

# **GEOFORCE** T E X A S JACKSON SCHOOL OF GEOSCIENCES

## ANNUAL REPORT 2007



THE UNIVERSITY OF TEXAS AT AUSTIN

# JACKSON

SCHOOL OF GEOSCIENCES



**Cover photo:**  
*The GeoFORCE Texas  
11th Grade Academy  
gathers on Mount Hood,  
Oregon, during Pacific  
Northwest field trip.*



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## MESSAGE FROM THE DEAN

For many years, we have been hearing about the dramatic and usually negative implications of the inevitable retirements of the baby boomers. Our nation's response to these forecasted problems has been to discuss them at length, worry about them a great deal, and make a plan to make a plan. We now find ourselves faced with substantial issues, from Medicare funding to workforce demographics, that require long-term solutions, and time is not on our side.

Since 1980, the number of workers over age 40 has increased significantly. In 1996, the baby-boomer generation of approximately 78 million Americans began turning 50 at a rate of 300,000 per month. By 2010, more than 51 percent of the workforce is expected to be 40 or older, a 33 percent increase since 1980, while the portion of the workforce aged 25 to 39 will decline 5.7 percent.<sup>1</sup>

New U.S. Census Bureau estimates for 2005 show that 98 million people in the United States—about 33 percent of the total U.S. population of 296.4 million—are part of a racial or ethnic minority group. In addition, 45 percent of children under age 5 are minorities. Obviously, the engagement of minorities is essential to the viability of our future workforce.

GeoFORCE Texas is designed specifically to address the need to increase the number of students who will enter the workforce with the necessary technical skills to succeed in a global economy. Additionally, by recruiting students from regions that have predominately minority populations, GeoFORCE will be augmenting the workforce with minority graduates who historically have not tracked into the geosciences. GeoFORCE attempts to attract top-quality students in large numbers in an effort to meet the overwhelming scientific and technological requirements of the future.

The numbers are important, but GeoFORCE is a program all about kids: Kids with whom we interact starting in the eighth grade when they are just 13 years old. Kids who



Aditya Kar (Fort Valley State University), Stanley Stackhouse, JSG Class of 2007, and Eric Barron (Jackson School of Geosciences).

*The generation of scientists and engineers who were motivated to go into science by the threat of Sputnik in 1957 and the inspiration of JFK are reaching their retirement years and are not being replaced in the numbers that they must be if an advanced economy like that of the United States is to remain at the head of the pack.*

—Thomas L. Friedman, *The World Is Flat*

have exhibited strong academic work ethics and skills, as well as commitments to being good citizens. And kids, many of who are from economically challenged households, for whom college is a distant dream.

Addressing workforce issues with 13-year-olds is a long-term project, but it is proving to be effective through our outreach programs. As GeoFORCE enters its fourth year of operation, we have had only 3 students choose to leave the Academy program out of a total of 120 students. And this last May, Stanley Stackhouse, who nine years ago as an eighth grader started in our partner program with the visionary Dr. Isaac J. Crumbly at Fort Valley State University, graduated with a bachelor of science degree in geology from the Jackson School of Geosciences and will enter graduate school with us this fall. These things take time, but they are well worth our effort.

I want to thank everyone involved in this exciting program for making it the rewarding experience it has become.

Eric Barron  
Dean

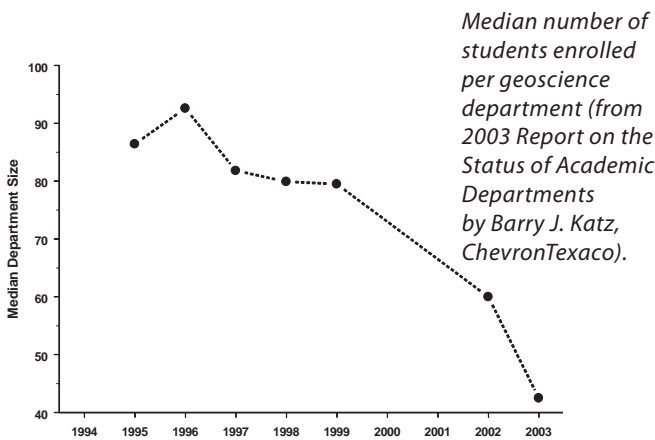
<sup>1</sup>Ellen Mosner and Craig Spiegle, *The Convergence of the Aging Workforce and Accessible Technology* (Microsoft Corporation, July 2003).

# GeoFORCE PROGRAM

GeoFORCE Texas is designed to address two pressing needs:

- ✦ Increase the number of students pursuing degrees in math and science
- ✦ Increase the diversity of the future high-tech workforce

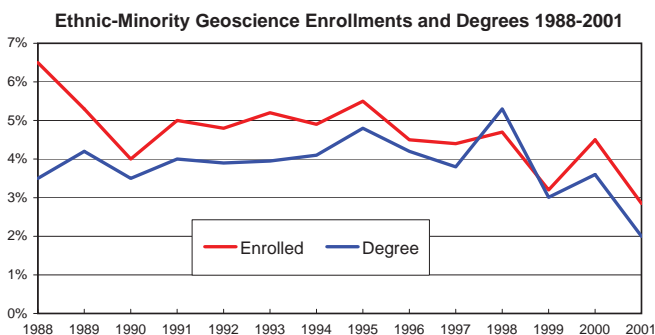
The program involves students from two main areas through partnerships with other colleges. Although the program is open to all outstanding students, regardless of background, the recruiting areas exhibit a high percentage of minorities, and our academies reflect these demographics.



Since the late 1990s, the number of students enrolled in the geosciences has been rapidly decreasing. GeoFORCE seeks to reverse this trend by increasing the number of students from diverse backgrounds who complete degrees in math and science and enter the workforce.

## Goals and Objectives

Minorities and women represent a virtually untapped reservoir for increasing the number of



Source: 2001 American Geological Institute Report on the Status of Geosciences Academic Departments, figure 4, page 3.

individuals pursuing degrees in the geosciences. According to National Science Foundation (NSF) statistics, participation by minorities in science and engineering in general, but specifically in the geosciences, is unacceptably low. NSF statistics indicate that underrepresented groups earn almost 15 percent of all U.S. bachelor's degrees in science and engineering but only 4.6 percent of the degrees awarded in the geosciences.

## Methods and Strategies

GeoFORCE draws on a wealth of resources that are utilized to develop a comprehensive program of hands-on learning for our students and participants. Components of the Jackson School of Geosciences (JSG) play a major role in carrying out the program. Financial assistance is received from the Geology Foundation that supports all full-time staff required, thus allowing all contributed funds to be directly applied to the student and teacher activities. The Jackson School's Bureau of Economic Geology supplies instructors and assists in the writing and printing of the guidebooks. Additionally, the School's Institute for Geophysics and Department of Geological Sciences contribute instructors and counselors to many of the summer activities.

Through partnerships with Fort Valley State University (FVSU) and Southwest Texas Junior College (SWTJC), GeoFORCE has access to existing outreach programs and the opportunity to attract high-caliber students into the program. These partnerships were essential in the initial creation of GeoFORCE, and they remain crucial to its continued success.

GeoFORCE is neither a subtle nor an inexpensive approach. It is designed to provide lasting experiences for middle and high school students that will capture their interest, motivate them to achieve excellence in math and science courses, and build their awareness of opportunities in high-tech careers, especially the geosciences. This intense program is accomplished through a four-year series of summer academies and field courses that include learning in a dynamic classroom environment, living on a major university campus, and participating in field trips to spectacular geologic settings in Texas and across our nation.

## GeoFORCE STAFF

The Jackson School provides support for GeoFORCE that includes funding as well as personnel. Members of the Dean's Office staff assist with accounting, contracting, purchasing, communications, and human resources.

Doug Ratcliff, director of outreach, supervises the GeoFORCE program. He is assisted by two coordinators, Julie Spink and Cristina Rodriguez, who have primary responsibility for organizing and

conducting the many activities associated with the program. Julie Jackson, professor of science education at Texas State University, assists in development of program content, testing materials, and evaluation. Jessica Gordon, graduate student in the College of Education, also assists with program content and development. Liliana Martinez, undergraduate assistant, helps with program logistics and organization.



*Julie Spink*



*Cristina Rodriguez*



*Julie Jackson*



*Jessica Gordon*



*Liliana Martinez*

Many, many others in the School assist with GeoFORCE, and they are mentioned in other sections of this report. Of special note, Sigrid Clift (Bureau of Economic Geology) and Jay Raney (consultant) have helped extensively

with designing and participating in field activities, as well as writing guidebooks. Guidebook preparation has been the job of Susie Doenges, Joel Lardon, Jamie Coggin, David Stephens, and Lana Dieterich.



*Jay Raney*



*Sigrid Clift*



*Susan Doenges*



*Jamie Coggin*



*Joel Lardon*



*David Stephens*



*Lana Dieterich*



## PARTNERSHIPS

The success of GeoFORCE depends on bringing together academic, government, and industry partners who have institutional and personal commitments to improving the lives of the next generation. The financial support provided by our partners allows the students to experience spectacular geologic venues that are important to increasing and maintaining their attraction to science and math. The personal commitments of individuals from our partners create one-on-one learning experiences, provide an opportunity to discuss careers with professionals, and make GeoFORCE the special experience that it is.

### Fort Valley State University

Fort Valley State University (FVSU) has played a significant role in the development of GeoFORCE starting on day one. Our program is styled after FVSU's successful Mathematics, Science and Engineering Academy (MSEA), which has been in operation since 1993. In addition to incorporating several aspects of the MSEA program, GeoFORCE interacts with FVSU by hosting and funding their MSEA 11th graders and providing scholarships for FVSU students who choose to transfer to the Jackson School and pursue degrees in the geosciences. This year, the first two FVSU transfer students successfully completed their coursework and graduated from the Jackson School. April Duerson received a bachelor of science degree in hydrogeology/environmental geology, and Stanley Stackhouse received a bachelor of science degree in general geology. April has now taken employment with a private firm, and Stanley will enter the Jackson School as a graduate student in the fall.

The Jackson School supports the FVSU programs in a variety of ways, including providing scholarships to transfer students, providing travel assistance to



April Duerson, Cristina Rodriguez (JSG coordinator), Stanley Stackhouse, and Aditya Kar (Professor, FVSU) at May 2007 graduation ceremonies.



Randy Orndorff instructing at Harpers Ferry.

*This is the second time I have participated, and I am extremely impressed with the quality of students and their passion for science. They were quite attentive during my presentations and had excellent questions and comments. These students are definitely part of the future of the sciences, and programs like this will keep their interest. I am happy and proud that the USGS supports these programs.*

—Randy Orndorff, Associate Program Coordinator, U.S. Geological Survey (USGS)

potential transfer students, funding the 11th Grade MSEA program, and providing instructional and logistical support to the activities. ConocoPhillips has provided substantial funding for this partnership.

### Southwest Texas Junior College

Southwest Texas Junior College (SWTJC) is the portal that connects the Jackson School with 18 independent school districts in southwest Texas. Their established network of schools, principals, and teachers has allowed GeoFORCE to efficiently disseminate information, conduct the application process, and establish the program across a large geographic area.

In addition to providing the school network, SWTJC is an active participant in all aspects of the GeoFORCE program. JSG supports a full-time coordinator at SWTJC who is responsible for providing local logistical support, making initial contacts with teachers and students, identifying counselors, and maintaining financial and contractual records for local purchases. SWTJC personnel (Blaine Bennett, Nita Reed, Willie Edwards, Wade Carpenter, and others) assist in setting up for GeoFORCE events, arrange transportation for students in Eagle Pass and Del Rio, and prepare news articles for publication in local newspapers.



Andrea Flores  
SWTJC Coordinator

JSG financial contributions to FVSU programs from 2004 through 2007.

<b>Contributions to FVSU</b>	<b>2003-04</b>	<b>2004-05</b>	<b>2005-06</b>	<b>2006-07</b>	<b>Total</b>
MSEA 11th Grade	35,000	39,300	40,694	35,000	149,994
FVSU Student Visits	0	0	4,700	8,700	13,400
FVSU Transfer Scholarships	0	0	51,216	62,791	114,007
<b>Total</b>	<b>35,000</b>	<b>39,300</b>	<b>96,610</b>	<b>106,491</b>	<b>277,401</b>
<b>Sources of Funding</b>					
ConocoPhillips thru JSG	0	20,000	41,000	21,000	82,000
Out-of-State Tuition Waivers from UT	0	0	18,816	24,313	43,129
Direct from JSG	35,000	19,300	36,794	61,178	152,272
<b>Total</b>	<b>35,000</b>	<b>39,300</b>	<b>96,610</b>	<b>106,491</b>	<b>277,401</b>

Current network of southwest Texas schools participating in GeoFORCE.

