# GEOFORCE TEXAS

## JACKSON SCHOOL OF GEOSCIENCES

ANNUAL REPORT 2006


SWTJC
Southwest Texas Junior College

THE UNIVERSITY OF TEXAS AT AUSTIN

THE UNIVERSITY OF TEXAS AT AUSTIN
JACKSON
SCHOOL OF GEOSCIENCES

## FOREWORD

In my first year as dean of the Jackson School of Geosciences, I am especially honored to have the chance to support and work with GeoFORCE Texas.

Speaking broadly, science and engineering in this nation will fail if the population of scientists and engineers do not start to look like the rapidly evolving populations of Texas and the United States. One can look at this issue from many angles—the viewpoint of demographic projections, or human justice, or the tragedy of wasted talent. Regardless, we need to empower the next generation of scholars.

This isn't the job of one or two people assigned to the task, it is everyone's job—from industry to the academy, from high school educators to individual students and their families. The supporters and students of GeoFORCE have already embraced this vision, have already chosen to make this job their own. The key contributors are too numerous to name here, but let me single out Dr. Isaac Crumbly for his inspirational work at Fort Valley State University, Bill Fisher and Doug Ratcliff for spearheading the program at the Jackson School, Julie Spink for managing it, and our corporate champions for ensuring its success.

I look forward with great enthusiasm to working with GeoFORCE's stakeholders to expand and strengthen this program in years to come.

Eric J. Barron

Dean

Jackson School of Geosciences

Front cover: GeoFORCE 10th Grade Academy students experience the Colorado river on a half day floating lecture

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GeoFORCE 10th Grade Academy students at Balancing Rock, Arizona

## INTRODUCTION

Building on the momentum triggered by the 2005 inaugural GeoFORCE Texas program, the Jackson School of Geosciences, in partnership with Southwest Texas Junior College (SWTJC), successfully completed the second year of our outreach activities in South Texas.

The 2005 experience taught us many lessons and prompted some changes. We added day-to-day field guides, as well as daily quizzes, to reinforce materials and encourage interaction in the field and the classrooms. At the same time, we maintained the Fort Valley State University (FVSU) model of blended week-long activities, guiding more than 170 students through hands-on field trips and in-class lectures and generating excitement in the communities served by GeoFORCE. Nearly 250 family members and friends attended each closing ceremony. The Young Geoscientists program more than doubled its participation, engaging 73 students and two University of Texas at Austin-bound interns in the activities.

The success of GeoFORCE Texas depends on maintaining and building relationships. Our outreach would not be possible without the network of South Texas educators. Facilitated by SWTJC, the relationships formed with the teachers, administrators, and principals help us identify eligible, outstanding students with an aptitude for science and math.

Thanks to the US Geological Survey, students from both the FVSU 9th grade Mathematics, Science, and Engineering Academy (MSEA) and the GeoFORCE 9th Grade Academy enjoyed a day of hands-on exhibits and presentations. And our sponsors—Shell, ConocoPhillips, ExxonMobil, Chevron Corporation, BP, Minerals Management Service, AT&T Foundation, Dominion, Halliburton, Marathon Oil Corporation, Schlumberger, and Swift Energy Company—provided not only essential financial assistance but also expertise in the field.

Working directly with the students, industry professionals exemplified how exciting a career in the geosciences can be. Shell provided support to both academies and to the Young Geoscientists field courses. Max Brouwers, Mark Martin, Dominic Druke, and Carlos Guzman, all from Shell, attended the events and gave presentations. ExxonMobil sent Jackson School alumni Christie Rogers and Jackie Floyd to assist with the week-long academies and Debbie Weeden to attend the MSEA closing ceremony. Also thanks to ExxonMobil, GeoFORCE has enhanced their field safety measures.

Uvalde welcomed BP's Patricia Hall and Tina Foster for the 10th Grade Academy. In addition to her energetic presentation on careers in the geosciences, Patricia outlined what BP is doing to address some of the current issues in the energy industry. Tina rafted the Colorado River with the group and pointed out keys aspects of the rock face. Danielle Carpenter, with support from Chevron Corporation, spoke to the 10th Grade Academy about the industry and all the fascinating sites she has seen in her work.

