memphis, Bill has thirty-two years of experience developing and presenting NASA education programs, products, and services to educators and students at all levels.

Gregg Buckingham, Kennedy Space Center, Brevard County, Florida
Gregg serves as the chief, Education Programs and University Research Division of External Relations, where he works to utilize NASA mission-related content in science, technology, engineering, and mathematics education to attract and retain more students in these disciplines. He also serves as a history point of contact and has worked on several history projects with space center personnel.

LAUNCH AND MISSION CONTROL

Christine Chiodo, Johnson Space Center, Houston, Texas
Christine has worked for more than eighteen years as a flight controller and crew trainer. She helped establish NASA at the Russian mission control center during Shuttle-Mir and now manages the Training Integration Branch, which is responsible for integrating and implementing crew-training plans for NASA and its international partners from Europe, Japan, Russia, and Canada.

Sally Davis, Johnson Space Center, Houston, Texas
Sally recently became Shuttle safety manager with the Space Shuttle Program Office. Previously, Sally worked for twenty-eight years in Mission Operations, including twelve years as a NASA flight director who helped assemble and operate the International Space Station.

Tuan Manh Doan, Kennedy Space Center, Brevard County, Florida
Tuan has worked at NASA for twenty years and is currently with the Launch Services Program. He supports communications and telemetry for Expendable Launch Vehicles, including the Delta, Atlas, and Pegasus at Cape Canaveral Air Force Station, Florida, and Vandenberg Air Force Base, California.

George Haddad, Kennedy Space Center, Brevard County, Florida
As an aerospace engineer, George has supported the integration and launch of many of NASA's scientific and planetary missions, such as the Solar and Heliospheric Observatory, the GOES weather satellites, the Cassini mission, the Gravity Probe B mission, and, recently, the STEREO mission. He is principal investigator for several research projects and is developing the Constellation Program's ground systems.

Tiffany Nail, Kennedy Space Center, Brevard County, Florida
Tiffany is a specialist for NASA's Launch Services Program. She is frequently in front of the camera as the host of NASA's webcast of prelaunch coverage and behind the camera as an award-winning producer of expendable launch vehicle videos.

LUNAR OUTPOST

Durlean Leslie Bradford, Marshall Space Flight Center, Huntsville, Alabama
Durlean is an educational specialist for WILL Technology Inc. in the Academic Affairs Office. Since September 2001, she has been the project manager for the NASA Great Moonbuggy Race and coordinator for the Student Volunteer Service Program. She is a retired educator from the Huntsville City School system.

Barbara Cohen, Marshall Space Flight Center, Huntsville, Alabama
Barbara is a planetary scientist who studies meteorites from the moon, Mars, and asteroids and has been to Antarctica twice to hunt for them. Barbara also works on the Mars Exploration Rovers *Spirit* and *Opportunity* and is working to plan new missions to the moon. She even has an asteroid named after her.

Joy Dukemineer, Marshall Space Flight Center, Huntsville, Alabama
Joy is the counselor at the Huntsville Center for Technology, a career technical training center for students in Huntsville city schools. In her school career, which spans more than thirty years, she has worked as a classroom teacher, middle school counselor, and in her present position. Joy is a team member in the NASA Great Moonbuggy Race.

Sabrina Pearson, Marshall Space Flight Center, Huntsville, Alabama
Sabrina is an educational project coordinator for WILL Technology Inc. in the Academic Affairs Office, which she joined in September 2003 as an administrative assistant. In December 2006, she became technical coordinator of the NASA Great Moonbuggy Race. A native of Huntsville, she earned her BS in computer information systems from Faulkner University.

Robert Singleterry, Langley Research Center, Hampton, Virginia
Robert is a national expert in space radiation engineering. He works to mitigate the great risks from radiation faced by astronauts and sensitive instruments during spaceflight. Robert's research helps reduce radiation exposure and is vital for the health of human space explorers, as well as the reliable operation of in-space instruments.

Tim White, Huntsville Center for Technology, Huntsville, Alabama
For the past several years, Tim and his classes have been active participants in the NASA Great Moonbuggy Race. His teams have won two consecutive first-place titles, two consecutive Engineer Design Awards, and second- and third-place finishes in the 2008 race. Tim was hired by the Huntsville City School System in 1987 as a precision machining instructor.

Karen Whitley, Langley Research Center, Hampton, Virginia
As an aerospace engineer, Karen is the lead for Expandable Structures and helps develop technology to design and build inflatable structures for the lunar surface. Karen researches the durability of nonmetallic materials under extreme environments and has worked on aircraft morphing, the Space Shuttle external tank, in-space propulsion, and high-speed civil transport aircraft.

NASA-DERIVED TECHNOLOGIES

Bruce Banks, Alphaport, Inc., Cleveland, Ohio
Currently a consultant to Alphaport, Bruce holds more patents than any other researcher in Glenn Research Center history. During his forty-one years with NASA, he conducted research activities in electric propulsion technology, thin film coatings, surface texturing processes, and space environment durability. He has authored 184 technical publications and has received 147 invention and meritorious performance awards.

Peter Homer, Southwest Harbor, Maine
Peter is the developer of an innovative new space suit glove design that is strong, easy on the hands, and gives the operator a high degree of dexterity. Working alone at his dining room table, Peter designed and then manufactured the best-performing glove within competition parameters to win NASA's 2007 Astronaut Glove Challenge.

Sharon Miller, Glenn Research Center, Cleveland, Ohio
As a research engineer for twenty-seven years, Sharon has focused on environmental durability testing of power system materials for the low-Earth orbit environment. She has also been involved in the development of coatings and surface modification techniques to make materials more durable and/or to enhance properties such as heat transfer and optical performance for Earth- and space-based applications.

PROPULSION

Bart Hebert, Stennis Space Center, Hancock County, Mississippi
Bart serves as chief engineer at Stennis and has more than twenty years of experience in the design, construction, activation, and operations of large-scale rocket-engine test facilities, including the Space Shuttle Main Engine. He received a BS in mechanical engineering from the University of Louisiana at Lafayette.

Casey Kirdner, Stennis Space Center, Hancock County, Mississippi
Casey first joined NASA at the Johnson Space Center, where she discovered that she enjoyed work related to rocket propulsion. While at the Stennis Space Center, Casey has worked as rocket engine test conductor and propulsion and piping design engineer. She received a BS in aerospace engineering from Purdue University and an MS in engineering management from the University of New Orleans.

Bryon Maynard, Stennis Space Center, Hancock County, Mississippi
Bryon is a rocket propulsion test system engineer and a recognized expert on the thrust measurement

of space propulsion systems. He is currently working on the development and construction of a new facility to test future space vehicle propulsion systems at altitude. Earlier in his career, he prepared flight hardware for missions on the Space Shuttle.

Bradley Messer, Stennis Space Center, Hancock County, Mississippi
Brad is currently chief, Systems Engineering and Integration Division, responsible for managing systems engineering on a number of propulsion ground test programs, including the J2-X. He served as a senior project engineer for the Space Shuttle Program, External Tank Project Office at Marshall Space Flight Center's Michoud Assembly Facility during its Return to Flight effort.

Elizabeth Messer, Stennis Space Center, Hancock County, Mississippi
Elizabeth is currently a process integration engineer, responsible for designing and managing the Center's Design and Data Management System. She leads a team in developing and improving test and test support processes. Previously, Ms. Messer served as test conductor for the E-1 Test Stand and as facility lead/test engineer at the B-2 Test Stand.

Rosa Obregón, Stennis Space Center, Hancock County, Mississippi
Rosa is the lead mechanical engineer for the E-1 Test Stand and has been a test conductor for a hybrid rocket test program and the Return-to-Flight External Tank Ice Frost Formation test program, which resulted in her recognition by *Latina Magazine* as one of its "Top 10 Women of the Year" in 2005.

Ben Powell, Stennis Space Center, Hancock County, Mississippi
As operations manager for the B-Test Complex, Ben manages a multi-million-dollar test facility and support systems in support of commercial and NASA propulsion test projects. His engineering experience includes working on developmental propulsion test programs, especially Test Facility Control Systems, Instrumentation, and Mechanical Engineering, and supporting the Rocket Propulsion Test Management Board.

Christine Powell, Stennis Space Center, Hancock County, Mississippi
As branch lead for Systems Engineering and Test Integration, Christine represents the Stennis Space Center within NASA's Systems Engineering Working Group and runs a team of systems engineers supporting Propulsion Test Facility and Infrastructure efforts to test the J-2X Engine. For many years, she has worked on developmental propulsion test programs as an engineer.

Steve Taylor, Stennis Space Center, Hancock County, Mississippi
As deputy chief, Systems Engineering and Integration Division, Steve is responsible for systems engineering on a number of propulsion ground test programs, including the J-2X. He previously served as test director in the E-Complex on a number of propulsion test development programs. He received a BS in mechanical engineering from Mississippi State University and an MS in industrial and systems engineering from the University of Alabama-Huntsville.

Bill Wrobel, NASA Headquarters, Washington, D.C.
As assistant associate administrator for launch services, Bill oversees the administration, management, and direction of the acquisition and certification of expendable launch vehicles within NASA. In addition, he manages the overall policy definition, strategic planning, direction, and administration of the Rocket Propulsion Test Program.

ROBOTICS

Ken Fernandez, Marshall Space Flight Center, Huntsville, Alabama
Since joining NASA in 1968, Ken has worked on many programs, including the Apollo lunar roving and robotic systems used in manufacturing the Space Shuttle. He currently serves as project manager for the Surface Mobility Systems project, which, in collaboration with the U.S. Army, is examining the technology needed to integrate and coordinate humans and robots.

Wendy Holforty, Ames Research Center, Moffett Field, California
Wendy is an aerospace engineer who develops procedures to facilitate air traffic control. She also serves as team project manager for an all-girls robotics team, the Space Cookies, and offers technical advice on building robots for the FIRST Robotics Competition. She became interested in aircraft and spaceflight while working as a police officer.

Harley Thronson, Goddard Space Flight Center, Greenbelt, Maryland
As associate director for advanced concepts and planning, Harley is responsible for identification, assessment, and advocacy for advanced human/robotic programs in coordination with other NASA centers, industry, and the scientific community. Previously, at NASA Headquarters, he was responsible for selecting and developing advanced technologies to enhance future science missions. He has published more than one hundred research papers and has co-edited twelve books.

SPACE ART

Chakaia Booker, New York, New York
Chakaia is best known for using recycled rubber tires to create highly expressive sculptures that address universal themes and environmental issues. She has been commissioned by notable institutions and organizations, including the NASA Art Program, to create such works as *Remembering Columbia* (2006), which pays tribute to the lost Space Shuttle *Columbia* using tire remnants preserved from *Columbia's* previous missions.

Les Bossinas, Cleveland, Ohio
Les is an artist and designer who worked with NASA's Glenn Research Center illustrating air and spacecraft concepts and drawing technical illustrations before retiring in 2001. He holds a Bachelor of Fine Arts

degree from Ohio University and has held several positions in graphics and industrial design in the Greater Cleveland area.

Nicky Enright, New York, New York
Nicky is a multimedia artist and founder of Big Hands Murals. His work has been exhibited nationally, and he has executed numerous commissions for clients such as NASA, NBC News, MTA Arts for Transit, and the Cooper-Hewitt National Design Museum. His work has been published and reviewed in several publications, including the *New York Times* and *Public Art Review*. For more information, visit www.Big-Hands.com.

Mary Edna Fraser, Charleston, South Carolina
Working in the ancient textile medium of batik, Mary Edna merges modern dye technology on silk with aerial and satellite photography, maps, and charts. Her pioneering art and large-scale batiks have been collected and exhibited worldwide, including at the Duke University Museum of Art, National Academy of Sciences, NASA, National Geographic Society, Smithsonian National Air and Space Museum, and other institutions.