<b>School District</b>	<b>High Schools</b>	<b>Middle Schools</b>
Brackett	Brackett High School	Brackett Junior High School
Carrizo Springs	Carrizo Springs High School	Carrizo Springs Junior High School
Cotulla	Cotulla High School	Frank Newman Middle School
Crystal City	Crystal City High School	Sterling Fly Junior High School
D'Hanis	D'Hanis School	D'Hanis School
Dilley	Dilley High School	Mary Harper Middle School
Eagle Pass	Eagle Pass High School CC Winn High School	Eagle Pass Junior High School Memorial Junior High School
Hondo	Hondo High School	McDowell Middle School
Knippa	Knippa School	Knippa School
La Pryor	La Pryor School	La Pryor School
Leakey	Leakey School	Leakey School
Nueces Canyon	Nueces Canyon High School	Nueces Canyon Junior High School
Pearsall	Pearsall High School	Pearsall Junior High School
Rocksprings	Rocksprings High School	Rocksprings High School
Sabinal	Sabinal High School	Sabinal Junior High School
San Felipe Del Rio	Del Rio High School	Del Rio Middle School San Felipe Memorial Middle School
Utopia	Utopia School	Utopia School
Uvalde	Uvalde High School	Uvalde Junior High School

JSG support to date to SWTJC for local costs and salary for the coordinator.

<b>Event</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>Total</b>
Coordinator and Logistical Support	25,000	25,000	35,000	85,000

## Government and Industry

Our government and industry partners provide funding, access to sites, instructors, and insight into what it is like to work as a geoscientist. The Jackson School provides funding for the full-time staff required to run the program so that all financial contributions can be applied directly to student activities. These activities have grown each year, so the cost of the

program has increased and will continue to climb as more students are added. The following table shows the contributions and expenses to date. This table has been revised from data from previous years, and it now includes the costs of staff contributed by JSG.

GeoFORCE students benefit from interactions with many corporate and government participants who take time from their busy schedules to personally

GeoFORCE Income and Expenses				
	2004-05	2005-06	2006-07	Total
<b>Sources</b>				
Alcoa			5,000	5,000
AT&T Foundation	25,000	15,000		40,000
BP			50,000	50,000
Chevron			40,000	40,000
ConocoPhillips	20,000	41,000	21,000	82,000
Dominion Exploration		10,000	5,000	15,000
ExxonMobil	10,000	25,000	40,000	75,000
ExxonMobil - Houston			10,000	10,000
Halliburton		10,000	20,000	30,000
Jackson School	141,722	260,052	358,051	759,825
UT Tuition Waivers		18,816	24,313	43,129
Marathon Oil Company		3,000	50,000	53,000
Minerals Management Service		25,000	25,000	50,000
Priority Oil & Gas LLC	2,000			2,000
Schlumberger		3,000	3,000	6,000
Shell Oil Company	60,000	60,000	40,000	160,000
Swift Energy		10,000	12,000	22,000
Vulcan Materials Foundation			15,000	15,000
<b>Subtotal</b>	<b>258,722</b>	<b>480,868</b>	<b>718,364</b>	<b>1,457,954</b>
<b>Expense Activity</b>				
JSG Staff and Admin	106,722	120,052	241,666	468,440
Teacher Workshops	6,000	6,500	6,500	19,000
MSEA 11th grade	39,300	40,694	35,000	114,994
FVSU Student Visits	0	4,700	8,700	13,400
FVSU transfer scholarships	0	51,216	62,791	114,007
GeoFORCE SW Texas	85,000	150,000	300,000	535,000
GeoFORCE Houston	0	0	10,000	10,000
Textbooks	0	85,000	59,000	144,000
<b>Total Expenses</b>	<b>237,022</b>	<b>458,162</b>	<b>723,657</b>	<b>1,418,841</b>
<b>Surplus/Shortfall</b>	<b>21,700</b>	<b>22,706</b>	<b>-5,293</b>	<b>39,113</b>



FVSU and GeoFORCE at USGS Headquarters.



*I am most pleased with the fact that USGS has been able to get both the Fort Valley and UT Austin programs here at the same time. The synergy between the two groups is incredible. These 80–90 kids get to mingle and network with scientists and receive positive reinforcement from others who have a passion about science and math. The network and the support system for these talented students widens and leaves the negativity that many of them face far behind.*

—Steve Hammond, Acting Chief, Science Information and Education Office, USGS

meet with them. The U.S. Geological Survey (USGS) puts on a half-day seminar and exhibition for the students that provides a smorgasbord view of the variety of career opportunities available to scientists. Steve Hammond, USGS, first conceived of bringing the students to USGS headquarters in Reston, Virginia, and through the support of Deputy Director Bob Doyle and the incredible efforts of Ivette Torres and Katrina Burke, the USGS seminar and exhibition has

been a resounding success for the third year in a row. For the past two years, we have combined the FVSU MSEA 9th graders with the GeoFORCE 9th graders at the USGS event, creating an avenue for substantial interaction between the two sets of students.

The field events would not be possible without the efforts and energy of the instructors. The following individuals provided professional instruction and outstanding interactions with the students in the field.

List of the many individuals at the USGS who contributed to the USGS Seminar and Exhibition.

USGS Seminar and Exhibition	
Robert Doyle	Deputy Director
Ivette Torres	Coordinator
Katrina Burke	Eastern Region NSDI
Tony Meunier	Cartographer
Kimm Gresset	Human Resources
Irma Mabry	Human Resources
Roger Barlow	Chesapeake Bay
Maria Acevedo	NASA - Goddard Space Flight
Jon Kolak	Energy Resources Program
Meliany Quintana-Velázquez	Geology Exhibit, GIS and the Mining Industry
Claudia Angle	Patuxent Wildlife Research
Adonnis Goldstein	Live Frogs Exhibit
Robert Weems	Dinosaur Footprints Exhibit
Donna Foulke	Energy Resources Program
Yolanda Fong Sam	Geology Exhibit, GIS and the Mining Industry



GeoFORCE students at USGS exhibits.

Field Instructors		
Dominic Druke	Shell Oil Company	9th Grade GeoFORCE Academy
Randy Orndorff	U.S. Geological Survey	
Sigrd Clift	Bureau of Economic Geology	
Christie Rogers	ExxonMobil	10th Grade GeoFORCE Academy
Danielle Carpenter	Chevron	
Ramon Trevino	Bureau of Economic Geology	
Anna Morisani	Shell Oil Company	11th Grade GeoFORCE Academy
Jeff Paine	Bureau of Economic Geology	
Orlando Ortega	Shell Oil Company	
Scott Rodgers	Bureau of Economic Geology	9th Grade Young Geoscientists
Sigrd Clift	Bureau of Economic Geology	
Tiffany Hepner	Bureau of Economic Geology	
Cristopher Marshall	The Colony High School	10th Grade Young Geoscientists
Richard Kilby	Shell Oil Company	
Sue Hovorka	Bureau of Economic Geology	
Ann Molineux	Texas Memorial Museum	11th Grade Young Geoscientists
Jay Banner	Dept. of Geological Sciences	
Ramon Trevino	Bureau of Economic Geology	
Pamela Owens	Texas Memorial Museum	11th Grade MSEA
Leon Long	Dept. of Geological Sciences	



*Dominic Druke*  
Shell Oil Company

*Randy Orndorff*  
U.S. Geological Survey

*Sigrd Clift*  
Bureau of Economic Geology

*Christie Rogers*  
ExxonMobil



*Danielle Carpenter*  
Chevron

*Ramon Trevino*  
Bureau of Economic Geology

*Anna Morisani*  
Shell Oil Company

*Jeff Paine*  
Bureau of Economic Geology



*Orlando Ortega*  
Shell Oil Company

*Scott Rodgers*  
Bureau of Economic Geology

*Tiffany Hepner*  
Bureau of Economic Geology

*Cristopher Marshall*  
The Colony High School

*Richard Kilby*  
Shell Oil Company



*Sue Hovorka*  
Bureau of Economic Geology

*Ann Molineux*  
Texas Memorial Museum

*Jay Banner*  
Department of Geological Sciences

*Leon Long*  
Department of Geological Sciences

GeoFORCE is a field-oriented program, and the number of individuals who contribute to the field experiences is impressive. The table on page 10 is our attempt to recognize those who participated in 2007. We are grateful to them, as well as to all others who contributed to the program but are not listed here.



We also had great participation from our industry sponsors for the two teacher workshops

that were held during the year. Swift Energy Company provided a new learning experience for our southwest Texas educator network by hosting 22 math and science educators at their Three Rivers site. The teachers were treated to a demonstration of how a subsurface reservoir is fractured by forcing sand down the drill bore under high pressure. The purpose of the demonstration was to show how geology, math, physics, and chemistry are all utilized in the day-to-day operation of a gas field.

GeoFORCE continually provides information on opportunities for careers in high-tech fields. Presentations made by professionals are critical to delivering this message (see page 11 for list of individuals who made formal career presentations to our students during 2007).

Representatives of the University's diversity office provided presenters to speak to the students on opportunities and challenges for minorities who attend the University of Texas (UT). These UT students, Pedro Roldan, Julian Ruiz, Stephanie Loreda, and Diana Pena, spoke from experience, giving their personal views of life for minorities at a major public institution.

*Math and science teachers from the GeoFORCE network, along with representatives of Swift Energy Company and Weatherford International, gather at the Three Rivers fracture demonstration.*

National Park Service Rangers, Museum Staff, and Others in the Field		
Preston Huffington	Barton Springs Aquatic	9th Grade GeoFORCE Academy
Robert Hansen	Great Falls Park Ranger	
Walter McDowney	Great Falls Site Manager	
Michael Sacks	Great Falls VUA Supervisor	
Catherine Bragaw	Harpers Ferry Education Specialist	
Roxanne Ruppenthal	Harpers Ferry Fee Supervisor	
Stan McGee	Harpers Ferry Park Ranger	
Jeff Bowers	Harpers Ferry Park Ranger	
Richard Erthim	Smithsonian Learning Center	
Mimi Westervelt	Smithsonian Learning Center	
Nanette Meo	Smithsonian Learning Center	
Kirsten Rhodes	Smithsonian Learning Center	
Beverly Hagberg	Smithsonian Learning Center	
Helene Lisy	Smithsonian Learning Center	
Samantha Smingler	Smithsonian Learning Center	
Cathy Whittow	Smithsonian Learning Center	
Lindsay Lowe	UT Austin, JSG Institute of Geophysics	
Lataya Young	Smithsonian Natural History Museum	
Joan Mayer	Carl Hayden Visitors Center - Paleo	
Cliff Biggs	Colorado River Discovery Guide	
Kris Sams	Colorado River Discovery Guide	
Korey Seyler	Colorado River Discovery Guide	
Bryant Bell	Colorado River Discovery Guide	
Mikaela Blake	Colorado River Discovery Guide	
Liz Stokloas Kolle	Escalante Visitors Center	
Patricia Ludwick	Glen Canyon NRA	
David Smith	Grand Canyon	
Randy Henderson	Grand Canyon	
Jim Heywood	Grand Canyon, Park Ranger	
Gary Shahan	Sunset Crater, Fee Manager	
Floy Healer	Sunset Crater, Park Ranger	
Rani El Khatib	UT Austin, JSG Earth and Energy Resources	
Diana Ulrey	Wupatki Visitors Center	
Dave Sharrow	Zion National Park	
Shelagh Forrester	Zion National Park	
Mary Lee Davis	Zion National Park	
Jill Killian	Zion National Park	
Becca Alfofara	Zion National Park, Park Ranger	
Amelia Bruno	Crater Lake National Park	11th Grade GeoFORCE Academy
Fawn Custer	Hatfield Marine Science Center	
Noreene Ignelzi	Hatfield Marine Science Center	
Maureen Collson	Hatfield Marine Science Center	
Athena Crichton	Hatfield Marine Science Center	
Nancee Hunter	Hatfield Marine Science Center	
Tammy Villali	Mt Hood National Forest, Timberline Lodge	
Julia Marcil	Mt St Helens Johnson Ridge Observatory	
Todd Cullings	Mt St Helens Johnson Ridge Observatory	
Gregg Pohl	Mt St Helens Johnson Ridge Observatory, Lead Park Ranger	
Tyson Rasor	Mt St Helens Johnson Ridge Observatory, Park Ranger	
Peg Bohan	Mt St Helens Johnson Ridge Observatory, Park Ranger	
Jennifer Winston	Newberry National Forest - Big Obsidian Flow	
Paul Meznarich	Sluslaw National Forest - Cape Perpetua	
Carole Wendler	Sluslaw National Forest - Cape Perpetua	
Kelsi Johnson	Sluslaw National Forest - Cape Perpetua	
Tony Summers	Sluslaw National Forest - Cape Perpetua	
Gwyneth Moody	Sluslaw National Forest - Cape Perpetua	
Bane Walker	Annandale Bat Cave	
Terry Maner	Big Oak River Camp	
Dick Whipple	Fort Ing and Uvalde Historical Society	
Sherman Mumme	Hacineda Outcrop	
Dee Kirkpatrick	Vulcan Materials - Knippa Trap Rock	
Chuck Beavis	Vulcan Materials - Uvalde Rock Asphalt	
Stan Dignum	Captain, Katy Research Vessel	
Rick Tinnin	Marine Science Institute	
Linda Fulman	Marine Science Institute	
John Williams	Marine Science Institute, Naturalist	
Gary Mysorski	Port Aransas Dept of Parks and Recs	
Mike Lauer	Port Aransas Dept of Parks and Recs, Lifeguard Supervisor	10th Grade Young Geoscientists
Bill Slingerland	Port Aransas High School	
Johnnie Smith	TX State Aquarium	
Tara Schultz	TX State Aquarium	
Temelka Thomas	UT Austin, Multi-cultural Center	
Tonya Vessels	Inner Space Cavern, General Manager	11th Grade Young Geoscientist
Amanda Lopez	Austin State Capitol	MSEA
Kaye Barlow	Longhorn Cavern State Park	
Troy Futrel	Longhorn Cavern State Park	
John Williams	Thunderbird Lodge	
Donna Williams	Thunderbird Lodge	
Tim Taylor	UT Austin, College of Engineering	