This type of interaction, essential to the long-term success of GeoFORCE, certainly leaves a lasting impression. Recognizing that this life-changing opportunity would not be possible without the support of industry leaders, the students wrote 225 personal letters of thanks.

Although GeoFORCE would not exist without institutional, corporate, and government support, the program is truly defined by the volunteers, park rangers, educators, university staff, and more than 100 other individuals who took

personal time to make this experience something special for our students. Everyone, without exception, provided positive role models and presented their information in a manner that stirred excitement in the kids.

I cannot name everyone in this document. I hope that each of you understands that we are enormously grateful for your contribution to and enthusiasm for the program. Some must be mentioned by name: Isaac Crumbly and Jackie Hodges of Fort Valley State University; Blaine Bennett, Dick Whipple, Nita Reed, and Andrea Flores of Southwest Texas Junior College; and Steve Hammond, Ivette Torres, and Katrina Burke of the US Geological Survey. We also thank these contributors from The University of Texas at Austin: Sigrid Clift, Jay Raney, and Tiffany Hepner of the Bureau of Economic Geology; Leon Long, Peggy Neill, and Andy Dewhurst of the Department of Geological Sciences; and Julie Jackson of the College of Education.

You never know what type of impact one moment can have on the future of these young scientists. For everyone who worked so hard to make this happen, I offer the following letter (reproduced with permission from the author) as a statement of what your efforts meant to the South Texas communities.

Julie Spink
Outreach and Diversity
Program Coordinator

Dear Mr. Ratcliff (and All),

I am still recuperating from all of the fun I had traveling to Austin and Washington D.C. I can't believe how many new friends I made and how many amazing things I learned. My GeoFORCE experience was awesome and I thank you and your team for allowing me to attend.

I sincerely do appreciate this program and admire all of the scientists and counselors who helped to make it a worthwhile and fruitful experience for me. I am convinced America needs smart, caring people to take an interest in not only geology but the many other earth science careers. I would like you to know that when our group was asked who all wanted to be an earth scientist (when Mr. Guzman was presenting) the majority of my friends didn't raise their hands because they were too shy! My guess is that after another year under our belts the shyness will have melted away.

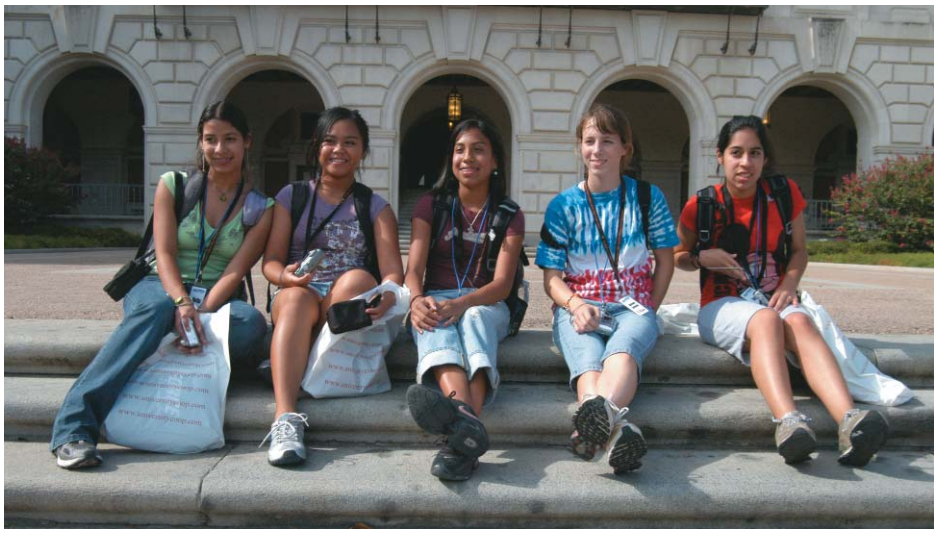
I thoroughly enjoyed visiting the sites we were taken to during the trip. Even though I'd been to Austin on many occasions, I had never been to McKinney Falls or Barton Springs. They were cool! The visit to McKinney Falls helped me to better understand the similar geologic processes that took place at Great Falls. What can I say about D.C. other than that too was a great experience! From our visits to Harper's Ferry, Great Falls, the US Geological Survey, the Smithsonian, Antietam, and the various memorials, I learned and saw lots of interesting things which will provide me with many life long memories.