Pat Rawlings, Houston, Texas
Pat creates images with scientific and technical themes that appeal to rocket scientists and regular folks. After consulting with numerous space experts, he uses hand-built and computer models, topographical maps, and space and family vacation photos to mentally create his worlds. His desire to travel in space and time has motivated him to make as accurate scenes as possible.

SPACE SCIENCE

Arthur Aikin, Goddard Space Flight Center, Greenbelt, Maryland
A scientist who retired from NASA in 2002, Arthur spent many years researching the solar-terrestrial area, particularly the lower ionosphere. He has been a guest investigator on the Solar Maximum mission and has led many sounding rocket expeditions, including two campaigns to launch rockets into solar eclipses.

Shadan Ardalan, Jet Propulsion Laboratory, Pasadena, California
Shadan is a senior member of the navigation team for the Cassini-Huygens mission to Saturn. He began his career as a co-op student working for the Aerospace Corporation and since then has worked as an attitude control engineer and navigator on such historic programs as the Galileo mission orbiting Jupiter, Mars Odyssey (in support of the Mars rovers), and Deep Impact.

Shari Asplund, Jet Propulsion Laboratory, Pasadena, California
Shari manages education and public outreach efforts for NASA's Discovery and New Frontiers programs of pioneering space science investigations. She shares the excitement and meaning of NASA's discoveries with students, educators, and the public by developing and writing Web site content, newsletters, and engaging educational materials.

Todd Barber, Jet Propulsion Laboratory, Pasadena, California

Todd is a senior propulsion engineer, now working as lead propulsion engineer on the Cassini mission to Saturn following part-time work on the Mars Exploration Rover and Deep Impact missions. He also worked as the lead impactor propulsion engineer on Deep Impact, which successfully crashed into Comet Tempel-1 on Independence Day 2005 at 23,000 miles per hour.

Ron Bastien, Jacobs Engineering and Science Contract Group/Johnson Space Center, Houston, Texas

Ron is a team member of the Stardust, Cosmic Dust, and Space-Exposed Hardware collections for the Astromaterials Research and Exploration Science department. He serves as a sample extractor and documentation specialist for these collections and has more than twenty-five years of experience working with extraterrestrial sample collections at NASA.

Dominic Benford, Goddard Space Flight Center, Greenbelt, Maryland

Dominic is deputy principal investigator of the Destiny mission concept study to measure dark energy. His astronomical interests focus on the infrared properties of galaxies and their evolution. He has pursued research in continuum detectors for ground-based submillimeter observations, near-Terahertz heterodyne receiver technology, cryogenic systems for space observatories, and the development of instrumentation using ultrasensitive bolometers for far-infrared and submillimeter astronomy.

Max Bernstein, NASA Headquarters, Washington, D.C.

After studying chemistry at McGill and Cornell universities, Max entered space science and never looked back. He has been the principal investigator on numerous NASA grants and has published more than twenty-five first-author peer reviewed research papers on topics ranging from the chemistry of the interstellar medium, star-forming regions, and planetary nebulae to astrobiology, including the origins of and search for life.

Jacob Bleacher, Goddard Space Flight Center, Greenbelt, Maryland

Jacob is a volcanologist who characterizes planetary volcanic provinces through a combination of terrestrial field studies and spacecraft data analysis. His current research combines geomorphology, basaltic volcanology, planetary geology, fieldwork, remote sensing, and GIS-based data analysis.

Lora Bleacher, Goddard Space Flight Center, Greenbelt, Maryland

Lora works as an outreach specialist on the education and public outreach teams for several NASA missions, including the Lunar Reconnaissance Orbiter, the MESSENGER mission to Mercury, and the Mars Science Laboratory rover. Her primary interest is working with informal learning institutions, such as museums and science centers, to increase public understanding of science.

Beth Brown, Goddard Space Flight Center, Greenbelt, Maryland

As a NASA astrophysicist, Beth uses physics to study things like stars, supernovae, galaxies, and other objects in space. Most recently, she was engaged in the NASA Administrator's Fellowship Program, where she was able to teach astronomy to college students, conduct research on black holes, and become closely involved in NASA education projects.

Ginger Butcher, NASA Headquarters, Washington, D.C.

Ginger started working at the Goddard Space Flight Center in 1997 by developing Web sites and other educational products. Her Echo the Web site was launched in 1998 and helped students from fifth to eighth grade learn about the electromagnetic spectrum and false-color satellite imagery. She also created an interactive Web site for younger students based on a story about Amelia the Pigeon.

Allan Chevront, Lockheed Martin, Denver, Colorado

Allan Chevront has worked with Lockheed Martin since 1980 and has participated in three deep-space missions since 1988. He currently works as the flight system program manager for the Stardust-NExT mission.

Troy Cline, Goddard Space Flight Center, Greenbelt, Maryland

Troy is the educational technologist for NASA's Sun-Earth Connection Education Forum team. Before joining NASA, he was a high school mathematics teacher and educational technology coordinator at an alternative high school in Virginia. He previously taught in a Bureau of Indian Affairs boarding school and in the Peace Corps in Chad as an algebra and geometry teacher.

John Cooper, Goddard Space Flight Center, Greenbelt, Maryland

John is an expert on space radiation environments in the Solar System. He has participated in the Pioneer 11, Voyager 2, Galileo, and Cassini missions to, respectively, Saturn, Uranus, Jupiter, and again Saturn. He is working with other space scientists to plan future missions to these planetary systems.

Emilie Drobnes, Goddard Space Flight Center, Greenbelt, Maryland

As the education and public outreach lead for the Solar Dynamics Observatory, Emilie is responsible for the development and implementation of the NASA Family Science Night, the Sunday Experiment, and other programs. Her main goal is to excite students, teachers, and families about science—ultimately changing their perceptions of what science is and who scientists are.

Therese Errigo, Goddard Space Flight Center, Greenbelt, Maryland

Therese was the lead contamination engineer for the SOHO, STEREO, and IMAGE (dedicated to imaging the Earth's magnetosphere) missions and a consultant and instrument engineer for Hinode, a project to study the sun, led by the Japanese Aerospace Exploration Agency. She is currently working on the Sample Analysis on Mars.

Don Fairfield, Goddard Space Flight Center, Greenbelt, Maryland

While working at NASA for the past forty-two years, Don has conducted research on many aspects of the solar wind interaction with Earth's magnetosphere. His particular interests are the Earth's magnetic tail and its relationship to aurora and magnetic storms. For the past fifteen years, he has been NASA's project scientist for the Geotail spacecraft.

Lisa Fletcher, Jacobs Engineering and Science Contract Group/Johnson Space Center, Houston, Texas

Lisa is the facility engineer within the Astromaterials Research and Exploration Science Directorate, where she is responsible for the facility projects associated with the various astromaterials sample collections and research facilities. She grew up in Richmond, Virginia, and received her BS in industrial engineering from Virginia Tech and her professional engineering license in the state of Texas.

Brenda Franklin, Jet Propulsion Laboratory, Pasadena California

As a planetary geologist, Brenda has been mapping Mars from orbital images for more than twenty years. Now an invited collaborator with the Athena Science Team on Mars Exploration Rovers, she contributes to decisions about which surface features to visit and study, why they are important, and how this information can be used to build the geologic history of Mars.

Daniel Garrison, Jacobs Engineering and Science Contract Group/Johnson Space Center, Houston, Texas

Dan is chief scientist for Astromaterials Research and Exploration Science under the Engineering and Science Contract Group for basic and applied research in the field of planetary science, astromaterials curation, and exploration science. Dan spent twenty years conducting noble gas cosmochemistry research on meteorites, Martian meteorites, and lunar samples to determine chronology, cosmic-ray exposure history, and planetary atmospheres.

Kevin Grazier, Jet Propulsion Laboratory, Pasadena, California

Kevin holds dual titles of investigation scientist and science planning engineer for the Cassini/Huygens mission to Saturn and Titan. He has written mission planning and analysis software that has won numerous awards and continues research involving computer simulations of solar system dynamics, evolution, and chaos. He teaches classes in stellar astronomy, planetary science, cosmology, and the search for extraterrestrial life at several universities.

Roger Harrington, Johnson Space Center, Houston, Texas
Roger is a sample collections processor in the Lunar and the Meteorite laboratories. He processes samples in both laboratories for allocation to scientists, museums, and educational institutions around the world. Roger has also worked for a geotechnical engineering firm and has taught geology and oceanography at the college level.

Jeffrey Hayes, NASA Headquarters, Washington, D.C.
Jeffrey is a heliophysics discipline scientist, who has also served as program executive for various astrophysics missions, including the Hubble Space Telescope, Spitzer Space Telescope, GALEX, and FUSE. Prior to NASA, he was team lead on the NPOESS satellite software group with Raytheon, faculty member at New Mexico State University, and resident astronomer for the Sloan Digital Sky Survey.

Paul Hertz, NASA Headquarters, Washington, D.C.
Paul is a senior scientist in the Science Mission Directorate and serves as senior advisor to the associate administrator of science. He has been program scientist for several projects, including the Structure and Evolution of the Universe Program, the Explorer Program, the Chandra X-ray Observatory, and the Discovery Program. He has authored or co-authored more than one hundred scientific papers.

Steele Hill, Goddard Space Flight Center, Greenbelt, Maryland
Steele is the media specialist for the SOHO and STEREO solar study missions. For more than eleven years, he has produced CDs, posters, illustrations, video clips, litho sets, cards, and more to support educators and outreach events. He responds to media requests and consults with museums and media production companies to get them the images and information resources they need.

David Hurd, Edinboro University of Pennsylvania, Edinboro, Pennsylvania
David is professor of geosciences and director of the planetarium at Edinboro University of Pennsylvania. His goal is to make the physical sciences visible to students who are visually impaired or blind. Trained as an astronomer and atmospheric scientist, David has developed techniques for representing the stars and universe in a very tactile way.

Terry Hurford, Goddard Space Flight Center, Greenbelt, Maryland
Terry studies geophysics, planetary tectonics, and deformations and stress. Much of his research focuses on Europa, a moon of Jupiter. He received a BS in astronomy and physics and a PhD in planetary science, both from the University of Arizona.

Daniel Hurley, Jet Propulsion Laboratory, Pasadena, California
Daniel Hurley is a team chief on the Mars Exploration Rover and has worked for twenty-five years with missions studying Mars, Venus, Earth, and the infrared sky. His jobs have included mission control, integration and testing, software tool development, and systems engineering.

Lindley Johnson, NASA Headquarters, Washington, D.C.
Lindley is program scientist for NASA's Planetary Astronomy and Near Earth Object Observation programs. He was also the program executive for the Deep Impact mission to Comet Tempel 1. Lindley joined NASA shortly after retirement from twenty-three years of Air Force active duty, during which he worked on a variety of national security space systems and obtained the rank of lieutenant colonel.

Anne Kascak, Johnson Space Center, Houston, Texas
Anne has worked for eight years for the Astromaterials Curation Facility. As a business specialist, she performs property control administration for Lunar, Antarctic Meteorites, Cosmic Dust, Stardust, and Genesis samples. She is also a point of contact for researchers and public institutions worldwide. She is a resource on extraterrestrial materials and curation for the data and publications library.

Michael Kelley, NASA Headquarters, Washington, D.C.
Mike is the new program scientist for the Planetary Geology and Geophysics Program and the Planetary Data System. He also serves as program scientist for the EPOXI and Stardust-NExT Discovery Spacecraft missions. He is a long-time visiting astronomer at the NASA Infrared Telescope Facility and served as chair of the Planetary Geology Division of the Geological Society of America and its award committees.

Terry Kucera, Goddard Space Flight Center, Greenbelt, Maryland

As a solar physicist working on the STEREO and SOHO missions, Terry studies different aspects of the sun's atmosphere using data from telescopes in space and on the ground. Originally from the Chicago area, Terry received a BA from Carleton College and a PhD from the University of Colorado at Boulder.