Access to Sites	
Vulcan Materials Corporation	Knippa Basalt Quarry Uvalde Rock Asphalt Quarry
Dick Whipple	Fort Inge
Sherman Mumme	Del Rio Hacienda Outcrop
Smithsonian Learning Center	Access to museum collections and hands-on discovery
Swift Energy Company	Three Rivers natural gas site - active frac job for SW Educators Workshop
Oregon State University	Hatfield Marine Science Center and Labs

Educator Workshop Instructors	
Kathy Ellins	Institute for Geophysics
Hilliary Olson	Institute for Geophysics
Jessica Gordon	Jackson School
Leon Long	Department of Geological Sciences
Tim Rowe	Department of Geological Sciences
Jack Sharp	Department of Geological Sciences

Participant	Company	Event
<b>Career Presentations</b>		
Steve Hammond	U.S. Geological Survey	9th Grade GeoFORCE Academy
Jean Self-Trail	U.S. Geological Survey	
Nigel Simon	EPA	
Brian Domingues	EPA	
Dominic Druke	Shell Oil Company	
Robert Mocko	Great Falls Park Ranger	
Aaron LaRocca	Great Falls Park Ranger	
Danielle Carpenter	Chevron	10th Grade GeoFORCE Academy
Christie Rogers	ExxonMobil	
Chuck Caughey	Houston Geological Society	11th Grade GeoFORCE Academy
Orlando Ortega	Shell Oil Company	9th Grade Young Geoscientists
Richard Kilby	Shell Oil Company	11th Grade Young Geoscientists
Juanita Baldwin	Texas Commission on Environmental Quality	
Heather Beatty		
Patricia Hall	BP	11th Grade MSEA



*Pedro Roldan speaking to GeoFORCE 9th Grade Academy.*



# MAINTAINING THE NUMBERS

The objective of GeoFORCE is to place substantially more students into the high-tech career fields of the future, especially in the geosciences. To achieve this objective in the coming years, it is essential that we have a high retention rate of our students who begin

the GeoFORCE program after completing the eighth grade. The following chart shows that we have lost only three students from the academy program. The Young Geoscientist program provides replacements for those who choose to leave the academy program.

GeoFORCE Academies														
Retention Profiles														
GeoFORCE Academy Class of 2005					GeoFORCE Academy Class of 2006					GeoFORCE Academy Class of 2007				
Town	2005	2006	2007	2008	Town	2005	2006	2007	2008	Town	2005	2006	2007	2008
Cotulla					Dilley					Eagle Pass				
Uvalde					Uvalde					Eagle Pass				
Rocksprings					Cotulla		6			Uvalde				
Sabinal					Crystal City					Hondo				
Del Rio					Cotulla					Knippa				
Dilley					Uvalde			9		Uvalde				
Del Rio					Utopia		7			Eagle Pass			16	
Cotulla					Dilley					Hondo				
Pearsall					Eagle Pass					Brackettville				
Sabinal					Eagle Pass					Brackettville				
Eagle Pass			3		Pearsall					Uvalde				
Hondo					Crystal City			11		Del Rio				
Eagle Pass					Pearsall					Crystal City				
Uvalde					Hondo					Rocksprings				
Eagle Pass					Brackettville					Hondo				
Rocksprings					Sabinal					Uvalde				
Eagle Pass					Pearsall					Eagle Pass				
Uvalde		1			Pearsall					Pearsall				
Camp Wood					Barksdale			13		Hondo				
Eagle Pass					Uvalde					Crystal City				
Crystal City					Pearsall					Uvalde				
Pearsall					Carrizo Springs					Uvalde				
Pearsall					Eagle Pass					Eagle Pass				
Brackettville					Uvalde					Eagle Pass				
Uvalde					Uvalde					Uvalde				
Uvalde					Uvalde					Eagle Pass				
Crystal City					Uvalde					Nueces Canyon				
Uvalde					Eagle Pass					Hondo				
Pearsall					Uvalde					Dilley				
Eagle Pass					Uvalde					Eagle Pass				
Uvalde					Eagle Pass					La Pryor				
Eagle Pass					Pearsall					Eagle Pass				
Dilley					Cotulla					Del Rio				
Hondo					Uvalde					Carrizo Springs				
Eagle Pass					Uvalde					Eagle Pass				
Cotulla					Brackettville					Brackettville				
Eagle Pass					Rocksprings		5			Leakey				
Uvalde					Uvalde		8			Uvalde				
Crystal City					Uvalde					Eagle Pass				
Uvalde					Eagle Pass					Pearsall				
Brackettville		2			Leakey					Uvalde			17	
Dilley			4		Del Rio									
					Utopia			10						
					Uvalde			12						
					Hondo			14						
					Nueces Canyon			15						
<b>Total</b>	<b>40</b>	<b>40</b>	<b>40</b>				<b>40</b>						<b>40</b>	

Footnotes:  
<sup>1</sup> Left program to pursue other activities  
<sup>2</sup> Replaced GF0518  
<sup>3</sup> Special circumstances, enrolled in advanced summer courses in 2007, will return in 2008  
<sup>4</sup> Replaced GF0511 in 2007, will stay with program  
<sup>5</sup> In car accident in 2006, returned in 2007  
<sup>6</sup> Replaced GF0637 in 2006 and stayed with the program  
<sup>7</sup> Left program, homesick and unable to attend, choose to leave  
<sup>8</sup> Replaced GF0607 in 2006 and stayed with the program  
<sup>9</sup> Left program to pursue other activities  
<sup>10</sup> Replaced GF0606 in 2007, will remain in the program  
<sup>11</sup> Special circumstances, family issue 2007, will return 2008  
<sup>12</sup> Replaced GF0612, will remain in program  
<sup>13</sup> Medical emergency morning of event 2007, will return 2008  
<sup>14</sup> Replaced GF0619, will remain in program  
<sup>15</sup> Logistical issue, additional female to even number for rooming will remain with program  
<sup>16</sup> Ill at time of departure for 2007, will return in 2008  
<sup>17</sup> Replaced GF0707, will remain in the program

The Young Geoscientist program allows students to miss a summer activity and return the next year to the program, so it has a different attendance log from that of the academies. Several of the Young

Geoscientist students have missed an event and returned the following year, and eight of the top performers have moved up to the academy program.



Young Geoscientists Program														
Retention Profiles														
Young Geoscientists Class of 2005					Young Geoscientists Class of 2006					Young Geoscientists Class of 2007				
Town	2005	2006	2007	2008	Town	2005	2006	2007	2008	Town	2005	2006	2007	2008
Del Rio					Nueces Canyon					Uvalde				
Brackettville					Cotulla					Dilley				
Crystal City					Brackettville					Dilley				
Rocksprings					Hondo					Uvalde				
Eagle Pass					Hondo					Hondo				
Dilley					Crystal City					La Pryor				
Eagle Pass					Eagle Pass					Eagle Pass				
Eagle Pass					Brackettville					Eagle Pass				
Del Rio					Brackettville					Rocksprings				
Uvalde					Uvalde					Eagle Pass				
Eagle Pass					Uvalde					Uvalde				
Eagle Pass					Hondo					Eagle Pass				
Uvalde					Dilley					Uvalde				
Brackettville					Uvalde					Dilley				
Dilley					Hondo					Rocksprings				
Cotulla					Eagle Pass					Brackettville				
Uvalde					Hondo					Eagle Pass				
Eagle Pass					Eagle Pass					Brackettville				
Eagle Pass					Hondo					Barksdale				
Eagle Pass					Hondo					Uvalde				
Brackettville					Uvalde					Uvalde				
Sabinal					Dilley					Eagle Pass				
Del Rio					Uvalde					Uvalde				
Dilley					Brackettville					Eagle Pass				
Cotulla					Hondo					Del Rio				
Rocksprings					Uvalde					Pearsall				
Uvalde					Crystal City					Uvalde				
Uvalde					Cotulla					Eagle Pass				
Uvalde					Uvalde					La Pryor				
Rocksprings					Uvalde					Eagle Pass				
Uvalde					Cotulla					Uvalde				
Uvalde					Hondo					Eagle Pass				
Uvalde					Cotulla					Del Rio				
Charlotte					Uvalde					Uvalde				
Nueces Canyon					Eagle Pass					Del Rio				
Eagle Pass					Uvalde					Uvalde				
Rocksprings					Eagle Pass					Del Rio				
Cotulla					Utopia					Hondo				
Del Rio					Eagle Pass					La Pryor				
Uvalde					Sabinal					Uvalde				
Nueces Canyon					Brackettville					Barksdale				
Hondo					Eagle Pass					Uvalde				
Hondo					Eagle Pass									
Cotulla					Dilley									
Hondo					Eagle Pass									
Brackettville					Uvalde									
Brackettville					Uvalde									
Brackettville					Uvalde									
					Nueces Canyon									
					Eagle Pass									
					Eagle Pass									
Total	26	34	31				39	42					42	



Young Geoscientist 9th graders at Annandale Bat Cave, Uvalde, Texas.

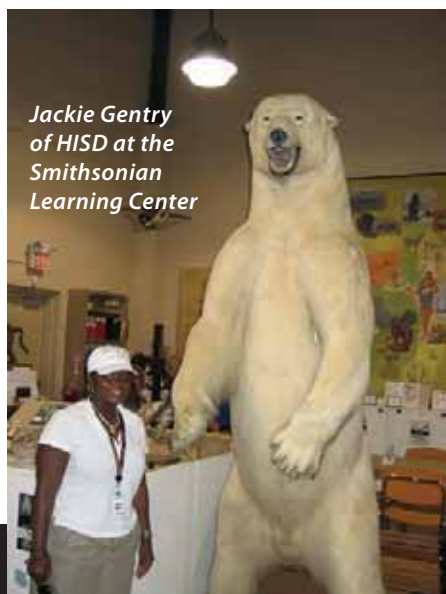
## 2008—BROADENING THE PROGRAM

The following new activities are planned for the coming year:

- ✦ *Initiating the GeoFORCE program in the Houston Independent School District (HISD)*
- ✦ *Adding the 12th Grade Academy and 12th Grade Young Geoscientists in southwest Texas*
- ✦ *Adding support for the Preliminary Scholastic Aptitude Test (PSAT)*
- ✦ *Adding freshman geoscience classes at Southwest Texas Junior College*
- ✦ *Adding a scholarship facilitator to the program*

### **GeoFORCE and the Houston Independent School District**

With encouragement from Mike Loudin of ExxonMobil, the Jackson School of Geosciences (JSG) will be introducing GeoFORCE to the Houston public school system beginning in 2008. The Houston Independent School District (HISD) is the seventh largest school district in the United States, with a population of more than 200,000 students (59 percent Hispanic, 29 percent African American, 8 percent White, and 3 percent Asian). The Houston program began in the summer of 2007 with discussions between JSG and HISD to determine target schools. Two HISD teachers attended the 2007