Again, thank you for creating this program. I have no doubt that many students like me might not otherwise be exposed to such elements, simply because we live in rural Texas. I have been given the opportunity to branch out, make new friends, and develop a taste for new ideas. I can honestly say that I learned more geology in this one week experience than I have the past year in school. Please know that I am so glad we were given the field guide to help us keep track of what we were being taught. Plus, Sigrid, Peggy, Andy, Ann, and all of the other educators really explained how and why certain events took place and that made my comprehension of the material much easier. Even though I make very good grades in science, I've never felt like it came as easy to me as math. Now though, I no longer feel like a total dummy in science!

I will be looking forward to next year, so until then, best wishes to you and the crew at GeoFORCE!

Sincerely,

Adriana Jarosek



GeoFORCE 9th Grade Academy students on UT Austin Tower steps, Adriana second from right

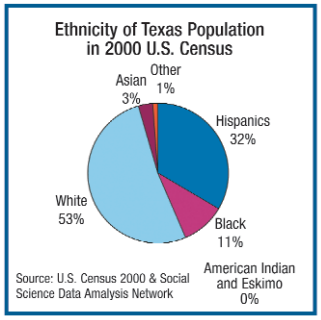
## EXECUTIVE SUMMARY

GeoFORCE Texas was launched to address two pressing needs: inspiring the next generation of geoscientists and fostering increased diversity in the U.S. workforce. The program recruits from the predominantly Hispanic South Texas region. It is open to all students in the region regardless of background, as reflected by the diversity of both the inaugural class of 2005 and the 2006 academies.

### Goals and Objectives

Minorities and females represent a virtually untapped reservoir for recruitment into geoscience careers. 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.

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.




### Methods and Strategies

GeoFORCE is truly a Jackson School initiative. To establish and enhance the program as a premier geosciences learning opportunity, the School enlists the expertise of its three major units. Current and future contributions include:

- Bureau of Economic Geology—curriculum development and instruction, including field guide contribution and authorship
- Department of Geological Sciences—faculty and graduate students directing program activities
- Institute for Geophysics—future development of teacher workshops and educator field trips aligned with Texas science curriculum

In addition, we draw from the wealth of resources available across The University of Texas at Austin campus. GeoFORCE enlists elements from sister programs in the Environmental Science Institute. The College of Education advises in curriculum development and teaching methodologies, and the Multicultural Information Center provides college students to interact with the GeoFORCE participants and give them insight into university life. Finally, the University's Development Office has helped foster relations with corporate sponsors and provided details for future financial support.

GeoFORCE Texas is neither a subtle nor an inexpensive approach. It is meant to provide a lasting experience that will capture middle and high school students' interest, motivate them to achieve excellence in math and science courses, and build their awareness of career opportunities in math and science, especially the geosciences.

Rather than duplicate existing efforts, this project sought an existing program for expansion and focused the efforts on the geosciences. With a 20-year record of success, Fort Valley State University (FVSU) in Georgia continues to attract minority talent, especially young African American students, to its outreach initiatives. GeoFORCE is an active partner in the FVSU program, providing funding and resource assistance with their summer academies and college transfer students.

GeoFORCE incorporates aspects of the FVSU undergraduate Cooperative Developmental Energy Program (CDEP) and its pre-university Mathematics, Science, and Engineering Academy (MSEA). By identifying high-potential minority students as early as the eighth grade and continually mentoring, challenging, and motivating them throughout their secondary education, MSEA nurtures their commitment to math and science. Like this FVSU program, GeoFORCE offers week-long hands-on and classroom experiences.