Elaine Lewis, Goddard Space Flight Center, Greenbelt, Maryland

Elaine is a science educator and curriculum developer who has coordinated the GLOBE program, the JASON Project, and Sun-Earth Day. Together with spacecraft mission personnel, she made near real-time NASA space weather data accessible for inquiry-based learning. She also coordinates distance-learning training opportunities.

Colette Lohr, Jet Propulsion Laboratory, Pasadena, California

Colette is a senior software systems engineer who has been working on the Mars Exploration Rover Project since 2001 and in mission systems support for the Constellation Program since 2006. She joined the Laboratory in 1999 after receiving her BS in computer science from the University of Colorado at Boulder.

Lou Mayo, Goddard Space Flight Center, Greenbelt, Maryland

Lou is a planetary astronomer and an education outreach specialist. He has developed a network of over one hundred after-school astronomy clubs and has worked extensively with other NASA centers and the Girl Scouts USA by training scout leaders on heliophysics materials.

Aimee Meyer, Jet Propulsion Laboratory, Pasadena, California

Aimee leads the Education and Public Outreach efforts of NASA's Genesis and Stardust Sample Return missions in addition to the New Exploration of Tempel-1 (NExT) mission currently en route to rendezvous with Comet Tempel-1 in February 2011.

Michael Meyer, NASA Headquarters, Washington, D.C.

Michael is the lead scientist for the Mars Exploration Program and program scientist for the Mars Science Laboratory rover mission, to be launched in 2009. He also served as program scientist for the 2001 Mars Odyssey. His interests are in microorganisms living in extreme environments, and he has conducted field research in the Gobi and Negev deserts, Siberia, Canadian Arctic, and Antarctica.

David Mohr, Jet Propulsion Laboratory, Pasadena, California

David has been part of the Cassini-Huygens mission to Saturn and Titan for the past seven years. He led the integration and sequencing of the Cassini mission science operations plan and is currently working

as a system engineer with the Flight Engineering Group. He performed classified work for the Navy in missile defense while earning a master's degree from Old Dominion University.

Andrea B. Mosie, Johnson Space Center, Houston, Texas

Andrea is lab manager for the Lunar Curation Laboratories, which is part of Astromaterials Research and Exploration Science. She began her career in 1975 by working in the Lunar Sample Laboratory, where the majority of samples returned from the moon are stored and prepared for allocation to lunar scientists. She enjoys giving talks and demonstrations at schools, educational conferences, and seminars.

Keiko Nakamura-Messenger, Jacobs Engineering and Science Contract Group/Johnson Space Center, Houston, Texas

Keiko specializes in studies of meteorites, comets, and cosmic dust. Her major research accomplishments include discovering interstellar organic matter in meteorites and a proposed new mineral in interplanetary dust. She has played a key role in the extraction and preparation of cometary dust samples from the NASA Stardust mission.

Carolyn Ng, Goddard Space Flight Center, Greenbelt, Maryland

Carolyn has a background in earth science and works with the space science education communities to distribute education and outreach materials. Her most recent project (in partnership with the Exploratorium in San Francisco) has taken her to the westernmost part of China to prepare for a live webcast of a total solar eclipse on August 1, 2008.

Tam Nguyen, Jet Propulsion Laboratory, Pasadena, California

Tam is a member of the technical staff of the Robotic Software Systems Group, Mobility and Robotic Systems Section. He has worked on various spaceflight missions, such as the flight experiments onboard the Space Shuttle, the 1996 Mars Pathfinder, and the 2003 Mars Exploration Rover. He has also participated in numerous robotic wheeled-vehicle research projects.

Sten Odenwald, Goddard Space Flight Center, Greenbelt, Maryland

Sten is an astronomer, writer, and education and public outreach member of several heliophysics spacecraft missions. He has spoken on a number of radio talk shows, including National Public Radio programs and *Let's Talk Stars*, as well as on NASA TV programs, such as *CONNECT*, *Destination: Tomorrow*, and *The SciFiles*.

Alexei Pevtsov, NASA Headquarters, Washington, D.C.

Alexei serves as solar physics discipline scientist for the Heliophysics Division and is also program scientist for several heliophysics missions. In addition to his NASA responsibilities, he is an associate astronomer at the National Solar Observatory, where he studies topology and evolution of solar magnetic fields and their role in solar activity. He is the author and co-author of more than ninety scientific papers.

Cecilia Satterwhite, Johnson Space Center, Houston, Texas

Cecilia is lab manager for the Antarctic Meteorite Laboratory, where her primary task is to process and curate samples for classification and to supply samples to scientists worldwide for their research. Cecilia started her career working in the Lunar Sample Laboratory. Her academic background includes geology and a Texas Lifetime Certification in elementary education, specializing in physical and earth sciences.

Carol Schwarz, Johnson Space Center, Houston, Texas

Carol has worked for more than thirty years in the Astromaterials Curation Facility, including the Pristine and Returned Lunar Sample labs, the Antarctic Meteorite Lab, and the Genesis Lab. Currently, she is contractor project manager for Astromaterials Curation, which includes the Lunar, Meteorite, Cosmic Dust, Genesis, and Stardust collections. She also works in the various labs processing and curating samples.

Thomas See, Jacobs Engineering and Science Contract Group/Johnson Space Center, Houston, Texas

Tom specializes in impact cratering and related processes as they apply to planetary and geologic materials. He has been a member of the Astromaterials Research and Exploration Sciences group for nearly thirty years, where he has worked on the Long Duration Exposure Facility, the Orbital Debris Collector, and the Stardust mission.

Jim Thieman, Goddard Space Flight Center, Greenbelt, Maryland

Jim is a planetary radio astronomer and manager of information systems for the National Space Science Data Center. He also handles education and outreach for NASA, especially in the area of heliophysics. Jim is coleader of the Sun-Earth Connection Education Forum, an award-winning education group that promotes the use of heliophysics science results in education nationwide.

Jack Warren, Jacobs Engineering and Science Contract Group/Johnson Space Center, Houston, Texas

Jack started working for NASA in June 1967 and had the honor of opening the first "Rock Box" from the moon and the Apollo 11 mission. As part of his work with extraterrestrial samples, Jack is an expert in designing cleanrooms. He received the NASA Public Service Medal at the Johnson Space Center in September 2002.

Heather Weir, Goddard Space Flight Center, Greenbelt, Maryland

A former classroom teacher, Heather is a science education specialist who uses her experience in formal education to help implement the education and public outreach programs of several NASA missions, including the New Horizons mission to Pluto, the MESSENGER mission to Mercury, and the Lunar Reconnaissance Orbiter mission.

Randii R. Wessen, Jet Propulsion Laboratory, Pasadena, California

Randii is a program system engineer who has worked on Voyager, Galileo, Cassini, Mars Global Surveyor, 2001 Mars Odyssey, and Mars Exploration Rovers and has helped look for Earth-like planets around other stars. He has lectured internationally, co-authored two books, written numerous space exploration papers, and has an asteroid named after him.

Michael Zolensky, Johnson Space Center, Houston, Texas

Mike is an internationally recognized scientist known for his expertise in the mineralogy of comets and asteroids and is on the science teams for NASA's Stardust sample return mission to Comet Wild 2 and the joint Japan-USA-Australia Hayabusa mission. Mike is an authority on the analysis of small extraterrestrial samples and has led or participated in meteorite collection expeditions to six continents, including Antarctica.

SPACE SHUTTLE

Dennis Chamberland, Kennedy Space Center, Brevard County, Florida

As technical representative for the Life Sciences Contract, Dennis oversees the advanced life-support systems under consideration for moon and Mars bases, as well as medical operations, human subject research, and environmental monitoring. Dennis previously worked as a NASA aquanaut, directing twelve underwater missions, including the first to plant and harvest an agricultural crop on the ocean floor.

Joseph Lavelle, Ames Research Center, Moffett Field, California

As a senior research engineer, Joe manages the 3D vision research laboratory, where he has worked for the last twenty-three years. His laboratory has produced 3D vision systems for critical NASA applications, including inspection and evaluation of Space Shuttle tiles, health monitoring of spacecraft, planetary rover guidance, and terrain mapping. He received the NASA Exceptional Achievement Medal in 2007.

Maria Lott, Stennis Space Center, Hancock County, Mississippi

Maria has been director of Astro Camp since 1995 and is the lead teacher for Hancock County Schools in Mississippi. She has twenty-five years of teaching experience, specializing in math and science. She strives to engage students in hands-on learning activities and inspire the next generations with a love for lifelong learning.

David Rainer, Kennedy Space

Center, Brevard County, Florida

As a NASA test director in the Shuttle Processing Directorate, David is responsible for overseeing NASA-managed activities for Space Shuttle launch countdown and landing operations. He works in association with Shuttle launch management to improve prelaunch processes and enhance launch and landing activities.

Nathan Sovik, Stennis Space Center, Hancock County, Mississippi

Nathan serves as the university affairs officer and has expertise in environmental policy modeling and analysis, geographic information systems and remote sensing, software design, and systems integration. His current research interests include the development of Web-based geospatial applications and management information systems. He has taught and carried out research in Europe, Africa, and the United States.

Katie Veal Wallace, Stennis Space

Center, Hancock County, Mississippi

Katie is an electrical engineer who has worked in propulsion testing and remote sensing at Stennis. She has done extensive work in instrumentation, control systems, and data collection for all Stennis test stands. She is currently the elementary and secondary education lead, helping to bring the excitement of NASA to school-age children.

Festival Participants

Texas: A Celebration of Music, Food, and Wine

MUSIC

Asleep At the Wheel, Austin, Texas

Ray Benson

Jim Finney

Elizabeth McQueen

David Miller

Jason Roberts

Under the able leadership of Ray Benson, *Asleep at the Wheel* has enjoyed close to forty years of making Western swing music for audiences of all ages. Keeping alive the jazzy, up-tempo dance favorites of the genre has been a crusade for this ensemble, which has met with much success and many, many GRAMMYS.

Marcia Ball, Austin, Texas

Marcia Ball

Don Bennett

Corey Keller

Johnny Medina

Andrew Nafziger

Thad Scott

Pianist and singer/songwriter

Marcia Ball is an East Texas phenom. Learning from various family members, she began playing piano at age five. Her piano style mixes equal parts boogie-woogie, zydeco, and swamp rock. Most of the songs on her albums are her own creations, so songwriting has always been a part of her job description.

CJ Chenier, Houston, Texas

CJ Chenier

Timothy Betts

Daniel Glenn Griffin

Michael Morris

Michael Vowell

CJ Chenier is the son of zydeco pioneer Clifton Chenier. CJ pays tribute to his father's musical prowess but has expanded his legacy with formidable, original contributions. As a Houston native, he is living proof that zydeco music is Texas music.

Guy Clark, Nashville, Tennessee

Guy Clark

Verlon Thompson

Though he currently resides in the so-called Music City, Texas lays fierce claim to songwriter Guy Clark, and Clark himself never forsakes his roots in the Lone Star State. Part of the songwriting cabal of the 1960s and 1970s, which included Lyle Lovett, Townes van Zandt, and Billy Joe Shaver, Clark continues to tour with many of his Texas cohorts and play throughout the state.

Conjunto Los Angeles del Sur,

La Feria, Texas

Joe Cantú

Arturo Galván

Joe Sánchez

Joe Sánchez Jr.

Lorenzo Sánchez

Joe Sánchez, accordionist, vocalist, and founder in 1978 of *Los Angeles del Sur*, traces his musical heritage to the 1930s, when his grandfather organized dances in *La Feria*, a small community in the Rio Grande Valley of Texas. His father joined the conjunto to play *bajo sexto*. Joe's son, Joey, plays drums. They are joined by Arturo Galván on bass and Joe Cantú on harmony vocals.