*Jackie Gentry  
of HISD at the  
Smithsonian  
Learning Center*



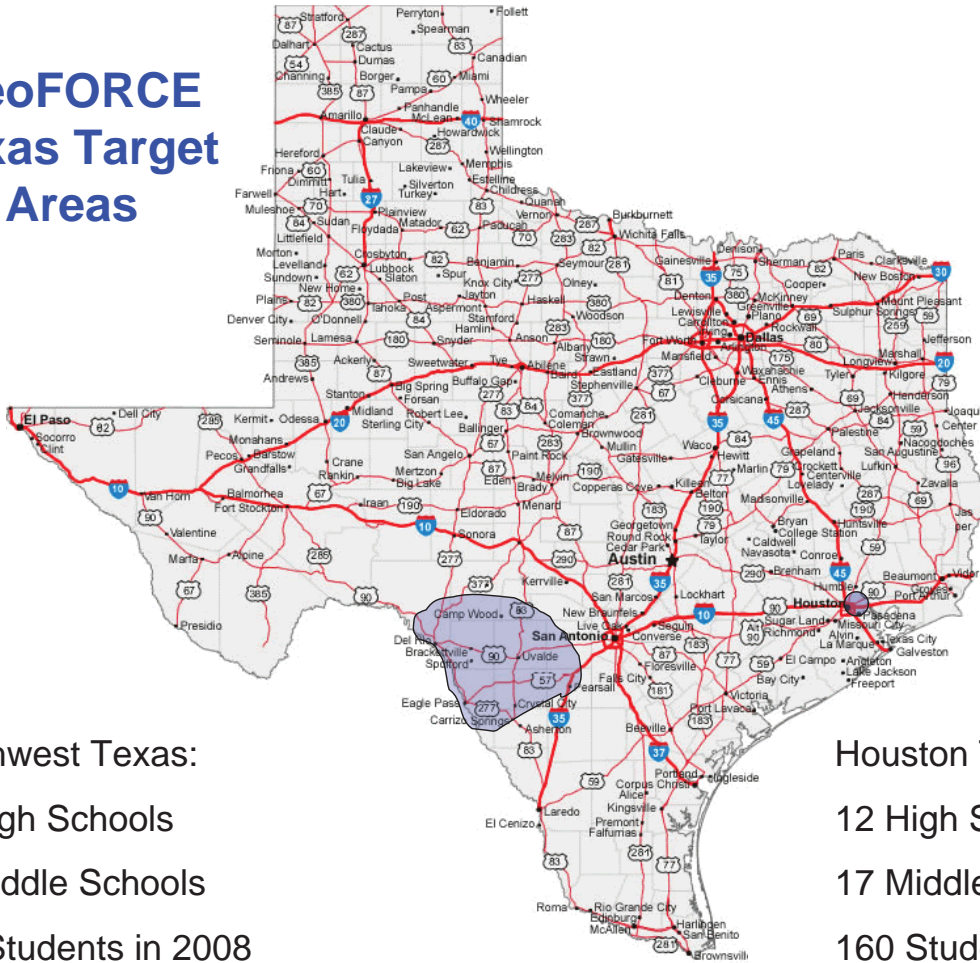
*Barbara Rivas of HISD (second from the left) with 9th Grade GeoFORCE students and counselors after a trip to Harpers Ferry, West Virginia.*

9th Grade Academy in Washington, D.C., to observe the logistical and operational aspects of the program.

The next steps in the Houston program will be hosting a fall educator workshop that will include 25 math and science teachers from each of our two target regions (southwest Texas and Houston). This event will take place in November in Austin with the objective to inform all teachers of the GeoFORCE program and lay the groundwork for the application process.

The first year of the Houston program will include summer academies and Young Geoscientist activities for rising 9th and rising 11th graders. Applications will be solicited starting in November 2007, and selections will be made in February 2008. The Houston program will follow the same activities that are already in place for southwest Texas (see descriptions of 9th and 11th grade academies later in this report). The Houston program will reach full potential in the summer of 2009 when the initial grades graduate to the next academy year and two more cohorts of rising 9th and 11th graders are added to the program, resulting in the four-year program with 320 students enrolled.

## GeoFORCE Texas Target Areas



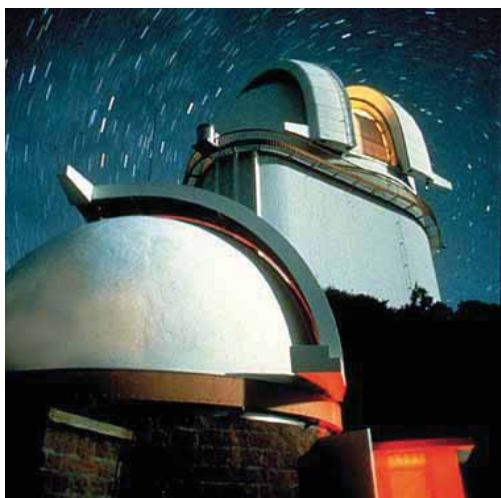
Southwest Texas:  
19 High Schools  
20 Middle Schools  
320 Students in 2008

Houston Texas:  
12 High Schools  
17 Middle Schools  
160 Students in 2008

## **New 12th Grade Programs for GeoFORCE**

The final grade level will be added to the GeoFORCE menu in 2008 when we create the 12th Grade Academy and Young Geoscientist field activities. The 12th Grade Academy will be conducted in Florida and will include visits to John Pennekamp Coral Reef State Park (active carbonates), Everglades National Park (wetlands), Sanibel and Captiva Islands (barrier island systems), University of South Florida GeoPark (karst), and the Kennedy Space Center.

The 12th Grade Young Geoscientists will go to West Texas and New Mexico, where they will have a chance to visit McDonald Observatory, Guadalupe Mountains National Park, Franklin Mountains, White Sands National Monument, and Balmorhea State Park.



*McDonald Observatory*



*John Pennekamp Coral Reef State Park*

## **Assistance with College Entrance Exams**

In the fall of 2007, our inaugural group of GeoFORCE students will enter the 11th grade and begin taking their college entrance exams.

In an effort to improve the scores of GeoFORCE students, the Jackson School offers a professionally delivered tutorial for the Scholastic Aptitude Test (SAT) to all GeoFORCE students when they are in the 10th grade. This fall they will have an opportunity to take the Preliminary Scholastic Aptitude Test (PSAT). Although this test is not required for college admission, the Jackson School thinks it provides valuable practice for students who will later take the SAT. Furthermore, scores from the PSAT are used to determine National Merit Scholars.

Recognizing that some of our students are economically challenged, the Jackson School has offered to cover the cost of the PSAT for all of our 11th grade students (Academy and Young Geoscientist programs).

## **Geoscience Courses in Southwest Texas**

Southwest Texas Junior College does not currently offer any courses in geology. The Jackson School is studying this situation to see if we can assist them in establishing two freshman courses that will meet the following objectives:

- Objective 1:** To make available college-credit courses in the geosciences for students attending community college in southwest Texas.
- Objective 2:** To make concurrent courses in geosciences available to high school students in the GeoFORCE network.
- Objective 3:** To make dual-credit courses in geosciences available to high school students in the GeoFORCE network.
- Objective 4:** To meet the Earth and Space Science capstone requirements.

Our plan is to complete objectives 1 and 2 (and perhaps 3) before the fall 2008 semester. This time frame will allow GeoFORCE students who are beginning their senior year to take the course and begin preparing for their college careers.



## Scholarship Facilitator for GeoFORCE Students

Many of our students who complete the four-year GeoFORCE program may not have the finances available to cover the costs of a college education. JSG is committed to ensuring that the cost of education is not a barrier to our GeoFORCE students achieving their dreams. We also recognize that many of these students are the first in their families to go to college and their families may have little or no experience in the application and scholarship procedures. To make sure that all avenues for financial assistance are pursued, JSG will assign a specialist to meet individually with the parents of our students, discuss their options for college, and assist them in preparing and submitting required forms and applications.

## COST OF OPERATION— 2008 AND BEYOND

The following table is an estimate of the cost of operating the GeoFORCE program for the next three years, including new initiatives that will begin in 2008. The estimates are based on sustaining the GeoFORCE programs at full capacity in both Houston and southwest Texas and include an inflation adjustment of 3 percent per year. Substantial efforts will be made in 2008 to increase the funding base for the program and to prepare for scholarship needs (not included in the table) that will occur as GeoFORCE students move into college programs. Because of the long-term nature of the program, it would benefit greatly from receiving multiyear funding from sponsors.

GeoFORCE Texas Future Cost Estimate

	2007-08	2008-09	2009-10	Total
<b>Sources</b>				
Alcoa	Pending			0
BP	Pending			0
Chevron	Pending			0
ConocoPhillips	Pending			0
Dominion Exploration	Pending			0
ExxonMobil	40,000			40,000
ExxonMobil - Houston GF	40,000			40,000
Halliburton	Pending			0
Jackson School	471,453	485,597	500,164	1,457,214
UT Tuition Waivers	25,000	25,000	25,000	75,000
Marathon	50,000	50,000		100,000
Minerals Management Service	Pending			0
Priority Oil & Gas LLC	Pending			0
AT&T Foundation	Pending			0
Schlumberger	Pending			0
Shell Oil Company	Pending			0
Shell Oil Company-Houston GF	30,000			30,000
Swift Energy	Pending			0
Vulcan Materials Foundation	15,000	15,000	15,000	45,000
<b>Subtotal Sources</b>	<b>671,453</b>	<b>575,597</b>	<b>540,164</b>	<b>1,787,214</b>
<b>Expense Activity</b>				
JSG Staff and Admin	321,453	331,097	341,029	993,579
Teacher Workshops	10,000	10,300	10,609	30,909
MSEA 11th grade academy	35,000	35,000	35,000	105,000
FVSU student visits	5,000	5,150	5,305	15,455
CDEP transfer scholarships	32,000	64,000	65,920	161,920
GeoFORCE Texas	425,000	437,750	450,883	1,313,633
GeoFORCE Houston	263,000	624,800	628,154	1,515,954
AP Courses in Geosciences	65,000	100,000	100,000	265,000
Scholarship Facilitator	50,000	51,500	53,045	154,545
Textbooks	25,000	25,750	26,523	77,273
<b>Total Expenses</b>	<b>1,231,453</b>	<b>1,685,347</b>	<b>1,716,467</b>	<b>4,633,267</b>
<b>Funding Required</b>	<b>560,000</b>	<b>1,109,750</b>	<b>1,176,303</b>	<b>2,846,053</b>

# SUMMARY OF 2007 ACTIVITIES

GeoFORCE continued to expand and refine its activities during 2007. The number of students engaged in the southwest Texas program rose from 153 in 2006 to 236 in 2007. The 11th Grade Academy and the 11th Grade Young Geoscientist summer programs were added, and we provided a professionally delivered review course for the Scholastic Aptitude Test (SAT). The SAT review course will be an annual event for our 10th grade students.

Our interactions with Fort Valley State University (FVSU) continued, and for the fourth straight year, we conducted the summer program for their 11th Grade Mathematics, Science and Engineering Academy. We also provided scholarships to two FVSU transfer students pursuing (and completing) degrees in the geosciences at the Jackson School of Geosciences (JSG). And we funded and hosted a campus visit for FVSU sophomores and juniors who are considering transferring to JSG.

The GeoFORCE educator network remained strong and engaged as we hosted two workshops last year. Each workshop had 22 participants from our network, who engaged in hands-on learning, as well as listened to presentations and earned professional development credits. JSG also participated in College Days during the year.

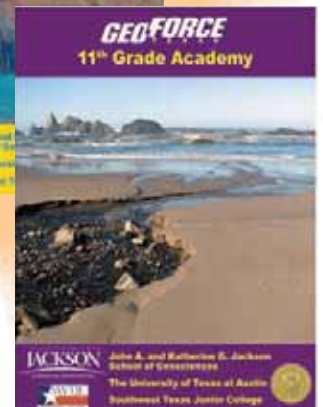
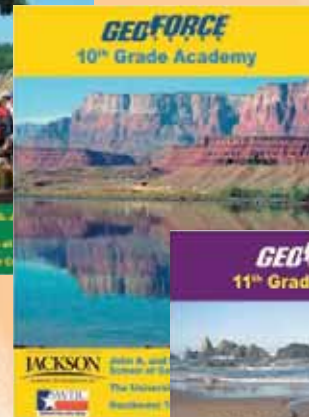
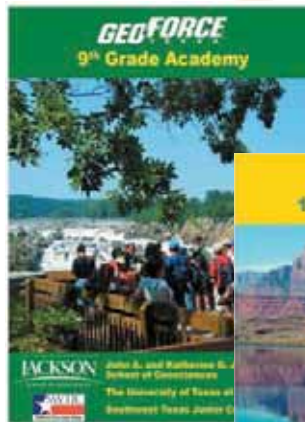


## GeoFORCE Academies

GeoFORCE academies are the premier activities of the program. Our students continue to exhibit outstanding academic skills, and their conduct throughout our summer programs has been outstanding. Our retention rate of 98 percent is a testament to GeoFORCE's ability to hold the attention and performance of the students.

Staffing for each academy is built around a team leader, who in the case of all 2007 academies was Julie Spink, JSG program coordinator. She is assisted by faculty and scientists who deliver the technical material to the students. All learning materials, including guidebooks and tests, are reviewed by Julie Jackson, who as a professor of science education ensures the content is aligned with the grade level and learning expectations. The team also includes teaching assistants who come from the Jackson School and help the instructors deliver content and provide individual tutoring to the students. Our counselors also assist in tutoring, as well as providing logistical support such as monitoring student activities and performance.