Hispanics represent a major portion of the Texas population—32 percent of the state overall and 75 percent of South Texas—yet they remain vastly underrepresented in the high-tech workforce and scientific community.

To reverse this trend, the Jackson School joined with Southwest Texas Junior College (SWTJC) to establish a recruitment and retention program focused on the sciences. SWTJC is the logical partner for this effort for several reasons:

- Multiple South Texas campuses (Uvalde, Eagle Pass, Del Rio)
- Student population of 4,700—75 percent Hispanic
- An established network of math and science teachers to assist in identifying students from 21 South Texas school districts for program inclusion

This partnership provides an excellent population for implementing a FVSU-style program and using a blended model of classroom work with hands-on field exercises to attract geoscientists.

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## PROGRAM PLAN FOR SOUTH TEXAS

Preparations for the GeoFORCE Texas academies and field courses begin months before the students arrive for the summer programs. In cooperation with SWTJC, the Jackson School sponsors workshops during the school year for educators from 21 South Texas school districts.

These workshops feature hands-on geoscience learning experiences that the teachers can take back to their classrooms. For example, at the January 2006 teacher workshop on the SWTJC Uvalde campus, workshop leaders from the Environmental Science Institute at The University of Texas at Austin introduced teachers to a variety of geospatial tools that can be used to engage students in math and science education. Participants also learned how to implement Geographic Information Science (GISc) in their classrooms through the use of free data sources (including remotely sensed data such as aerial photographs and satellite images) and free software.

These workshops update counselors and teachers about GeoFORCE program changes and procedures. Our network of educators helps us identify outstanding eighth grade math and science students eligible for the ninth grade summer program and provides these potential participants with brochures and applications.

The first call for applications in 2005 resulted in 118 applications for the 9th Grade Academy from eighth grade honor students; in 2006, 108 students applied for this academy. Each of the 108 applicants was an outstanding candidate, making the selection process a challenging task. Providing that the application is complete and the applicant meets the entry criteria, the student becomes eligible for the selection process for the GeoFORCE week-long academy track.

The program introduces students to geological issues usually not addressed in their academic coursework. Hands-on activities develop analytical and data analysis skills and offer insight into careers in the field of geology. Faculty and appointed graduate students from The University of Texas at Austin's Jackson School of Geosciences teach the geology course and lead the field work.

Each year, academy students visit different geological sites across the United States (Table 1). The program integrates elements of history, ecology, biology and teaches life skills that can be applied to the students' future successes.

South Texas educators learn GISc basics on SWTJC Uvalde campus, led by Jessica Gordon, UT Austin ESI


Dean Blaine Bennett welcomes over 120 people at GeoFORCE 9th Grade Academy orientation

**Table 1: GeoFORCE Academy Track Destination Summaries**

| | |
|---|---|
| 9th Grade Academy | US Geological Survey Headquarters, Reston, Virginia |
| | McKinney Falls |
| | Smithsonian National Museum of Natural History |
| | Smithsonian National Air and Space Museum |
| | Harpers Ferry National Historical Park |
| | Great Falls Park |
| 10th Grade Academy | Grand Canyon National Park |
| | Zion National Park |
| | Glen Canyon Dam |
| | Colorado River raft trip |
| | Navajo Bridge |
| | Balancing Rock |
| | Sunset Crater National Monument |
| | Wupatki National Monument |
| 11th Grade Academy | Mount St. Helens National Volcanic Monument |
| | SAT prep course |
| | Columbia River Gorge National Scenic Area |
| | Mount Hood, Oregon |
| | Hot Springs National Park |
| | Newberry Caldera, Oregon |
| | Crater Lake National Park |
| | Oregon coast |
| 12th Grade Academy | Houston |
| | Sponsor-led activities |

Students graduate to the next grade-level academy, provided they

- Continue to meet application criteria
- Maintain good grades
- Complete pre-academy assignments including essays

Of the 40 inaugural students, 39 graduated to the 10th Grade Academy. One student opted to pursue another summer activity, although his continued good grades and social conduct made him eligible to continue the program.