Joe Ely, Austin, Texas and

Joel Guzman, Kyle, Texas

Amarillo native Joe Ely got his start with the legendary Lubbock ensemble *The Flatlanders*. Since then, his music has sampled everything from Western to honky-tonk stomps and rockabilly, to Woody Guthrie ballads and Mexican-influenced *corridos*. This formidable writer and interpreter of classic Texas songs is joined by Texas accordion king Joel Guzman, whose prowess

on the squeezebox ranges from rocked-up and straight-ahead conjunto to more nuanced and romantic Mexican roots music.

Fiddlin' Frenchie Burke, Lytle, Texas

Frenchie Burke

Jeffery Barosh

Born in Louisiana, Burke received his first music lessons from his grandfather. After his family moved to San Antonio, he joined the Air Force. His apprenticeship in the Texas honky-tonk scene included work with the likes of Ray Price and Johnny Bush. In the early 1970s, he perfected a blend of the Texas and Louisiana fiddle repertoires and wrapped it in flamboyant showmanship.

The Gillette Brothers, Crockett, Texas

Guy Gillette

Pip Gillette

In 1983, the Gillette brothers took over their grandfather's ranch outside of Crockett, Texas. It was a fortuitous turn of events because, at the same time, they found themselves part of a growing network of cowboy singers and poets who were revitalizing folks' appreciation for Western music and musical lore.

Mark Halata and Texavia,

Houston, Texas

Mark Halata

Bruce Brosch

Jeff Brosch

Mike Gest

Texavia is a Czech polka band led by accordion player Mark Halata, who grew up attending Czech family and community events where polka music was a mainstay. Usually singing in Czech, *Texavia* plays waltzes and polkas that have been popular in the Texas Czech community for well over seventy-five years.

James Hand, Tokio, Texas

James Hand
Will Indian
John McGlothlin
Speedy Sparks
Born in Waco, Texas, rodeos and country music surrounded James from an early age. The classic strains of Lefty Frizzell, Hank Williams, and Ernest Tubb made their mark on him, but a more substantial influence on his performing and songwriting was life itself. Though largely a hidden treasure, James has been a true Texas honky-tonk player for forty years.

Terri Hendrix, San Marcos, Texas, and Lloyd Maines, Austin, Texas
Drawing on an early affection for country, blues, and other roots music, Terri Hendrix falls squarely in the long songwriting tradition of the state. She has joined forces with legendary steel player and producer Lloyd Maines. Member of the second-generation of The Maines Brothers Band and father of one of country music's feistiest female vocalists, his roots in Texas music are almost unparalleled.

The Jones Family Singers, Markham, Texas

Fred Allen Jones Sr.
Velma Davis
Ernestine Jones
Fred Allen Jones Jr.
Sarah M. Jones
Theresa Patrelle Jones
Alexis Jones-Roberts
Ian Wade
Sabrina Renee Wade
The Jones Family Singers is entirely comprised of family. Bishop Fred A. Jones Sr. leads this quartet-style gospel

group, which includes five daughters, two sons, a grandson, and a son-in-law. While the group travels nationwide, they can usually be found every Sunday ministering musically to a small Pentecostal congregation led by Bishop Jones in their rural home base, Markham, Texas.

Tutu Jones and Soul Crew, Dallas, Texas

Tutu Jones
Tyson Grimes
Kevin Ross
Wayne Ross
The son of Dallas-based guitarist Johnny B. Jones, Tutu Jones is truly a product of his early environment, which included regular houseguests like Freddie King, Little Joe Blue, and Ernie Johnson. Obviously, his own future as a bluesman was never in doubt. You could say he exemplifies the sound of South Dallas, where blues and soul meet to create a special Texas mix.

Les Amis Creole, Beaumont, Texas

Ed Poullard
James Adams
Lawrence Ardoin
Led by veteran fiddler and accordionist Ed Poullard, this trio draws its inspiration from old-style French songs of the upper Gulf Coast. They expertly play and preserve a traditional repertoire of waltzes, ballads, and two-steps. Featuring the acoustic interplay of diatonic accordion, fiddle, guitar, and voice, their music is homemade, with an Afro-French twist.

Little Joe y la Familia, Temple, Texas

Joe Hernandez
Gracie Acosta
Frank Cagigal
Manuel Castaneda
Thomas Cruz
Jesus Gaitan
Sam Jones
Jesse Lopez
John Ontiveros
In the 1960s, this ensemble, led by Little Joe Hernandez, pioneered the Tejano sound. An innovative combination of many musical elements, including inventive approaches to Latino music, Tejano gives voice to the Chicano political movement. Little Joe y la Familia may be best known for recording the anthem of the Mexican American civil rights struggle, "Las Nubes."

Los Texmaniacs, San Antonio, Texas

Max Baca
David Farias
Lorenzo Martinez
Israel Villanueva
A contemporary-sounding conjunto ensemble, Los Texmaniacs combine traditional instrumentation and repertoire, with blues, rock, R&B, and a dash of country. Leader Max Baca is a much-in-demand *bajo sexto* player whose music echoes that of his many genre-bending San Antonio mentors—legendary musicians like Doug Sahm, Augie Meyers, and Flaco Jimenez.

Mariachi Los Arrieros, El Paso, Texas

Manny Andrade
Joseph Baca
Antonio Luis Bordonada
Doug Edward Brown
Rene Eduardo Castañeda
Juan Alberto Contreras
Leopoldo Gomez

Angel Hernandez
 Eduardo Alfonso Hernandez
 Omar Daniel Lopez
 Albert Gil Martinez Jr.
 Jose Montes Jr.
 Gabriel Prado
 Mannel Talamantes III
 Javier Villarreal Jr.
 Since 1996, this fifteen-member ensemble has performed for El Pasoans. *Arriero* is the Spanish word for “drover,” the person who drives livestock to its destinations. Los Arrieros have lived up to their moniker by educating young people about the mariachi tradition. They now share their music with audiences nationwide.

Augie Meyers, San Antonio, Texas
 Augie Meyers
 Joe Forlini

Growing up in San Antonio, Texas, Angie Meyers absorbed all the styles of music that were popular in his childhood. As a founding member of the Sir Douglas Quintet and the Texas Tornados, he put this knowledge to use. Meyers, a Texas musical icon, continues to be at home with styles as diverse as polka, conjunto, Cajun, country, and rock and roll.

Jody Nix and The Texas Cowboys, Big Spring, Texas

Jody Nix
 Johnny Cox
 Dixie Hankins
 Larry Nix
 Robert Weeks

A second-generation Western swing musician, Jody Nix inherited the leadership of the Texas Cowboys from his father, the early and important Western swing fiddler Hoyle Nix. To this day, the Texas Cowboys play dancehalls, rodeos, and community events throughout

the nation, but their special stomping ground is West Texas, where swing fans are avid and demand a driving, danceable sound.

The Original Soul Invaders, Industry, Texas

Roy Green
 Danny Davis
 Demontreal Edmond
 David Scott
 Chadwick Turner
 Chris Washington
 The Original Soul Invaders draw on the amplified quartet tradition popular with African American gospel groups in Texas. Founder and leader Roy Green, who pastors the Mars Hill Deliverance Tabernacle Church in Fayetteville, Texas, started the group in the late 1970s.

The Quebe Sisters Band, Burleson, Texas

Grace Quebe
 Hulda Quebe
 Sophia Quebe
 Joey McKenzie
 Drew Phelps
 Among the Quebe sisters, stunning sibling vocals are matched by triple-threat sister fiddling. Their mentor, master musician Joey McKenzie, and upright bass player Drew Phelps join them. Their repertoire includes Western swing, cowboy tunes, and traditional Texas-style fiddling.

Mingo Saldivar, San Antonio, Texas

Accordianist Mingo Saldivar is known for his distinctive twist on the conjunto tradition. He has built a loyal following in dancehalls across South Texas by blending straight-

ahead conjunto with country and western standards and by translating original English lyrics into Spanish and the plaintive sound of country into bright and danceable conjunto sound.

Texas Johnny Brown, Houston, Texas

Texas Johnny Brown
 Larry Evans
 Giovanni Godley
 William Hollis
 Blues guitarist and session man, songwriter and bandleader, Texas Johnny Brown has a storied yet little known musical history. As studio guitarist for Houston’s groundbreaking Black label, Duke/Peacock Records, Brown toured, played, and recorded with many of the greatest blues, gospel, and R&B artists of the day. He now leads his own ensemble.

Charles Thibodeaux and the Austin Cajun Aces, Austin, Texas

Charles Thibodeaux
 Steve Doerr
 Peter Schwarz
 Although recently formed and from a Texas town not known for its Cajun roots, the Austin Cajun Aces is steeped in Texas Cajun tradition. Fronted by Cajun accordionist Charles Thibodeaux, whose musical mentor and hero is the great Texas Cajun accordionist Andrew Cormier, the Aces play the music Charles grew up with in dancehalls, community centers, and clubs throughout Southeast Texas.

TEXAS FOOD

Hoover Alexander, Austin, Texas

Hoover Alexander is a fifth-generation African American Texan. He grew up loving his mother Dorothy's Southern home cooking and spent summers on the Utley farm where she was raised. Influenced by the multicultural community in Austin, he honed his cooking skills in the legendary Night Hawk Restaurant in Austin, where he opened his own restaurant in 1998.

Bill Avila, El Paso, Texas

Bill Avila is a fourth-generation El Pasoan who grew up in his family's Mexican restaurant, Leo's. He worked his way up from dishwasher to cook to owner and opened his own restaurant, Avila's, in 1970. The menu's recipes came straight from family—father, great aunts, and grandmothers. The restaurant closed only last year.

Gene Marie Bohuslav and Rene Matula, Komensky, Texas

Texas Czechs Gene Marie and her daughter Rene were born and raised in the tiny community of Komensky in Lavaca County. Gene Marie still lives on the land she grew up on and farmed with her husband. Czech was her first language, and she's spent a lifetime making traditional Texas Czech dishes for her family and community.

Tom Nall, Burnet, Texas

Born and raised on his family's ranch, Tom Nall has worked as a cowboy and wagon boss at ranches in Texas, Arizona, Colorado, and New Mexico. He had already participated in chili cook-offs around the state when he met and eventually went to work for the Fowler family, the well-known chili spice company owners. Tom's unofficial title is "chili ambassador."

Lyly Nguyen, Corpus Christi, Texas

Lyly immigrated to the United States from Vietnam in the late 1970s and lived in several states before settling in Rockport, Texas, where her father worked in the shrimping industry. Along the Gulf Coast, Lyly and six family members own Vietnamese restaurants where they serve dishes influenced by their family's traditional cooking.

Betty and Steve Orsak, Katy, Texas

Taught by family members in South Central Texas, husband and wife Steve and Betty Orsak have canned, pickled, and preserved foods together since the early 1970s. Their Czech heritage influences their choice of recipes and produce. Steve was a foodways participant at the 1996 Festival.

Tom Perini, Buffalo Gap, Texas

Tom Perini grew up and worked on his family's cattle ranch in Buffalo Gap in West Texas. Later in life, when his father's death brought him back to the ranch he loved, he combined his two passions—ranch life and cooking. In 1983, Tom opened the Perini Ranch Steakhouse on his property.

Wendy Power, San Antonio, Texas

Growing up in a Polish Texan family in a majority Mexican American Texas city, Wendy Power ate and cooked sausage. Her grandfather started the Kielbassa Provision Company, which makes Polish-style sausage and Mexican chorizo. Wendy, well versed in recipes that draw on both traditions, now works for the sausage company her family still owns.

TEXAS WINE

Ed Auler, Tow, Texas

Texas businessman and rancher Ed Auler, started Fall Creek Vineyards with his wife, Susan, in 1975 after a trip to France convinced them that their ranch and parts of the French wine country were remarkably similar in soil, terrain, and microclimate. Hugely successful, the Aulers have been tireless spokespersons for the industry ever since.