We now have rising 9th, 10th, and 11th graders in the program, and we will complete the circuit in 2008 when we add the 12th Grade Academy.



## 9th Grade Academy

The 9th Grade Academy is the starting point for our GeoFORCE students. This year we received 128 applications from students throughout our educator network. The applications were reviewed by a committee that selected students on the basis of academic achievements, essays, recommendations of teachers, and the quality of their application. Selections were also made to ensure that we had balanced representation across our network. The 40 students selected in 2007 represent 14 schools from the 18 participating school districts in the program.

The objective of the 9th Grade Academy is to introduce the students to basic geologic terms and processes, give them a glimpse of life on a major college campus, expose them to the many types of careers in the geosciences, and give them first-hand experience in field geology.

A rigorous schedule of activities immerses the new GeoFORCE students in opportunities in the geosciences.

**Day 1:** Check in (Uvalde), transfer to UT campus via chartered bus, take pre-test, hear lectures on rock types, rock cycle, erosion, deposition, and sedimentary rocks, tour campus, bowl at the Student Union, and spend night in Jester Dormitory.

**Day 2:** Take field trip to McKinney Falls (Law of Superposition) and Barton Springs (Edwards aquifer and recharge), attend lectures on Texas rocks and topography (analogy to Virginia), minerals, meteorites, and fossils, review, and take daily quiz.

**Day 3:** Travel to Washington, D.C., by air, attend lectures on geomorphology and geology of the Appalachians, review, and take daily quiz.

**Day 4:** Visit Washington monuments, Smithsonian Air and Space and Natural History Museums, attend lecture on floods, review, and take daily quiz.

**Day 5:** Learn about geology and history of Harpers Ferry, join with FVSU MSEA, hear about geology of the Piedmont and Coastal Plain, visit Smithsonian Learning Center, and attend reception at USGS headquarters.

**Day 6:** Attend USGS Seminar and Exhibition on careers and opportunities in the sciences, visit Great Falls Park, hear lectures on flooding, erosion, terraces, and ecosystems, review, and take daily quiz.

**Day 7:** Take part in comprehensive review of the week, take final exam, and prepare to return to Texas. Note: Results on the final exam were all A's.

**Day 8:** Transfer to Uvalde by air and charter bus (from San Antonio). Note: A closing ceremony was scheduled for this evening, but it was washed out by flooding in the Uvalde area. The ceremony was held on August 25 and attended by more than 200 people.



First time on an airplane



**Coordinator:** Julie Spink  
**Instructors:** Dominic Druke, Shell Oil Company  
Randy Orndorff, USGS  
Sigrid Clift, Bureau of Economic Geology  
Julie Jackson, Texas State University

**Teaching Assistant:** Lindsay Lowe, Institute for Geophysics

**Counselors:** Cristina Rodriguez  
Mary Gabaldon  
Ambar Salazar  
Sorayda Arellano  
Gus Castillon  
Chris Heiligenstein

**Guidebook Authors:** Jay Raney  
Sigrid Clift





## 10th Grade Academy

Our 10th Grade Academy was the first GeoFORCE activity of the summer. One student who chose to leave the program was replaced by one of our top-performing students in the Young Geoscientist program. We have 42 students in this academy as a result of the return of a student who was in a car accident the previous year and the addition of another student to the program in order to have double-occupancy in the rooms. Students in the 10th Grade Academy represent 15 school districts from the 18 in the program.

The objective of the 10th Grade Academy is to inspire students to think like geoscientists while learning about geologic processes that created the spectacular landscapes of the Southwest. Students learn concepts such as uniformitarianism (the present is the key to the past), faulting, deposition, differential erosion, stratigraphy, the geologic timescale, and geologic cross sections.

**Day 1:** Students took pre-test then traveled from Uvalde to San Antonio by charter bus, then by airplane to Las Vegas, and by bus to the Virgin River Canyon (deformation, erosion, strata, crossbeds, desert varnish). Overnight in St. George, Utah.

**Day 2:** Tour of Zion National Park and Checkerboard Mesa, Grand Staircase Escalante (differential erosion, joints, monoclines, geologic time), review, and daily quiz. Overnight in Page, Arizona.

**Day 3:** Raft trip down the Glen Canyon, Lees Ferry, Balancing Rock, Navajo Bridge (gradients, mass wasting, unconformity, landslides, fossils, extinctions, geophysics), review, and daily quiz. Overnight in Page, Arizona.

**Day 4:** Glen Canyon Dam, Lake Powell (electric power generation, potential and kinetic energy, geology of the area, aquifers, reservoirs, paleontology), Grand Canyon orientation, review, and daily quiz. Overnight in Grand Canyon Village, Arizona.

**Day 5:** Grand Canyon (angular unconformities, hike down canyon, stratigraphy, geologic time, lateral continuity, geologic cross section, fossils), review, and daily quiz. Overnight in Grand Canyon Village.



**Day 6:** Wupatki Indian Ruins and Sunset Crater (volcanoes, igneous rocks, viscosity, cinder cones, age dating, geochronology), review, and daily quiz. Overnight in Phoenix, Arizona.

**Day 7:** Transfer back to Uvalde via air and charter bus. Final review, Q&A session, career presentations, and preparation for closing ceremony. Overnight in Uvalde, Texas.

**Day 8:** Final exam, closing ceremony, and return home.

**Coordinator:** Julie Spink

**Instructors:** Christie Rogers, ExxonMobil  
Danielle Carpenter, Chevron  
Ramon Trevino, Bureau of Economic Geology

**Teaching Assistant:** Rani El Khatib, Energy and Earth Resources, Jackson School

**Counselors:** Martha Gomez  
Mary Gabaldon  
Ambar Salazar  
Ana Martinez  
Abel Ruiz  
Michael Ponce

**Guidebook Authors:** Jay Raney  
Sigrid Clift



## 11th Grade Academy

The inaugural group of GeoFORCE students continue to impress all who have an opportunity to meet them. Over the three years they have been involved in the program, only one person has chosen to leave the program. All students have consistently met the academic requirements of the program and this year scored 39 A's and 1 B on the Academy final exam. These students have now reached the later stages of their high school careers and will begin taking college entrance exams in the coming year. The objective of the 11th Grade Academy is to have the students look at the big picture (plate tectonics) and use lessons learned in earlier academies such as geologic concepts like the Law of Superposition and "the present is the key to the past" and geologic processes such as deposition and erosion to understand the history of active geologic areas.

**Day 1:** Students took pre-test then traveled from Uvalde to San Antonio by charter bus, then by airplane to Portland, Oregon. Lectures on plate tectonics and volcanic igneous rocks. Overnight in Portland, Oregon.

**Day 2:** Mount St. Helens, Johnston Ridge Observatory, Columbia River Gorge (stratovolcano, crater, debris flow, lahar, lava flows, basalt), review, and daily quiz. Overnight in Cascade Locks.

**Day 3:** Mount Hood, Kah-Nee-Ta Hot Springs, Crooked River Gorge (shield volcano, glacier, geothermal energy, andesite, subduction zone, geologic maps), review, and daily quiz. Overnight in Bend, Oregon.

**Day 4:** Newberry Caldera, Crater Lake, Salt Creek Falls (caldera, obsidian, pumice, pyroclastic flow, uniformitarianism, geologic hazards), review, and daily quiz. Overnight in Eugene, Oregon.

**Day 5:** Oregon Dunes State Park, Heceta Head, Cape Perpetua, Seal Rock (coastal processes, longshore current, tsunami, wave dynamics, currents, dunes, tide pools, intertidal zone), review, and daily quiz. Overnight in Newport, Oregon.

**Day 6:** Oregon Coast Aquarium and Hatfield Marine Science Center (ocean ecology, habitats, salinity, deposition, ocean currents), and preparation for return to Texas. Overnight in Portland, Oregon.

**Day 7:** Return to Texas via airplane and charter bus. Final review, Q&A session, career presentations, and preparation for closing ceremony. Overnight in Uvalde, Texas.

**Day 8:** Final exam, closing ceremony, and return home.



**Coordinator:** Julie Spink

**Instructors:** Jeff Paine, Bureau of Economic Geology  
Ana Morisani, Shell Oil Company  
Julie Jackson, Texas State University

**Teaching Assistant:** Jessica Gordon, Jackson School

**Counselors:** Martha Gomez  
Lauren Welker  
Mary Gabaldon  
Andrea Flores  
Michael Cavazos  
Michael Ponce

**Guidebook Authors:** Jay Raney  
Sigrid Clift

**Career Presenter:** Chuck Caughey,  
ConocoPhillips and  
Houston Geological Society



## Young Geoscientist Field Courses

Our Young Geoscientist program is designed to provide field experiences for outstanding students in our network. These students have met all of the academic and application requirements of the GeoFORCE program, but there simply was not enough space to accommodate them in the academies. This program provides spectacular learning experiences that are predominantly within the state of Texas.

### 9th Grade Young Geoscientists

Our 9th Grade Young Geoscientist program involved 42 students on a tour of geological interests in their local surroundings. The objective of the 9th grade program is to introduce the students to basic geology, including geologic features and processes, and to apply these concepts to observations in the field.

**Day 1:** Blackwater Hole, Knippa traprock quarry, Del Rio Formation fossil hunting, Fort Inge, 3-D visualization of an aquifer, Annandale Bat Cave (three rock types, floodplains, volcanoes, “the present is the key to the past,” joints, lithification, differential erosion), and review of the day.

**Day 2:** Vulcan Asphalt Quarry and the Nueces River (Law of Superposition, reservoirs/traps, watershed, river systems, point bar), review, and final test.

**Coordinator:** Cristina Rodriguez

**Instructors:** Orlando Ortega, Shell Oil Company  
Sigrid Clift, Bureau of Economic Geology  
Scott Rodgers, Bureau of Economic Geology

**Teaching Assistant:** Jessica Gordon, Jackson School

**Counselors:** Elizabeth Collins  
Sorayda Arellano  
Lauren Welker  
Andrea Flores  
Cristina Sanchez  
Brett White  
Abel Ruiz

**Guidebook Author:** Sigrid Clift



## 10th Grade Young Geoscientists

We had 42 students attend the 10th Grade Young Geoscientists' field experience in 2007. These students have proven their dedication to maintaining good grades over a two-year period with the GeoFORCE program. The objective of the 10th Grade Young Geoscientist program is to learn the nomenclature of the coastal zone and coastal processes.

**Day 1:** Travel by charter bus from Uvalde to Port Aransas. Lecture on waves, currents, tides, and geologic history of Mustang Island.

**Day 2:** Morning: Walk across Mustang Island from the swash zone to the bay (dune formation, grain size, marshes, vegetation variation, washover fan, tidal inlets). Afternoon: Group A to Texas State Aquarium in Corpus Christi and Group B to the Marine Science Institute for a voyage on the research vessel *Katy*. Evening review and lecture.

**Day 3:** Morning: Project work on the beach, including measuring a transect, longshore current, and impact of jetties. Afternoon: Group A on the research vessel *Katy* and Group B to the Texas State Aquarium. Evening review and final test.

**Day 4:** Return to Uvalde.

**Coordinator:** Julie Spink

**Instructors:** Tiffany Hepner,  
Bureau of Economic Geology  
John Williams, Marine Science Institute  
Julie Jackson, Texas State University

**Teaching Assistant:** Cristopher Marshall, Colony High School

**Counselors:** Cristina Rodriguez  
Andrea Flores  
Sorayda Arellano  
Cristina Sanchez  
Abel Ruiz  
Gus Castillon

**Guidebook Author:** Tiffany Hepner



## 11th Grade Young Geoscientists

Our 11th Grade Young Geoscientists are now in the third year of the program and beginning to make plans for college. The 2007 summer event provided an extended experience of life on the UT campus, as well as an opportunity to apply the basic geologic concepts learned in earlier years. Thirty-one students attended.

**Day 1:** Travel to Austin and check into Jester Dormitory. Tour McKinney Falls State Park (Cretaceous limestone, layers of volcanic ash, differential erosion, terraces, Law of Superposition), lectures on fossils and career opportunities at Texas Commission on Environmental Quality (TCEQ), campus tour, and review.

**Day 2:** Perry Park (escarpment, faulting, displacement), Mount Bonnell, Barton Springs (recharge and discharge, aquifer, springs), Inner Space Caverns (karst, dissolution, precipitates, water table, speleothems), bowling at the Student Union, and review.