The 2006 GeoFORCE Texas program served students going into the ninth and tenth grades. We will continue to add a grade level each year until the academies and field courses enroll ninth through twelfth graders. Our plans also include the establishment of sponsor internships to move GeoFORCE Texas graduates into a degree track. This building block approach will ultimately result in an enrollment of 160 students (40 each in the ninth, tenth, eleventh, and twelfth grade tracks) at any one time.

## GEOFORCE TEXAS CHALLENGE: MAINTAINING THE NUMBERS

Attracting students, educators, and parents to the GeoFORCE program and keeping them engaged through four years of progressively demanding summer events and into a geosciences degree track is an ongoing challenge. This issue must be addressed swiftly with consistent improvements to the program.

It is essential that we maintain adequate participation in the program throughout all academies and cohort groups. The positive response to our call for applications prompted the Jackson School to implement a second track for outstanding students who missed the top 40 cut. The Young Geoscientists field course provides an opportunity to participate to bright students who either may have missed the call for applications (such as transfer students) or developed an interest in the geosciences later in their high school years.

Like the week-long GeoFORCE academies, the Young Geoscientists field course will grow in a building block progression. Students participating in these field courses visit geological sites in their own "backyard" (Table 2). These students provide a pool of proven young scientists, should any of the top 40 choose to leave the academy program.

GeoFORCE Texas Counselors at the Capitol, Washington D.C.

**Table 2: Field Course Track Destination Summaries**

| | |
|---|---|
| 9th grade | Uvalde |
| | Annandale bat cave |
| | Black Hole Tuft |
| | Basalt quarry |
| | Asphalt quarry |
| | Del Rio outcropping |
| | Leona Springs |
| | Fort Inge |
| 10th grade | Mustang Island State Park and Fish Pass |
| | Port Aransas Wetland Park |
| | Leona Belle Turnbull Birding Center |
| | South Jetty and the beach |
| | Marine Science Institute |
| 11th grade | The University of Texas at Austin |
| | SAT prep |
| | McKinney Falls |
| | Mount Bonnell |
| | Barton Springs and Edwards Aquifer |
| | Texas Memorial Museum |
| | Pedernales Falls State Park |
| 12th grade | Houston |
| | Sponsor site visits |

Unlike the academy track, which is limited to 40 students per grade level each year, this second track provides flexibility in enrollment numbers. The short duration of local trips allows both for a greater number of students to be invited and for a duplicate event if the numbers grow large enough. In 2005, 24 students attended the Uvalde field course for ninth graders. In 2006, this number increased to 38 students for the 9th grade Field Course and 34 students plus two high school interns for the 10th grade Field Course to Port Aransas and Mustang Island.

When all four Young Geoscientists field courses are in place, more than 120 students will be added to the 160 participating in the GeoFORCE academy program (Table 3). Both programs enjoy enthusiastic support from the students' communities, a clear indicator that the strategies developed for the South Texas region are proving successful.

**Table 3: Maintaining the Numbers in GeoFORCE**

| | Student Participation | | | | | |
|---|---|---|---|---|---|---|
| **Cohort** | 2005 | 2006 | 2007 | 2008 | 2009 | Total 2005-2009 |
| JSG-hosted FVSU MSEA 11th grade | 21 | 27 | 30[1] | 30 | 30 | 138 |
| GF 9th grade Academy | 40 | 40 | 40 | 40 | 40 | 200 |
| GF 10th grade Academy | 0 | 40 | 42[2] | 40 | 40 | 162 |
| GF 11th grade Academy | 0 | 0 | 40 | 42[2] | 40 | 122 |
| GF 12th grade Academy | 0 | 0 | 0 | 40 | 42[2] | 82 |
| Young Geoscientists 9th grade | 25 | 38 | 40[3] | 40 | 40 | 183 |
| Young Geoscientists 10th grade | 0 | 35 | 40[3] | 40 | 40 | 155 |
| Young Geoscientists 11th grade | 0 | 0 | 40[3] | 40 | 40 | 120 |
| Young Geoscientists 12th grade | 0 | 0 | 0 | 40[3] | 40 | 80 |
| **Totals** | **86** | **180** | **272** | **352** | **352** | **1,242** |

[1] Student numbers estimated for FVSU participation.