Jason Englert, Fredericksburg, Texas

Jason Englert earned his degree in biology from Texas Tech before apprenticing at the Llano Estacado Winery in Lubbock. After the original owner/winemaker died in 2005, Englert became winemaker at Grape Creek Vineyards. Jason makes wines only from grapes of the highest quality. He follows modern and traditional wine-making practices.

Gary and Kathy Gilstrap, Johnson City, Texas

The Gilstraps have a family-run operation, Texas Hills Vineyard, which champions environmentally sensitive ways of growing grapes and producing

wine. Gary is winemaker; Kathy runs the tasting room; and their son Dale manages the vineyard. Gary is well-known among his peers for his innovations.

Raymond and Gladys Haak, Santa Fe, Texas

Raymond and Gladys Haak were born and raised in South Texas. They began growing grapes in 1969 as a hobby, experimenting with numerous varieties to determine which would survive the Texas Gulf Coast climate. More than twenty-five years later, they turned their wine- and grape-growing passion into a commercial operation.

Jim and Karen Johnson, Bend, Texas

The Johnsons run the only Texas winery dedicated exclusively to warm-climate varieties. Jim, the winemaker, graduated from the University of California at Davis in enology and returned to his home state to work at several well-known wineries before opening his own Alamosa Wine Cellars in 1999. His wife, Karen, serves as harvest-crew boss every summer.

Kim McPherson, Lubbock, Texas
Kim McPherson's father founded Llano Estacado Winery in Lubbock in 1976. Kim returned to the winery as winemaker after completing the enology and viticulture program at the University of California at Davis. He created the McPherson Cellars label in 2000 and will open his own winery in Lubbock this summer.

Guy Stout, Houston, Texas

Guy Stout knows the Texas wine business—growing grapes (in his Central Texas vineyard), wine distribution, and the fine art of wine tasting. He is the state's only Master Sommelier, a designation given by the international Court of Master Sommeliers only after someone studies for years.

Caris Turpen, Fort Worth, Texas

Caris Turpen is the owner and winemaker of LightCatcher Winery. Though her first career was in film, she began making wine as a hobby. Deciding on a second career in wine making, she went back to school and got her degree in enology and viticulture. She opened LightCatcher in 2001 and has won numerous awards and acclaim for her wines.

Festival Participants

Rinzler Concert

Grupo Folklórico y Experimental Nuevayorquino, Bronx, New York

Thirty years ago, Ralph Rinzler and a group of Smithsonian colleagues traveled to the Bronx to observe rehearsals that led to Grupo Folklórico y Experimental Nuevayorquino's first double-album recording, *Concepts in Unity*. Their next recording was *Lo Dice Todo*, conceptualized, organized, and produced by René López. This groundbreaking group of composers, instrumentalists, and singers,

mostly from the South Bronx in New York, went on to establish new frontiers in various genres of Latin and American music, making their mark throughout the world. Grupo Folklórico became legendary for experimental recordings that brought together some of the most gifted, often little-noticed elder musicians, deeply rooted in Puerto Rican and other Caribbean and Latin American communities and popular with audiences.

BHUTAN



Bhutan Kitchen

Four Friends Narrative Stage

Tsechu Stage

NASA



Exploration Stage

Food Lab

Galaxy Stage

Time	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage	Exploration Stage	Food Lab	Galaxy Stage
11:00	Opening Ceremony Dancehall			Opening Ceremony Dancehall		
12:00	Cattle God's Gifts: Butter and Cheese	The Four Friends Story <small>£7</small>	Traditional Bhutanese Music and Dance	Space Shuttle	Packaging Food for Space <small>£7</small>	High Flight
1:00				Taste of Bhutan		Life of Monks and Nuns
2:00	Understanding Art in Bhutan	Traditional Bhutanese Music and Dance <small>£7</small>	NASA and Nation		Planning for the Moon and Mars	Sun-Earth Connections
3:00	Buckwheat Noodles	Gross National Happiness	Traditional Bhutanese Music and Dance	Astronaut Adventures <small>£7</small>	Creating Menus for Space	Rocket Scientists
4:00				Images of Bhutan		Ritual Monastic Dance
5:00	Festive Foods	Passing on Traditional Arts <small>£7</small>	Ritual Monastic Dance	Astronaut Adventures	Planning for the Moon and Mars	Leading the Greening <small>£7</small>
				Storytelling		Closing Ritual

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



Dancehall Lone Star Kitchen Opry House Texas Talk

11:00	Opening Ceremony Dancehall			
12:00			The Jones Family Singers	Talking Terror
1:00	Texas Johnny Brown	San Antonio Tex-Mex Cooking	Los Texmaniacs with Fiddlin' Frenchie Burke	
2:00	Terri Hendrix and Lloyd Maines	Polish Texan Cooking	Texas Johnny Brown	Making Wine for Texas Tastes
3:00	Little Joe y la Familia	Cowboy Cooking	Los Texmaniacs with Mingo Saldivar	Fiddles, Fiddles, Fiddles
4:00	Les Amis Creole	Vietnamese Cooking	Terri Hendrix and Lloyd Maines	Taco Polak-os: Eating in San Antonio
5:00	Jody Nix and the Texas Cowboys	Southern African-American Cooking		Tejano Music

NASA Kids' Space

Visit the Kids' Space tent to pick up your *Mission Guide* booklet, which is filled with fun activities, such as designing space vehicles and making craters. You'll earn a NASA reward to take home for finding solutions to challenges in the NASA program tents. There will also be opportunities to meet NASA scientists and engineers, see exciting science demonstrations, and participate in some awesome events. Check the Kids' Space schedule sign daily.

Bhutan Kids' Activities








Visit the Treasure Hunt tent to pick up your "Treasures of Bhutanese Culture" activity sheet, which will help you discover the eight lucky signs, learn some Dzongkha (the national language of Bhutan), and find new ways to explore the Bhutan program. Elsewhere on-site, you can color your own Bhutanese postage stamp and mail it, make traditional Bhutanese biscuits, learn some Bhutanese dance steps, try on a *kira* or *gho*, draw and paint in the Bhutanese style, use a block print to make a prayer flag, and more.

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

♣ indicates American Sign Language–interpreted program. Programs are subject to change.



	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage	Exploration Stage	Food Lab	Galaxy Stage
11:00	Dragon Drinks: Tea and Alcohol	What's in a Name? 	Traditional Bhutanese Music and Dance	Mysterious Universe	Packaging Food for Space	Moon Bound
12:00	Cattle God's Gifts: Butter and Cheese	Movie Making in Bhutan	Ritual Monastic Dance	NASA and Popular Imagination	Planning for the Moon and Mars 	NASA Pioneers
1:00	Taste of Bhutan	Cultural Identity	Traditional Bhutanese Music and Dance 	Why We Explore		Creating Menus for Space
2:00		Prayer Flags and Prayer Wheels		Astronaut Adventures	What on Earth?	
3:00	Buckwheat Noodles 	Protecting Bhutan's Environment	Ritual Monastic Dance	Science Update	Packaging Food for Space	NASA and Nation
4:00		Birth, Death, and Rebirth	Traditional Bhutanese Music and Dance	NASA and Popular Imagination	Planning for the Moon and Mars	Space Shuttle 
5:00	Festive Foods 	Crops: From Farm to Family	Teaching	Rocket Scientists 	Creating Menus for Space	Probing the Planets
		Natural Resources Used in Art		Astronaut Adventures		Mysterious Universe
		Storytelling	Closing Ritual			

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00			The Jones Family Singers	San Antonio Sounds
12:00	Terri Hendrix and Lloyd Maines	Southern African-American Cooking		ASL
			The Gillette Brothers	Ethnic Restaurants in Texas
1:00	The Jones Family Singers	Polish Texan Cooking	Les Amis Creole	
			ASL	Family Bands
2:00	Los Texmaniacs with Mingo Saldivar	Cowboy Cooking		Remembering the Duke Peacock Record Label
			The Gillette Brothers	
3:00	Jody Nix and the Texas Cowboys	Vietnamese Cooking	Los Texmaniacs with Augie Meyers	Becoming a Winemaker
4:00	Texas Johnny Brown	San Antonio Tex-Mex Cooking		
		ASL	Jody Nix and the Texas Cowboys	Texas: French Style
5:00	Little Joe y la Familia	Cowboy Cooking		

NASA Kids' Space

Visit the Kids' Space tent to pick up your *Mission Guide* booklet, which is filled with fun activities, such as designing space vehicles and making craters. You'll earn a NASA reward to take home for finding solutions to challenges in the NASA program tents. There will also be opportunities to meet NASA scientists and engineers, see exciting science demonstrations, and participate in some awesome events. Check the Kids' Space schedule sign daily.

Bhutan Kids' Activities

Visit the Treasure Hunt tent to pick up your "Treasures of Bhutanese Culture" activity sheet, which will help you discover the eight lucky signs, learn some Dzongkha (the national language of Bhutan), and find new ways to explore the Bhutan program. Elsewhere on-site, you can color your own Bhutanese postage stamp and mail it, make traditional Bhutanese biscuits, learn some Bhutanese dance steps, try on a *kira* or *gho*, draw and paint in the Bhutanese style, use a block print to make a prayer flag, and more.

EVENING CONCERTS

Texas



Dancehall

6.00 PM

Sounds of San Antonio

Los Texmaniacs with Mingo Saldivar, Augie Meyers, and Fiddlin' Frenchie Burke

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

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BHUTAN



Bhutan Kitchen

Four Friends Narrative Stage

Tsechu Stage

11:00	Dragon Drinks: Tea and Alcohol	The Eight Lucky Signs	Traditional Bhutanese Music and Dance
12:00	Cattle God's Gifts: Butter and Cheese	The Art of Bhutanese Postage Stamps	Ritual Monastic Dance
		Monarchy and Democracy	
1:00	Taste of Bhutan	Texas-Bhutan Connections	Traditional Bhutanese Music and Dance
		Looking at the Stars	Teaching
2:00	Buckwheat Noodles	Bhutan in the Twenty-first Century	Ritual Monastic Dance
		<i>Ghos and Kiras</i>	
3:00	Festive Foods	Home Altars and Rituals	Traditional Bhutanese Music and Dance
		Storytelling	Closing Ritual

NASA



Exploration Stage

Food Lab

Galaxy Stage

NASA Pioneers	Planning for the Moon and Mars	International Space Station
Moon Bound	Creating Menus for Space	High Flight
Astronaut Adventures	Packaging Food for Space	NASA Pioneers
Mysterious Universe	Planning for the Moon and Mars	NASA in Second Life
NASA and Popular Imagination	Creating Menus for Space	NASA and Nation
Sun-Earth Connections	Packaging Food for Space	NASA and Popular Imagination
Astronaut Adventures	Packaging Food for Space	Probing the Planets
International Space Station		Mysterious Universe

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00				
12:00	Los Texmaniacs with Augie Meyers	Polish Texan Cooking	Les Amis Creole	Saturday Night and Sunday Morning
1:00	Jody Nix and the Texas Cowboys	Cowboy Cooking	Little Joe y la Familia	Lubbock on My Mind
2:00	Little Joe y la Familia	Cheese and Chiles: From Texas to Bhutan	Texas Johnny Brown	Sustenance in the Black Church
3:00	The Gillette Brothers	Southern African-American Cooking	Joe Ely and Joe Guzman	Tex-Mex Food and Tex-Mex Music
4:00	Jody Nix and the Texas Cowboys	San Antonio Tex-Mex Cooking	The Jones Family Singers	Accordions: Texas Style
5:00	Los Texmaniacs with Augie Meyers	Vietnamese Cooking	The Gillette Brothers	Cowboy Grub and Gab

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

indicates American Sign Language–interpreted program. Programs are subject to change.

NASA Kids' Space

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Bhutan Kids' Activities

Visit the Treasure Hunt tent to pick up your "Treasures of Bhutanese Culture" activity sheet, which will help you discover the eight lucky signs, learn some Dzongkha (the national language of Bhutan), and find new ways to explore the Bhutan program. Elsewhere on-site, you can color your own Bhutanese postage stamp and mail it, make traditional Bhutanese biscuits, learn some Bhutanese dance steps, try on a *kira* or *gho*, draw and paint in the Bhutanese style, use a block print to make a prayer flag, and more.