**Day 3:** Exam, tour of the Texas Capitol, and return to Uvalde.

**Coordinator:** Cristina Rodriguez

**Instructors:** Ramon Trevino, Bureau of Economic Geology  
Sue Hovorka, Bureau of Economic Geology  
Richard Kilby, Shell Oil Company  
Ann Molineux, Texas Memorial Museum  
Jay Banner, Department of Geological Sciences

**Teaching Assistant:** Jessica Gordon, Jackson School

**Counselors:** Gus Castillon  
Brett White  
Stanley Stackhouse  
Abel Ruiz  
Sorayda Arellano  
Andrea Flores

**Guidebook Authors:** Tiffany Hepner  
Jay Raney



## **Fort Valley State University 11th Grade Mathematics, Science and Engineering Academy**

For the fourth straight year, the Jackson School hosted the Fort Valley State University (FVSU) 11th Grade Mathematics, Science and Engineering Academy (MSEA). The 2007 event included 20 students, 3 counselors, and 4 members of the FVSU staff. The course objectives are to give students an introduction to Texas geology, as well as provide an opportunity for them to learn about the Jackson School and the University of Texas and to experience life on the campus.

**Day 1:** Arrive in Austin and check into Jester Dormitory. Bowling at the Student Union.

**Day 2:** Pre-test and lectures (introduction to rocks, minerals, the rock cycle, maps and cross sections, geologic time, stratigraphy, contacts, erosion).

**Day 3:** Introduction to the geology of Central Texas, presentation on paleontology from a representative of the Texas Memorial Museum who brought fossils for the students to see, and preparation for departure to the field.

**Day 4:** Tom Miller Dam, the Llano Uplift, Krause Springs (geologic history), the Colorado River below Max Starcke Dam, Slaughter Gap faults, Longhorn Caverns (karst, dissolution, water table, calcite crystals), and overnight at Lake Buchanan.

**Day 5:** Devil's Waterhole (Law of Crosscutting Relationships, folds, metamorphics), Enchanted Rock State Natural Area (intrusions, exfoliation, joints), and return to Jester Dormitory.

**Day 6:** Tour of State Capitol, movie at the mall, and preparation for final exam and closing ceremony.

**Day 7:** Final exam and closing ceremony.

**Day 8:** Return to Fort Valley, Georgia.

**Coordinators:** Cristina Rodriguez, Jackson School  
Patrice McGee, Fort Valley State University

**Instructor:** Leon Long,  
Department of Geological Sciences

**Teaching Assistants:** Peggy Cagle,  
Department of Geological Sciences  
Jessica Gordon, Jackson School

**Career Presenter:** Patricia Hall, BP





## Educator Workshops

When GeoFORCE began activities in 2004, it was obvious that we needed to stay in close communication with our educator network. Our educators assist us with the application process, help monitor our students' progress through high school, participate in GeoFORCE field activities, and make exceptional suggestions on how to improve our program. Without them, GeoFORCE would not be enjoying the number of students we have in the program, nor would we be receiving the caliber of students that are directed to us by the network. The Jackson School hosts two workshops each year in an effort to stay connected with our educators.

Our fall workshop, held October 5–6, 2006, brought 21 educators to the UT Austin campus. The teachers had dinner with the dean of the Jackson School, followed by an interactive lecture delivered by the Environmental Science Institute titled "Is Climate Change Increasing Hurricane Activity?"

The second day of the workshop included a field trip to McKinney Falls State Park led by Leon Long, professor in the Department of Geological Sciences. The field trip illustrated geologic processes such as deposition, erosion, and lateral continuity. The educators returned to Uvalde at the end of the field trip.

Our spring workshop was held February 6–7, 2007, beginning in Three Rivers and then moving to San Antonio. Ed Duncan, vice president for exploration at Swift Energy, provided a demonstration of a fracture job on one of their wells with emphasis on showing the educators how math, chemistry, physics, and geology are used on a daily basis in petroleum exploration. The day concluded with a lecture on "Dinosaurs in the Digital Age" by Tim Rowe, geology professor and director of UT's Vertebrate Paleontology Laboratory.

On the second day, teachers learned about geologic time and absolute dating from Kathy Ellins, program manager at the Jackson School's Institute for Geophysics, and Hilary Olson, research associate at the Institute. Jessica Gordon, graduate research assistant for the Jackson School, led the teachers through an experiment demonstrating how ground cover affects surface runoff and how pollution travels through creeks, rivers, and aquifers.

For the final event of the workshop, Jack Sharp, geology professor in the Department of Geological Sciences, presented "The Edwards Aquifer: Will There Be Water for Texas?" He discussed the geologic history of the Edwards aquifer and management of an important natural resource that is crucial to the development of Central and South-Central Texas.



**Coordinators:** Julie Spink  
Cristina Rodriguez

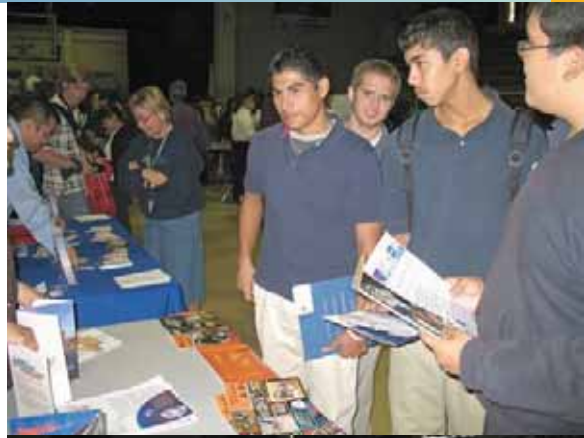
**Instructors:** Kathy Ellins, Institute for Geophysics  
Hillary Olson, Institute for Geophysics  
Leon Long, Department of Geological Sciences  
Jack Sharp, Department of Geological Sciences  
Tim Rowe, Department of Geological Sciences  
Jessica Gordon, Jackson School

**Hosts:** Ed Duncan, Swift Energy  
Dave Coatney, Swift Energy  
Henry Broom, Swift Energy  
Alan Goodwin, Swift Energy  
Daryl Johnson, Weatherford International



## College Day Program

The Jackson School takes part in the College Day programs sponsored by the Texas Association of the Collegiate Registrars and Admissions Officers (TACRAO). Last fall, the Jackson School participated in College Days at Southwest Texas Junior College and five southwest Texas high schools—Dilley High School, Hondo High School, Eagle Pass High School, Uvalde High School, and Carrizo Springs High School. GeoFORCE coordinators Cristina Rodriguez and Andrea Flores interacted with hundreds of high school students and gave them information about careers in the geosciences. Additionally, “Why Earth Science” brochures were distributed to educate students about the importance of the earth sciences. The “Careers in Geosciences” handouts published by the American Geological Institute gave students an idea of the broad range of professions available to a geoscientist. The College Days also provided an opportunity to distribute GeoFORCE applications for the Young Geoscientist track to the “late bloomers” who may not have had a chance to apply to the program during eighth grade.



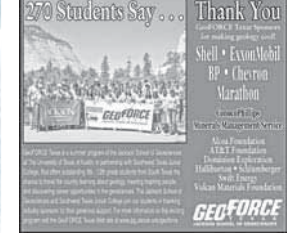


# APPENDIX A: GeoFORCE IN THE NEWS

In addition to creating opportunities for outstanding young students to study earth science, one of the prime objectives of our GeoFORCE program is to inform Texas communities of the importance of the geosciences. Fortunately, the communications officers at Southwest Texas Junior College, Willie Edwards, and at the Jackson School, J. B. Bird, have taken the lead in getting our story out to the press to keep GeoFORCE in the news.

In addition to our GeoFORCE students being recognized in local newspapers and national journals, we try to make sure that our sponsors, who provide vital funds to maintain and enlarge the program, are acknowledged. This increased visibility is essential to the success of our program.

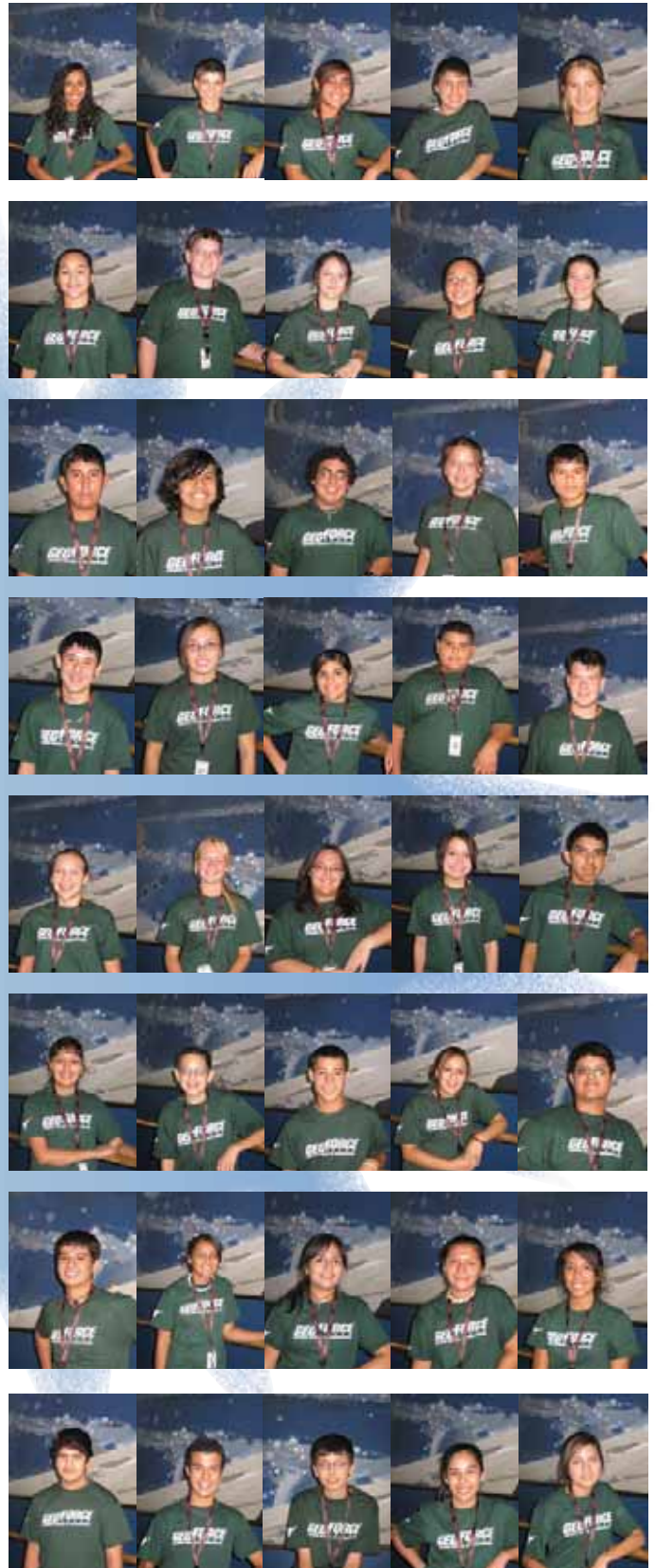
For a complete list of articles, go to: <http://www.jsg.utexas.edu/geoforce/news/index.html>



# APPENDIX B: LIST OF PARTICIPANTS BY COHORT

## 9th Grade GeoFORCE Academy

Name	School District
Maria Aldape	Eagle Pass
Eduardo Aranda	Eagle Pass
Anissa Arce	Uvalde
Jaquelyn Arias	Hondo
Caroline Beltran	Knippa
Sanette Bermudez	Uvalde
Allison Boehme	Hondo
Kelsey Bruce	Brackettville
Bryan Calk	Brackettville
Daniel Campos	Uvalde
Stephen Cantu	Del Rio
Michelle Contreras	Crystal City
Emily Dabney	Rocksprings
Matt De Leon	Hondo
Kalia Elrod	Uvalde
Victoria Fortiz	Eagle Pass
AJ Freitas	Pearsall
Nicholas Garcia	Hondo
Steven Garza	Crystal City
Zenia Garza	Uvalde
Alexis Gonzalez	Uvalde
Miguel Gonzalez	Eagle Pass
Jennifer Jimenez	Eagle Pass
Travis Kiesling	Uvalde
Priscilla Martinez	Eagle Pass
JT Morey	Nueces Canyon
Sabrina Morin	Hondo
Cheyenne Mueller	Uvalde
David Obregon	Dilley
Krizelle Olivo	Eagle Pass
Jesse Ortegon	La Pryor
Hector Pineda	Eagle Pass
Ruben Polanco	Del Rio
Ricky Rey Reyes	Carrizo Springs
Alexis Rodriguez	Eagle Pass
Sahara Rodriguez	Brackettville
Sarah Rubio	Leakey
Cecilia Soliz	Uvalde
Adriana Torres	Eagle Pass
James White	Pearsall