EVENING CONCERTS

Texas

Opry House

Texas Songsters

Terri Hendrix and Lloyd Mames
Joe Ely and Joel Guzman

Bhutan

Tsechu Stage

Music and Dance from the

Land of the Thunder Dragon



6:00 PM



6:00 PM

Saturday June 28

BHUTAN



NASA



	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage	Exploration Stage	Food Lab	Galaxy Stage
11:00	Dragon Drinks: Tea and Alcohol	<i>Zorig Chusum: The Thirteen Traditional Arts</i>	Traditional Bhutanese Music and Dance	High Flight	Creating Menus for Space	International Space Station
12:00	Cattle God's Gifts: Butter and Cheese	Gross National Happiness	Ritual Monastic Dance	Space Shuttle	Packaging Food for Space	Rocket Scientists
1:00		Ritual Arts		Astronaut Adventures		NASA Pioneers
2:00	Taste of Bhutan	Art and Architecture	Traditional Bhutanese Music and Dance	The Human Body in Space	Planning for the Moon and Mars	Probing the Planets
3:00		Tourism and Culture	Ritual Monastic Dance	Mysterious Universe	Creating Menus for Space	NASA and Nation
4:00	Buckwheat Noodles	Bhutanese Courtesies	Traditional Bhutanese Music and Dance	Probing the Planets	Packaging Food for Space	Space Shuttle
5:00	Festive Foods	Traditional Medicine	Teaching	Astronaut Adventures	Planning for the Moon and Mars	Moon Bound
		Storytelling	Closing Ritual	What on Earth?		High Flight

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00				
12:00	The Jones Family Singers	Cowboy Cooking	Les Amis Creole	Waltz Across Texas
1:00	Terri Hendrix and Lloyd Maines	Vietnamese Cooking	Texas Johnny Brown	Food in Remote Locations
2:00	Les Amis Creole	Southern African-American Cooking	Little Joe y la Familia	Cowboy Music
3:00	Jody Nix and the Texas Cowboys	San Antonio Tex-Mex Cooking	The Jones Family Singers	Songwriting Traditions
4:00	Texas Johnny Brown	Polish Texan Cooking	Los Texmamacos	Wine-making Tradition and Innovation
5:00	Little Joe y la Familia	San Antonio Tex-Mex Cooking	The Gillette Brothers	All in the Family (Business)

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

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Bhutan Kids' Activities

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EVENING CONCERTS

Rinzler Concert



Opry House

6:00 PM

Ralph Rinzler Memorial Concert
in honor of René López
Grupo Folklórico y
Experimental Nuevayorquino

Texas



Dancehall

6:00 PM

Saturday Night and Sunday Morning
The Jones Family Singers
Texas Johnny Brown

EHUTAN



NASA



	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage	Exploration Stage	Food Lab	Galaxy Stage
11:00	Dragon Drinks: Tea and Alcohol	The Four Friends Story	Traditional Bhutanese Music and Dance	Rocket Scientists	Packaging Food for Space	Space Shuttle
12:00	Cattle God's Gifts: Butter and Cheese	Natural Resources Used in Art	Ritual Monastic Dance	NASA Pioneers	Planning for the Moon and Mars	Mysterious Universe
1:00	Taste of Bhutan	Sacred Environment	Traditional Bhutanese Music and Dance	NASA and the Media	Creating Menus for Space	What on Earth?
2:00		Environment and Art	Traditional Bhutanese Music and Dance	International Space Station	Packaging Food for Space	The Human Body in Space
3:00		Cultural and Environmental Diversity	Traditional Bhutanese Music and Dance	Astronaut Adventures	Planning for the Moon and Mars	NASA Pioneers
4:00	Buckwheat Noodles	What's for Dinner? Geography and Crops	Ritual Monastic Dance	Probing the Planets	Planning for the Moon and Mars	Rocket Scientists
5:00	Festive Foods	Stewardship of the Environment	Traditional Bhutanese Music and Dance	Astronaut Adventures	Creating Menus for Space	International Space Station
		Storytelling	Closing Ritual	Leading the Greening		High Flight

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00		Vietnamese Cooking	Texas Guitar Traditions	Lone Star Barbecue Styles
12:00	The Jones Family Singers		Les Amis Creole	Talking Terror
1:00	Jody Nix and the Texas Cowboys	Southern African-American Cooking	ASL	
2:00	Terri Hendrix and Lloyd Maines	San Antonio Tex-Mex Cooking	The Jones Family Singers	The Vietnamese in Texas
3:00	Les Amis Creole	Polish Texan Cooking	The Gillette Brothers	Couple-run Wineries
4:00	Jody Nix and the Texas Cowboys	Cowboy Cooking	Los Texmaniacs	Sisters in Song
5:00	Los Texmaniacs	Polish Texan Cooking	Texas Johnny Brown	Accordion Building

NASA Kids' Space

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Bhutan Kids' Activities

Visit the Treasure Hunt tent to pick up your "Treasures of Bhutanese Culture" activity sheet, which will help you discover the eight lucky signs, learn some Dzongkha (the national language of Bhutan), and find new ways to explore the Bhutan program. Elsewhere on-site, you can color your own Bhutanese postage stamp and mail it, make traditional Bhutanese biscuits, learn some Bhutanese dance steps, try on a *kira* or *gho*, draw and paint in the Bhutanese style, use a block print to make a prayer flag, and more.

EVENING CONCERTS

Texas



- Dancehall 6:00 PM
- Waltz Across Texas Dance Party
 Gillette Brothers
 Jody Nix and the Texas Cowboys
 Asleep at the Wheel

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

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Wednesday July 2

B H U T A N



N A S A



	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage		Exploration Stage	Food Lab	Galaxy Stage
11:00	Dragon Drinks: Tea and Alcohol	The Four Friends Story	Traditional Bhutanese Music and Dance		NASA Pioneers	Creating Menus for Space	NASA and Nation
12:00	Cattle God's Gifts: Butter and Cheese	Bhutanese Architecture	Ritual Monastic Dance		Sun-Earth Connections	Packaging Food for Space	Probing the Planets
1:00		Life of Monks and Nuns			Astronaut Adventures		Moon Bound
		Crops: From Farm to Family	Traditional Bhutanese Music and Dance		Probing the Planets	Planning for the Moon and Mars	What on Earth?
2:00	Taste of Bhutan	Images of Bhutan	Traditional Bhutanese Music and Dance		Mysterious Universe	Creating Menus for Space	NASA and Popular Imagination
3:00		Gross National Happiness					
	Buckwheat Noodles	Birth, Death, and Rebirth	Ritual Monastic Dance		NASA Art	Packaging Food for Space	Global NASA
4:00		Movie Making in Bhutan	Teaching		Astronaut Adventures	Planning for the Moon and Mars	Space Shuttle
5:00	Festive Foods	Storytelling	Closing Ritual		Moon Bound		Rocket Scientists

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00			Mariachi Los Arrieros	
12:00	Tutu Jones and the Soul Crew	Home Canning		Polka Traditions
			The Quebe Sisters Band	ASL
1:00	James Hand	West Texas Barbecue		Food in Remote Locations
			Charles Thibodeaux and the Austin Cajun Aces	ASL
2:00	CJ Chemer	Czech Texan Cooking		The Quarter Sound
			Mark Halata and Texavia	
3:00	Conjunto Los Angeles del Sur	Cowboy Cooking		Women in the Wine Industry
			James Hand	
4:00	The Original Soul Invaders	Barbecue and Canning		Dance Texas
		ASL		
5:00	Charles Thibodeaux and the Austin Cajun Aces	El Paso Mexican Cooking	Mariachi Los Arrieros	Texas-style and Contest Fiddling

NASA Kids' Space

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Bhutan Kids' Activities

Visit the Treasure Hunt tent to pick up your "Treasures of Bhutanese Culture" activity sheet, which will help you discover the eight lucky signs, learn some Dzongkha (the national language of Bhutan), and find new ways to explore the Bhutan program. Elsewhere on-site, you can color your own Bhutanese postage stamp and mail it, make traditional Bhutanese biscuits, learn some Bhutanese dance steps, try on a *kira* or *gho*, draw and paint in the Bhutanese style, use a block print to make a prayer flag, and more.

EVENING CONCERTS

Texas



Dancehall 6:00 PM
 Texas Blues and Zydeco Dance Party
 Tutu Jones and the Soul Crew
 CJ Chemer

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

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Thursday July 3

BHUTAN



NASA



	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage	Exploration Stage	Food Lab	Galaxy Stage
11:00	Dragon Drinks: Tea and Alcohol	The Four Friends Story	Traditional Bhutanese Music and Dance	NASA Pioneers	Packaging Food for Space	Mysterious Universe
12:00	Cattle God's Gifts: Butter and Cheese	Prayer Wheels and Prayer Flags	Ritual Monastic Dance	Space Shuttle	Planning for the Moon and Mars	The Human Body in Space
		Bhutan in the Twenty-first Century				
1:00	Taste of Bhutan	Bhutanese Beliefs	Traditional Bhutanese Music and Dance	Astronaut Adventures	Creating Menus for Space	NASA and Generation Y
2:00		Environment and Art	Ritual Monastic Dance	Moon Bound		NASA Pioneers
3:00		Home Altars and Rituals	Traditional Bhutanese Music and Dance	Benefits to Society	Packaging Food for Space	NASA and Nation
4:00	Buckwheat Noodles	Bhutanese Courtesies	Teaching	Probing the Planets	Planning for the Moon and Mars	Rocket Scientists
		Sacred Environment		Astronaut Adventures	Creating Menus for Space	What on Earth?
5:00	Festive Foods	Storytelling	Closing Ritual	High Flight		NASA in Second Life

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00			Conjunto Los Angeles del Sur	
12:00	Tutu Jones and the Soul Crew	West Texas Barbecue		Accordions: French Style
1:00	The Quebe Sisters Band	Czech Texan Cooking	The Original Soul Invaders	Talking Terroir
2:00	Mark Halata and Texavia	Cowboy Cooking	Charles Thibodeaux and the Austin Cajun Aces	The Gospel in Black and White
3:00	CJ Chenier	Home Canning	Tutu Jones and the Soul Crew	Becoming a Winemaker
4:00	James Hand	El Paso Mexican Cooking	Mariachi Los Arrieros	El Paso Tex-Mex
5:00	Conjunto Los Angeles del Sur	Cowboy Cooking	Mark Halata and Texavia	Sisters in Song

NASA Kids' Space

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Bhutan Kids' Activities

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EVENING CONCERTS

Texas



Opry House 6:00 PM
 Viva El Paso:
 Building Connections with Bhutan Artists from
 Bhutan Royal Academy of Performing Arts and the
 Buddhist Monk Community
 Mariachi Los Arrieros

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

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BHUTAN



NASA



	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage		Exploration Stage	Food Lab	Galaxy Stage
11:00	Dragon Drinks: Tea and Alcohol	Gross National Happiness	Traditional Bhutanese Music and Dance		Probing the Planets	Planning for the Moon and Mars	Space Shuttle
12:00	Cattle God's Gifts: Butter and Cheese	What's in a Name?	Ritual Monastic Dance		NASA Pioneers	Creating Menus for Space	International Space Station
1:00	Cheese and Chiles from Bhutan to Texas	Understanding Art in Bhutan	Traditional Bhutanese Music and Dance		Why We Explore	Packaging Food for Space	NASA and Nation
2:00	Taste of Bhutan	Monarchy and Democracy	Teaching		What on Earth?	Planning for the Moon and Mars	Rocket Scientists
3:00		The Life of a Monk	Ritual Monastic Dance		Astronaut Adventures	Creating Menus for Space	NASA and Nation
4:00		Bhutan in the United States	Cultural Identity		NASA Photography	Packaging Food for Space	NASA and Popular Imagination
5:00	Buckwheat Noodles	The Eight Lucky Signs	Traditional Bhutanese Music and Dance		Astronaut Adventures		Moon Bound
		Storytelling	Closing Ritual		NASA and Popular Imagination		Probing the Planets

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00			Mark Halata and Texavia	
12:00	The Original Soul Invaders	Czech Texan Cooking		Fiddles, Fiddles, Fiddles
			Conjunto Los Angeles del Sur	
1:00	James Hand	El Paso Mexican Cooking		Texas Barbecue Styles
			Tutu Jones and the Soul Crew	
2:00	Mariachi Los Arrieros	Cowboy Cooking		The Songwriting Tradition
			Charles Thibodeaux and the Austin Cajun Aces	
3:00	Tutu Jones and the Soul Crew	Texas Barbecue		Making Wine for Texas Tastes
			The Original Soul Invaders	
4:00	Conjunto Los Angeles del Sur	West Texas Barbecue		Dancing Texas
			Guy Clark	
5:00	The Quebe Sisters Band	El Paso Mexican Cooking		Waltz Across Texas

NASA Kids' Space

Visit the Kids' Space tent to pick up your *Mission Guide* booklet, which is filled with fun activities, such as designing space vehicles and making craters. You'll earn a NASA reward to take home for finding solutions to challenges in the NASA program tents. There will also be opportunities to meet NASA scientists and engineers, see exciting science demonstrations, and participate in some awesome events. Check the Kids' Space schedule sign daily.

Bhutan Kids' Activities

Visit the Treasure Hunt tent to pick up your "Treasures of Bhutanese Culture" activity sheet, which will help you discover the eight lucky signs, learn some Dzongkha (the national language of Bhutan), and find new ways to explore the Bhutan program. Elsewhere on-site, you can color your own Bhutanese postage stamp and mail it, make traditional Bhutanese biscuits, learn some Bhutanese dance steps, try on a *kira* or *gho*, draw and paint in the Bhutanese style, use a block print to make a prayer flag, and more.

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

indicates American Sign Language-interpreted program. Programs are subject to change.

Saturday July 5

BHUTAN



NASA



	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage	Exploration Stage	Food Lab	Galaxy Stage
11:00	Dragon Drinks: Tea and Alcohol	The Four Friends Story	Traditional Bhutanese Music and Dance	Moon Bound	Creating Menus for Space	NASA Pioneers
12:00	Cattle God's Gifts: Butter and Cheese	Natural Resources Used in Art	Ritual Monastic Dance	Global NASA	Packaging Food for Space	Space Shuttle
1:00		Sacred Environment		Astronaut Adventures		NASA and Popular Imagination
2:00	Taste of Bhutan	Environment and Art	Traditional Bhutanese Music and Dance	Mysterious Universe	Planning for the Moon and Mars	What on Earth?
		Cultural and Environmental Diversity	Ritual Monastic Dance		Creating Menus for Space	Probing the Planets
3:00		What's for Dinner? Geography and Crops		NASA Pioneers		
	Buckwheat Noodles	Stewardship of the Environment	Traditional Bhutanese Music and Dance	Space Shuttle	Packaging Food for Space	NASA and Generation Y
4:00		Eco-Tourism	Teaching	Astronaut Adventures	Planning for the Moon and Mars	High Flight
5:00	Festive Foods	Storytelling	Closing Ritual	High Flight		NASA and Popular Imagination

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

In addition to the daily scheduled discussions and presentations, there are ongoing demonstrations of NASA's occupational culture throughout the site. Visitors are invited to meet NASA personnel and to learn more about aeronautics, astronomy, earth science, human spaceflight, moonbuggies, NASA history, propulsion, robotics, space art, space science, and new technologies derived from NASA research.

TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00		Cowboy Cooking	Conjunto Los Angeles del Sur	Saturday Night and Sunday Morning
12:00	James Hand			
		West Texas Barbecue	Charles Thibodeaux and the Austin Cajun Aces	From Soil to Sommelier
1:00	The Original Soul Invaders			
		El Paso Mexican Cooking	Tutu Jones and the Soul Crew	Texas Music in Translation
2:00	Conjunto Los Angeles del Sur			
		Czech Texan Cooking	The Quebe Sisters Band	Living off the Land
3:00	Tutu Jones and the Soul Crew			
		West Texas Barbecue	Guy Clark	Wine-making Tradition and Innovation
4:00	Charles Thibodeaux and the Austin Cajun Aces			
		Home Canning	Mark Halata and Texavia	Texas Kinds of Country
5:00	Mariachi Los Arrieros			

NASA Kids' Space

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Bhutan Kids' Activities

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EVENING CONCERTS

Texas



6:00 PM

Dancehall
Lone Star Dance Party
Guy Clark
Marcia Ball

Ongoing Texas Activities

In the Texas Wine Making tent, representatives from nine of Texas's most famous wineries will demonstrate the science of wine production, from vine to bottle. Visitors will go on a virtual tour of a vineyard and a winery to learn about the grape harvest, grape crushing, fermentation, wine aging, and bottling. They will be invited to smell ingredients that give wines their flavor and aroma, and young visitors will be able to participate in a daily grape stomp.

♣ indicates American Sign Language-interpreted program. Programs are subject to change.

Sunday July 6

BHUTAN



NASA



	Bhutan Kitchen	Four Friends Narrative Stage	Tsechu Stage	Exploration Stage	Food Lab	Galaxy Stage
11:00	Dragon Drinks: Tea and Alcohol	The Four Friends Story	Traditional Bhutanese Music and Dance	NASA Pioneers	Packaging Food for Space	Mysterious Universe
12:00	Cartle God's Gifts: Butter and Cheese	Eco-Tourism	Ritual Monastic Dance	What on Earth?	Planning for the Moon and Mars	High Flight
1:00	Taste of Bhutan	Buddhism in Bhutan	Traditional Bhutanese Music and Dance	Astronaut Adventures	Creating Menus for Space	Rocket Scientists
2:00		TV in Bhutan		Probing the Planets		NASA Art
3:00		Art and Architecture	Traditional Bhutanese Music and Dance	NASA and Nation	Packaging Food for Space	Moon Bound
3:00	Buckwheat Noodles	Life of Monks and Nuns	Ritual Monastic Dance	Space Shuttle	Planning for the Moon and Mars	NASA and Popular Imagination
4:00	Festive Foods	Bhutan in the United States	Traditional Bhutanese Music and Dance	Astronaut Adventures	Creating Menus for Space	International Space Station
5:00		Storytelling	Closing Ritual	Mysterious Universe		Probing the Planets

Ongoing Bhutan Activities

In addition to the daily scheduled discussions and performances, there are ongoing demonstrations of Bhutan's cultural and ritual traditions throughout the Festival site. Visitors are invited to meet Bhutanese participants to learn more about the kingdom's rich heritage and diverse environment through *zorig chusum* (thirteen traditional arts), monastic arts, foodways, traditional medicine, Bhutan's national sport of archery, and other recreational activities.

Ongoing NASA Activities

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TEXAS



	Dancehall	Lone Star Kitchen	Opry House	Texas Talk
11:00			Charles Thibodeaux and the Austin Cajun Aces	
12:00	Mark Halata and Texavia	El Paso Mexican Cooking		Sacred Songs
			Conjunto Los Angeles del Sur	
1:00	The Original Soul Invaders	Texas Cajun Cooking		Chili Cook-offs and Show-offs
			Tutu Jones and the Soul Crew	
2:00	James Hand	Home Canning		Lone Stars and Squeezeboxes
			The Quebe Sisters Band	
3:00	Marcia Ball	Cowboy Cooking		Talking Terroir
			Mariachi Los Arrieros	
4:00	Tutu Jones and the Soul Crew	West Texas Barbecue		Texas Czech Celebrations
			James Hand	
5:00	Marcia Ball	Czech Texan Cooking		Fiddles, Fiddles, Fiddles

NASA Kids' Space

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Ongoing Texas Activities

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♣ indicates American Sign Language-interpreted program. Programs are subject to change.

General Festival Information

FESTIVAL HOURS

The Opening Ceremony of the Festival will take place on the Texas Dancehall at 11:00 a.m., Wednesday, June 25. Thereafter, Festival hours will be 11 a.m. to 5:30 p.m., with special evening events. See the daily schedules on pages 106–125 for details.

FESTIVAL SALES

Visitors may purchase program-related lunches, snacks, and dinners from Festival food concessions. Food is also available inside the museums and at GSI kiosks on the Mall. A variety of objects produced by Festival artisans and a selection of relevant books and recordings are available at the Festival Marketplace, which is next to the Freer Gallery of Art. Smithsonian Folkways recordings are available there and through www.folkways.si.edu.

PRESS

Visiting members of the press should register at the Press tent located near the Smithsonian Metro station on the Mall at Jefferson Drive and 12th Street.

FIRST AID

A first aid station is located near the Smithsonian Metro stop on the Mall at Jefferson Drive and 12th Street.

RESTROOMS AND TELEPHONES

There are outdoor facilities for members of the public, including visitors with disabilities, located near each of the program areas on the Mall. Additional restroom facilities are available in the museum buildings during

visiting hours. Public telephones are available on-site—opposite and inside the American History and Natural History museums.

LOST AND FOUND/LOST PEOPLE

Lost items or family members should be brought to or picked up from the Volunteer tent located near the Smithsonian Metro stop on the Mall at Jefferson Drive and 12th Street.

METRO STATIONS

Metro trains will run every day of the Festival. The Festival site is easily accessible from the Smithsonian and Federal Triangle stations on the Blue and Orange lines.

SERVICES FOR VISITORS WITH DISABILITIES

Large-print and CD versions of the daily schedule and a CD version of the program book are available at the Festival Information kiosks and the Volunteer tent. The program book is available in other formats upon request. A limited number of wheelchairs are available for loan at the Volunteer tent. Audio loops are installed at the music stages. Service animals are welcome. American Sign Language interpreters are available on-site and can be requested at the Volunteer tent; the Festival schedule indicates which performances and presentations are interpreted. The Smithsonian will offer a verbal description and tactile tour of the Festival on Thursday, June 26, at 11:00 a.m. for visitors who are blind or have low vision; contact access@si.edu

for reservations. Other modes of interpretation may be provided if a request is made two weeks in advance by calling 202.633.4353 (TTY) or 202.633.2921 (voice), or by contacting access@si.edu.

THUNDERSTORMS

In case of a severe rainstorm, visitors should go inside a museum during visiting hours. Summer rainstorms are usually brief, and often the Festival resumes operations within an hour or two. In the event of a thunderstorm, the Festival must close. Do not remain under a tent or a tree!

ESPECIALLY FOR CHILDREN AND FAMILIES

Because many of the activities in the Bhutan program will take place for the first time ever in the United States, the 2008 Festival will offer families an especially rare opportunity to learn about one of the world's least known countries. Young visitors will be able to join Bhutanese participants in traditional dances, the thirteen traditional arts (*zorig chusum*), and festive games. In the NASA program's Kids' Space, young people will have the chance to interact directly with Festival participants through a variety of hands-on activities and learn more about NASA through the *Mission Guide* booklet.

Related Events

BHUTAN

Lecture on Bhutanese Traditions: Kunzang Choden

Meyer Auditorium,
The Freer Gallery of Art
June 25, 7 p.m.

A leading authority on Bhutanese culture shares her personal experiences from growing up in the Himalayas. Kunzang Choden's books include *Folktales of Bhutan* and *Bhutan Tales of the Yeti*. Her 2005 novel *Circle of Karma* follows a feisty young girl who leaves her family and travels far from home, much as the author did on horseback at age twelve. Kunzang Choden reads from her books and offers insights into Bhutanese life and society, including its unusual matriarchal system.