# APPENDIX B: CONTINUED

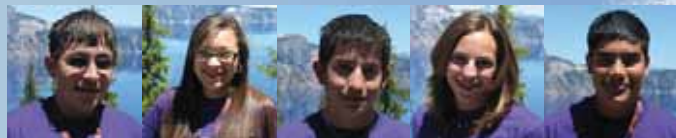
## 8th Grade GeoFORCE Academy

Name	School District
Elias Alvarez	Dilley
Monelle Aromin	Uvalde
Genesis Austin	Nueces Canyon
Dessirae Ayala	Cotulla
Maracruz Bustamante	Crystal City
Stephanie Campos	Cotulla
Kimberly Demaree	Dilley
Daniel Enriquez	Eagle Pass
Raquel Espinoza	Eagle Pass
Eryn Freitas	Pearsall
Teresa Gaitain	Uvalde
Josh Gonzales	Pearsall
Sharayah Gonzales	Hondo
Brooklyn Gose	Brackett
Christopher Graham	Sabinal
Jayne Grander	Pearsall
Alina Delmy Herrera	Pearsall
Adriana Jarosek	Uvalde
Kristen La Buhn	Pearsall
Thomas Lackey	Carrizo Springs
Alexis Magana	Eagle Pass
Antonio Martinez	Uvalde
Gregorio Martinez	Uvalde
Caleb McBride	Uvalde
George Melchor	Uvalde
Eric Munt	Eagle Pass
Martha Ortiz	Uvalde
Julia Quiroga	Uvalde
Katie Rainosek	Hondo
Ruben Recio	Eagle Pass
Aracely Reyes	Pearsall
Angela Rodriguez	Cotulla
Brittney Sanchez	Uvalde
Athena Sevilla	Uvalde
Jeff Sitgreaves	Brackett
Sondee Splawn	Rocksprings
Alexandra Talley	Uvalde
Cornelluis Tobias	Uvalde
Christopher Vanderveer	Utopia
Guillermo Villasenor	Eagle Pass
Hannah Windham	Leakey
Dominique Zvorak	Del Rio



# APPENDIX B: CONTINUED

8th Grade GeoFORCE Academy	
Name	School District
Siobhain Alvarado	Cotulla
Rosy Arellano	Uvalde
Joseph Arrevalos	Rocksprings
Katie Bales	Sabinal
Elyana Barrera	Del Rio
Aaron Cason	Dilley
Sabrina Cervantez	Del Rio
Jairo Chavez	Cotulla
Jonathan Cubriel	Pearsall
Carlos de la Torre	Sabinal
Karyssa DeLeon	Hondo
Melerie DeLeon	Dilley
Debbie Duran	Eagle Pass
Schaefer Edwards	Uvalde
Oscar Fuentes	Eagle Pass
Miranda Garcia	Rocksprings
Elsa Garza	Eagle Pass
Victoria Herndon	Camp Wood
Isaac Jimenez	Eagle Pass
Ramon Lopez III	Crystal City
Melanie Lynch	Pearsall
Benjamin Martinez	Pearsall
Samantha Moore	Brackett
Andrew Nunez	Uvalde
Nazarey Ortiz	Uvalde
Alexandra Perez	Crystal City
Hilary Prado	Uvalde
Karina Robledo	Pearsall
Kaitlin Rodrigues	Eagle Pass
Andrea Rodriguez	Eagle Pass
Michelle Rodriguez	Uvalde
Rosalie Rodriguez	Dilley
Andy San Miguel	Hondo
Pat Saucedo	Eagle Pass
Jacob Schroeder	Brackett
Justin Treviño	Cotulla
Karen Treviño	Eagle Pass
Marissa Vara	Uvalde
Adriana Vargas	Crystal City
Felipe Villanueva	Uvalde

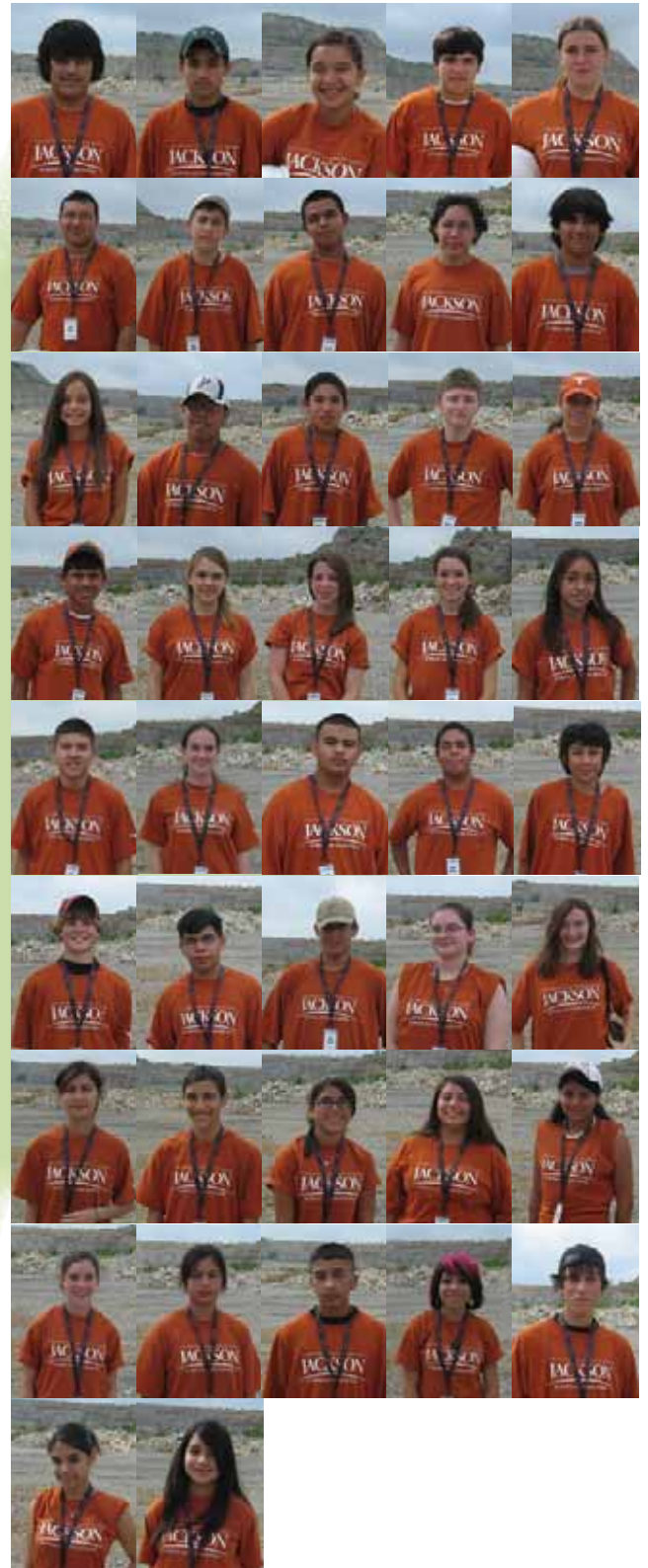




## APPENDIX B: CONTINUED

### 9th Grade Young Geoscientists

Name	School District
Katie Albarado	Uvalde
Abigail Aranda	Dilley
Brooke Bickham	Dilley
Joshua Bordovsky	Uvalde
Sarah Caffey	Hondo
Bobby Joe Castillo	La Pryor
Jessica Cedillo	Eagle Pass
Gressia Monique Chong	Eagle Pass
Joshua Cook	Rocksprings
Holly Cox	Eagle Pass
Christopher Cruz	Uvalde
Jonathan De La Cruz	Eagle Pass
Steven De La Rosa	Uvalde
Malison DeLeon	Dilley
Dallas Ann Drazan	Rocksprings
Mike Flores	Brackett
Hector Gloria	Eagle Pass
Haley Hale	Brackett
Joana Hicks	Barksdale
Jason Jimenez	Uvalde
Sierra King	Uvalde
Antonio Martinez	Del Rio
Juan Martinez	Juan Martinez
Kimberly Martinez	Eagle Pass
Roberto Antonio Martinez	Uvalde
Gerardo Monarres	Pearsall
Cheyenne Mueller	Uvalde
Jorge Negrete	Eagle Pass
Nathaly Olascoaga	La Pryor
Jose A Ovalle	Eagle Pass
Jacob Padilla	Uvalde
Evelyn Palomo	Eagle Pass
Jose Perales	Del Rio
Raul Perez	Uvalde
Jose Luis Rodriguez	Del Rio
Cristian Sandoval	Uvalde
Aimee Vasquez	Del Rio
Justin Vela	Hondo
Alonzo Vidal	Uvalde
Gabrielle Velasquez	La Pryor
Rogelio Velasquez	Uvalde
Cheyenne Walker	Barksdale



## APPENDIX B: CONTINUED

### 10th Grade Young Geoscientists

Name	School District
Ernesto Ale andro	Sabinal
Gwenda Austin	Nueces Canyon
Dessirae Ayala	Cotulla
Chris Blake	Brackett
Ashley Bragg	Hondo
Stephanie Campuzano	Crystal City
Victor Cantu	Brackett
Marco Carrillo	Eagle Pass
Cody Clark	Brackett
Charles Conoly	Brackett
Emilio Fuentes	Eagle Pass
Teresa Gaitan	Uvalde
Angel Garcia	Dilley
Christina Gauna	Hondo
Jose Gonzales	Dilley
Abi Guerra	Eagle Pass
Jonathan Gutierrez	Uvalde
Ross Jones	Hondo
Andres Kashani	Eagle Pass
James Knape	Hondo
Felan Kyle	Uvalde
Benjamin Miller	Uvalde
Faith Marie Mus uiz	Uvalde
Eryn Patterson	Dilley
Carlos Prado	Uvalde
Jaleel Proulx	Brackett
Katherine Rainosek	Hondo
Christine Reyna	Uvalde
Tomas Rivera	Crystal City
Ruth Ruiz	Eagle Pass
Gabriel Lee Saenz	Cotulla
Kaitlyn Samarraipa	Uvalde
Mauricio Sanchez	Uvalde
Caitlyn Storey	Cotulla
Taylor Sunderman	Hondo
James Talbert	Cotulla
Alexandra Talley	Uvalde
Christina Thomas	Uvalde
Roberto Trevino	Eagle Pass
Christopher Vanderveer	Utopia
Stormi Williams	Nueces Canyon
Victor apata	Eagle Pass



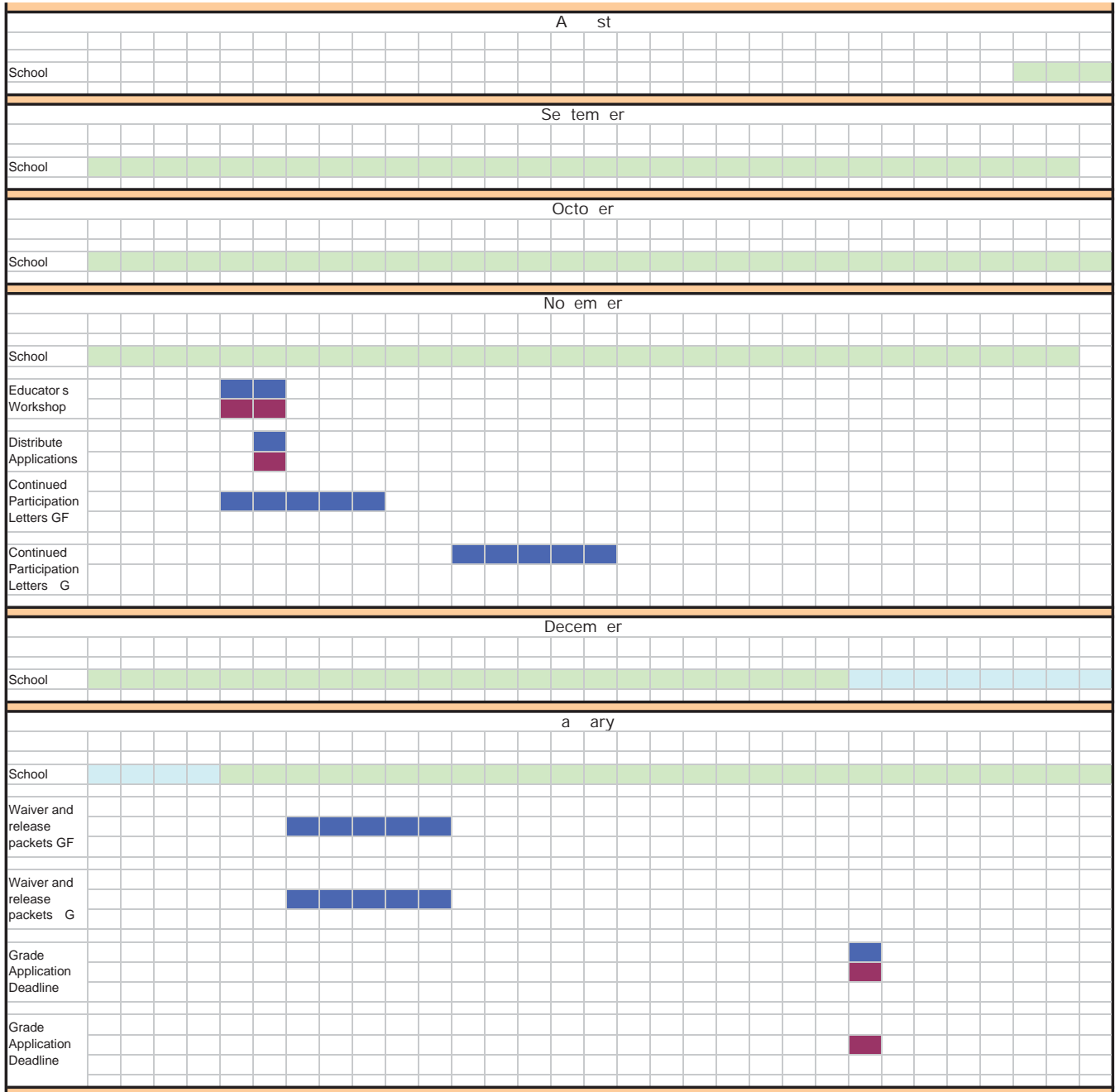
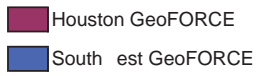
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### 11th Grade Young Geoscientists