Bhutanese Music and Masked Dances Lecture-Demonstrations

Arthur M. Sackler Gallery Pavilion
Music from Bhutan
June 27, June 28, July 3,
and July 6, 12 p.m.

Join Bhutanese singers and instrumentalists to learn about music from the Land of the Thunder Dragon. Discover how traditional music plays a role in daily life in Bhutan.

Masked Dances of Bhutan
June 27, June 28, July 3,
and July 6, 3 p.m.

Learn more about the symbolic elements of Bhutanese masked dances, expressed by the dancers, their costumes, and their instruments. This is a rare opportunity for close-up interactions with monks and other traditional dancers from the remote Himalayan mountain kingdom.

Recent Films from Bhutan

Meyer Auditorium,
The Freer Gallery of Art
Travellers and Magicians
June 26, 2 p.m. and July 2, 7 p.m.

This is a cinematic fable by Khyentse Norbu, Bhutan's most famous director and one of Himalayan Buddhism's most revered lamas. "To watch this movie," wrote Desson Thomson in the *Washington Post*, "is to be moved not only by an affecting, warmly spirited yarn, but also by the wisdom that seems to waft to us directly from those snow-capped peaks." 2003. 108 min. in Dzongkha with English subtitles. Special guests: Tshewang Dendup, the film's star, and Sonam Dorji, performer on the film's soundtrack
July 2 and July 3

Recent Bhutanese films will be screened throughout the afternoon.

Smithsonian Associates All-Day Seminar

S. Dillon Ripley Center
*Bhutan—Exploring the Last
Himalayan Kingdom*
July 12, 10 a.m.—4:30 p.m.

Largely isolated from the outside world until three decades ago, the spectacularly beautiful Kingdom of Bhutan is tucked in the massive mountains and subtropical forests between China and India. This tiny Buddhist nation is striving to retain the best of its traditional values amidst rapidly changing internal and external

environments. Television and the Internet only became available there in 1999, and in March of this year, Bhutan held its first democratic popular election for parliament. In this illustrated seminar, officials and experts from Bhutan introduce travelers to their fascinating country. For more information, visit www.residentassociates.org.

The Dragon's Gift: The Sacred Arts of Bhutan

Rubin Museum of Art,
New York City
September 19, 2008–January 5, 2009

In an historic gesture, the Royal Government of Bhutan is releasing the masterpieces of its kingdom for exhibition in *The Dragon's Gift: The Sacred Arts of Bhutan*. Organized by the Honolulu Academy of Arts, *The Dragon's Gift* is a groundbreaking display of national treasures, highlighting the religious arts of Bhutan and exploring the historical, philosophical, spiritual, and artistic perspectives of its culture. For more information, visit www.rmanyc.org.

Kennedy Center Millennium Stage

Participants in the Bhutan program will perform on the Kennedy Center Millennium Stage on Saturday, July 5, from 6 to 7 p.m. For more information, visit www.kennedy-center.org/programs/millennium.

NASA

Films at Baird Auditorium, National Museum of Natural History

The National Museum of Natural History will present the following feature-length films, from 5 to 7:30 p.m.

Friday, June 27

In the Shadow of the Moon

Saturday, June 28

Apollo 13

Sunday, June 29

2001: A Space Odyssey

Exhibitions at the National Air and Space Museum

The National Air and Space Museum has several exhibitions on display that relate to the NASA program. *Space: A Journey to Our Future* highlights current projects in space exploration and some possibilities for future human space travel. *NASA Art: Fifty Years of Exploration* presents works of art that capture the wonder of NASA's endeavors. *How Things Fly* teaches the principles of flight. Visit www.nasm.si.edu/exhibitions for more information about these and other exhibitions on aeronautics and space.

Space Symphony Orchestra

National Museum of the
American Indian

Wednesday, June 25, 6 p.m.

The Space Symphony Orchestra under Emil de Cou will perform a free concert of space-related music while projections of NASA images enliven the Potomac atrium of the National Museum of the American Indian.

TEXAS

Kennedy Center Millennium Stage

Participants in the Texas program will perform on the Kennedy Center Millennium Stage on the following evenings, from 6 to 7 p.m. For more information, visit www.kennedy-center.org/programs/millennium.

Wednesday, June 25

Jody Nix and the Texas Cowboys

Sunday, June 29

Los Texmaniacs

Wednesday, July 2

The Quebe Sisters Band

Thursday, July 3

Tutu Jones and the Soul Crew

Friday, July 4

Mark Halata and Texavia

Sunday, July 6

James Hand



Smithsonian Folkways

NEW RELEASES

MICHAEL DOUCET *From Now On*

SFW-CD-40177

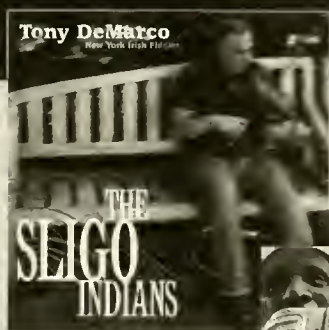
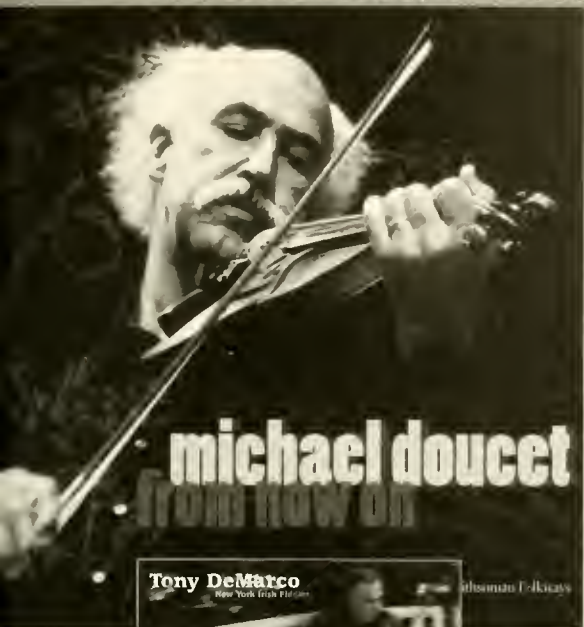
From Now On is a Cojune tour de force of distilled Michael Doucet, the much-admired leader of the GRAMMY-winning group BeauSoleil. Nineteen tracks of wide-ranging repertoire and pared-down instrumentation of solo fiddle, fiddle-plus-one, and solo accordion showcase Doucet's stylistic mastery, eclectic musical grounding, and creative spirit.

Classic Piano Blues from
Smithsonian Folkways

SFW-CD-40196

Born of ragtime and hard times, the piano blues migrated with its players from the deep South to the urban North. *Classic Piano Blues* revisits rousing boogie-woogie and blues legends Memphis Slim, Willie Dixon, Champion Jack Dupree, Speckled Red, Meade "Lux" Lewis, Lead Belly, Little Brother Montgomery, Roosevelt Sykes, James P. Johnson, and more, in twenty tracks drawn from the well of the Folkways Collections.





NEW RELEASES

TONY DEMARCO *The Sligo Indians*

SFW-CD-40545

The Sligo Indians is a long-awaited solo debut for one of America's finest folk fiddlers. A Brooklyn native of mixed Irish and Italian descent, New Yorker Tony DeMarco is a master of the intricate ornamentation, swinging rhythm, and adventurous melodic improvisation that mark the famed County Sligo fiddle style. Mentored by the late Sligo master fiddler Paddy Reynolds, Tony has for decades been a pillar of the Irish session scene in New York City.

¡Ayombe! *The Heart of Colombia's Música Vallenata*

SFW-CD-40546

Since the late twentieth century, the music of the Vallenotos—people of a small valley region of the Caribbean coast—“has best portrayed the true way of being and feeling of the Colombian people.” ¡Ayombe! *The Heart of Colombia's Música Vallenata* features two dozen seasoned vallenata performers from three generations, playing polished renditions of the music they know best—paseos, merengues, sones, and puyas of their homeland.

NATI CANO'S MARIACHI LOS CAMPEROS

Musica Ranchera: Amor, Dolor y Lágrimas

SFW-CD-40518

Amor, Dolor y Lágrimas (Love, Pain, and Tears) flow from the heart of the Mexican mariachi when it plays *música ranchera*, Mexico's soulful “country music.” Riding the wave of mass media beginning in the 1930s, *música ranchera* became the single most popular vein of Mexican music by the 1950s. GRAMMY-winning Mariachi Los Camperos de Nati Cano breathes new life into classic, soul-boring *rancheros* and *boleros* in this back-to-the-future recording.

TONY TRISCHKA *Territory*

SFW-CD-40169

With fearless musical curiosity as the guiding force, Tony Trischka's *Territory* roams widely through the banjo's creative terrain. Twelve all-Trischka solo tracks explore a panorama of tunings, banjo sounds, and traditions. Nine selections partner Tony with fellow banjoists Pete Seeger, Mike Seeger, Bill Evans, Bill Keith, Bruce Malsky, and other guest artists to tap the creative potential of America's signature musical instrument.

CDs and Digital Downloads Available at www.folkways.si.edu

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The 2008 Smithsonian Folklife Festival



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NASA

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- MOONBUGGY LUNARSCAPE
- FUTURE MISSIONS
- J-2 ENGINE
- PROPULSION
- LUNAR OUTPOST
- CREW EXPLORATION VEHICLE
- SPACE SHUTTLE MAIN ENGINE
- SPACE SHUTTLE
- HUMAN SPACEFLIGHT
- F-18
- SPACE SHUTTLE
- INTERNATIONAL SPACE STATION
- LAUNCH & MISSION CONTROL
- AERONAUTICS



BHUTAN



TSECHU STAGE

FOOD & DRINK

BHUTANESE TRADITIONS & FAMILY ACTIVITIES

INFO

- BEVERAGES
- GALAXY STAGE
- SPACE ART
- KIDS' SPACE
- ARABBERS
- BEVERAGES
- SPACE SCIENCE
- NASA-DERIVED TECHNOLOGIES
- SPACE SCIENCE
- ROBOTICS
- GRACAT OBSERVATORIES
- EARTH SCIENCE
- ORAL HISTORIES
- FOOD LAB

- BHUTANESE GATE
- SLATE & BAMBOO WORKS
- WOOD CARVING
- PEOPLE & ENVIRONMENT
- ARCHITECTURE
- BHUTANESE GATE
- ARABBERS
- BEVERAGES
- EMBROIDERY & BOOT MAKING
- TRADITIONAL BHUTANESE MEDICINE
- WEAVING
- TEXTILES
- PAINTING & CALLEGRAPHY
- BLACKSMITH & SILVERSMITH
- POTTERY & WOOD TURNING
- FOODWAYS
- FOUR FRIENDS NARRATIVE STAGE



- First Aid
- Accessible
- Information
- Audio Loop
- Food Concession
- Volunteers
- Metro
- Press
- Toilets
- Lost and Found



Jefferson Drive SW



12th Street



↑ TO THE FEDERAL TRIANGLE METRO



NATIONAL MUSEUM OF NATURAL HISTORY



TO THE U.S. CAPITOL →

TEXAS



INFO



MONASTIC ARTS



INCENSE MAKING & CLAY SCULPTURE



TEMPLE



DANCEHALL



FOOD & DRINK



FOOD & DRINK



INFO



OPRY HOUSE



TEXAS ROADHOUSE

FOOD & DRINK

FESTIVAL HISTORY



TEXAS TALK



LONESTAR KITCHEN



ARABBERS



BEVERAGES



TO THE NATIONAL AIR & SPACE MUSEUM →



TEXAS WINE MAKING



MARKETPLACE



SMITHSONIAN CASTLE



FREER GALLERY



SACKLER GALLERY



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—*New York Times*

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a current schedule and to relive
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the project. We hope these efforts will spark the
creation of new music and promote appreciation
of cultural diversity around the world.

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Smithsonian Folkways