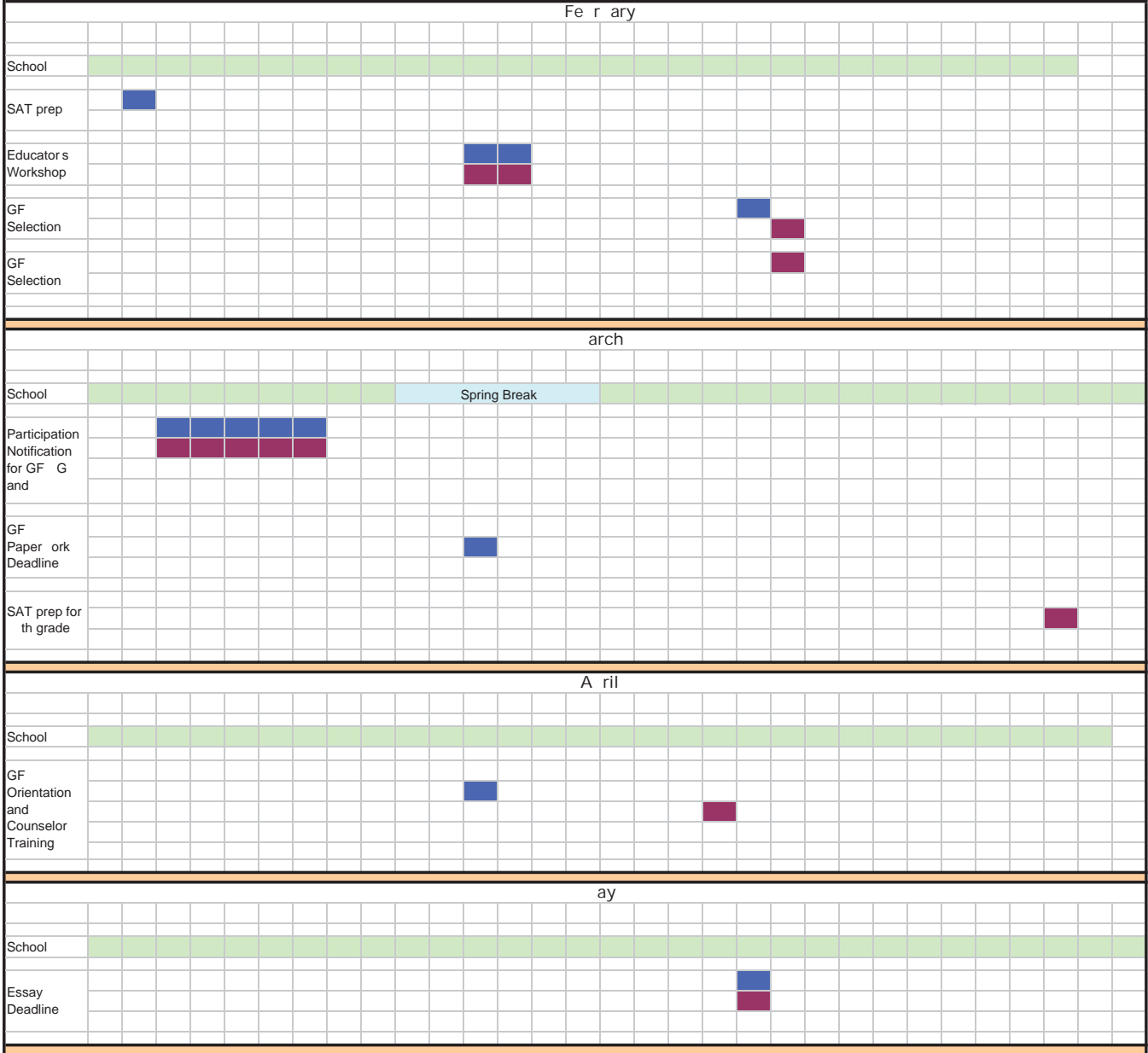
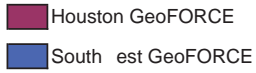
Name	School District
Javier Amaro	Del Rio
Emily Calk	Brackett
Jessica Cantu	Uvalde
Natalie Chapa	Crystal City
Jeffrey Dabney	Rocksprings
Raquel De La Cruz	Eagle Pass
Luciano Esquivel	Eagle Pass
Kimberly Estrada	Uvalde
Gina Falcon	Nueces Canyon
Gerardo Fisher	Eagle Pass
Sergio Gallegos	Uvalde
Eduardo Garcia	Del Rio
Leanna Garza	Hondo
Andre Haertner	Hondo
Jared Howard Tomchesson	Charlotte
Azia Ledesma	Eagle Pass
Janel Maurer	Eagle Pass
Ruth Montgomery	Cotulla
Jose Naera	Hondo
Harmony Pettett	Brackett
Maribel Rivas	Brackett
Ricardo Rodriguez	Uvalde
Abigail Rodriguez	Eagle Pass
Liliana Saldivar	Eagle Pass
Stephanie Sanchez	Eagle Pass
Joshua Smith	Del Rio
Laura Sinson	Brackett
Crystal Torres	Dilley
Andre Valles	Cotulla
Timothy Wade	Rocksprings
Anolda Watkins	Brackett



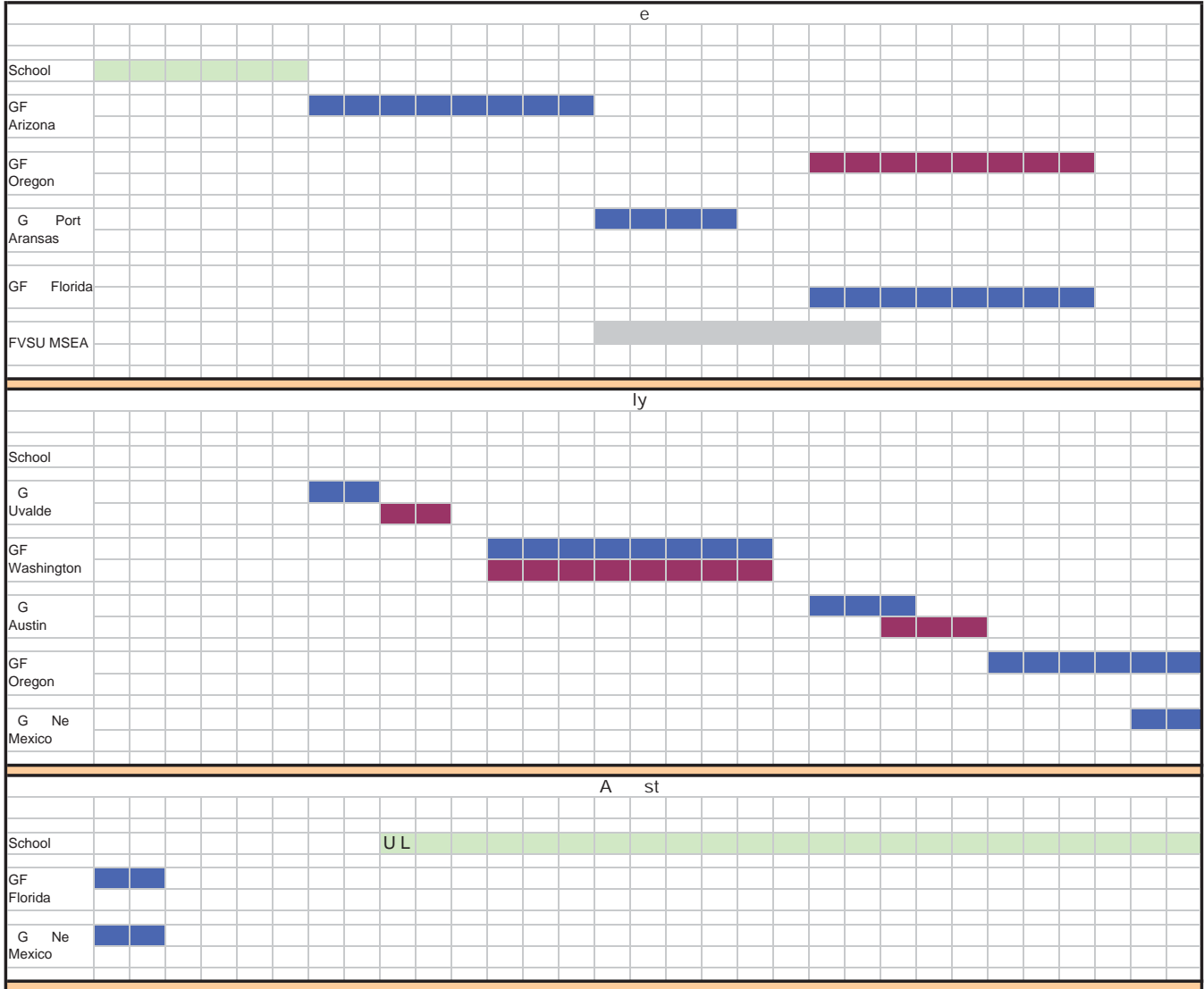
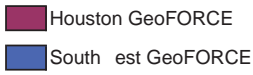
# APPENDIX C: GeoFORCE EVENT CALENDAR FOR 2008



# APPENDIX C: CONTINUED



# APPENDIX C: CONTINUED



## APPENDIX D: NOTES FROM STUDENTS

Dear Vulcan Materials,

June 30, 2007

I would like to personally thank you for everything you have done as well as donated to the GeoForce program. You could not even possibly begin to imagine how much I, & everyone involved in the 11<sup>th</sup> grade academy appreciate everyone's contribution to this program. GeoForce has opened so many doors for so many of us.

If it weren't for this amazing program, I would never have gotten outside of a 200 mile radius around my home town, Muchless Texas. I've seen more through this program than most do in their entire life-times. The sights I've seen, & the detailed Geology information I've learned in the past 3 years, are indescribable in comparison to anything else I've ever done.

Thank you so much for your interest & willingness to donate & sponsor our cherished program. You have no idea how much it's deeply appreciated.

Sincerely,

Victoria Herndon

GeoFORCE 2007 11<sup>th</sup> grade academy.

CHANGING THE WORLD OF GEOSCIENCES

APPENDIX D: CONTINUED

Dear Anna,  
 I wanted to thank you for all of your contributions to the Seeger trip to Oregon. You were wonderful and kind and everyone enjoyed listening to your lectures. We all learned a tremendous amount of fascinating information, much of which, others our age are not given the opportunity to learn. Everything we learned from you will remain with us for life. You were an awesome teacher and we greatly appreciate your willingness to answer all of our questions. All of us in the program sincerely hope you will be able to come with us again next year. It was an absolute pleasure being around you and I know for a fact that all of us appreciate you for giving your time to be with us. We all think of you as an extremely special person that is full of fun but at the same time someone who loves geology with a passion. You are a great role model for all of us. I would also like to thank you for sharing my group the chicken dance. I know it will be great. Thanks again, you made the trip much more of a joy, excitement, and memory. You have made a huge positive impact on all of us, and you have helped shape and create another path in our lives.

Sincerely,

Thank you! I love you Anna!! Jacob  
 Adriana V. Karissa  
 Love you lots! Thanks Justin  
 - Miranda Marie Garcia  
 Keep one for me! Thanks a million!  
 The best  
 eye on Anna my man! Thanks for the camera  
 - Marthe - connector  
 advice and the awesome lectures!  
 love you! Love you! Love you!  
 Katie Bels  
 Thanks for teaching us  
 a lot of thing  
 - ROSY ARELLANO  
 Thank you for the shell  
 hat! Love ya!  
 Sabrina Cervantes  
 Hope your finger is  
 on from the  
 obsidian

Jonathan Cantrell  
 Love ya!  
 - Samantha Moore  
 love always,  
 Melanie Lynch  
 (thanks for the camera)

Thank you for teaching us a lot. You are funny. Thanks for being with us. Confos de la Torre

Melanie DeLeon