[2] Student participation for each GeoFORCE academy is 40 students per event. An incoming ninth grader was in a car accident weeks before the ninth grade trip. She has been invited to attend the 10th Grade Academy in 2007, her grades permitting. For logistical reasons, an additional female will be added to round out rooming issues.

[3] Student numbers estimated for future participation based on previous year's data.

GeoFORCE 10th Grade students experience the Colorado river on a half day floating lecture.

## SUMMARY OF 2006 ACTIVITIES

The inaugural GeoFORCE Texas program began a process of discovery that would define the program's second year and reveal opportunities for transformation. Lessons learned in 2005 led to changes in the overall structure, content, and delivery of materials to students. Indeed, all those involved—students, public school educators, parents, field scientists, university students, event coordinators, industry professionals—were exposed to an abundance of materials that made the main geological concepts more accessible and connected to everyday life.

The Jackson School, working with Southwest Texas Junior College and Fort Valley State University, implemented several changes that transformed the 2006 experience for both tracks of GeoFORCE students, as well as for the students attending the Jackson School-hosted MSEA 11th grade program. These changes include:

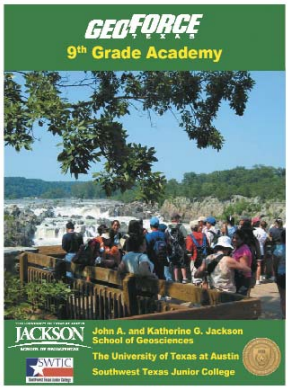
• Introduction of field guides for all activities. Written by Bureau of Economic Geology research and field scientists, these 30- to 70-page, spiral-bound handouts outline the geological concepts learned at each location and provide comparisons and contrasts to other visited sites.

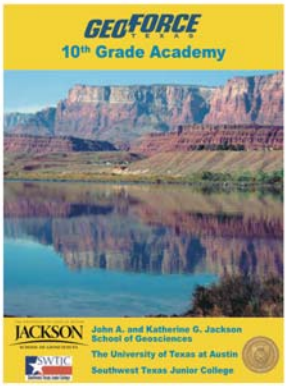
• Addition of graduate student instructors. Their assistance in classroom and field activities frees the lead instructor (field scientist or University of Texas at Austin professor) to focus and expand on key concepts. These graduate students also help identify and work with students who are struggling.

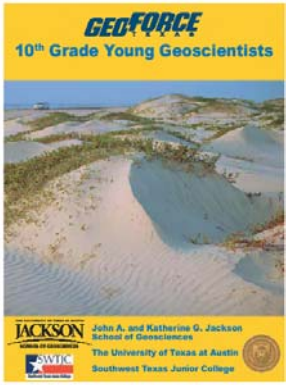
• Development of age-appropriate program assessment tools. The College of Education at The University of Texas at Austin helped program organizers understand different learning styles and suggested ways to improve information retention. The addition of daily quizzes reinforced the field guides, helping students remember key concepts learned each day.

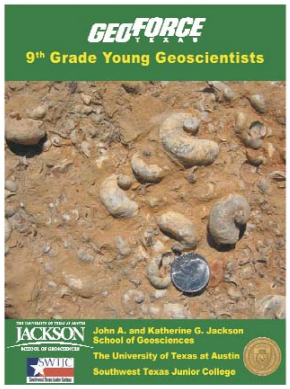
• Inclusion of energy professionals. Students benefited from interactions with people who put science to work in the field activities and in the classroom through sponsor presentations. Sponsors suggested program improvements, such as enhancing safety measures, and introduced students to the idea of starting "right now" by taking advantage of opportunities to accelerate their educations through pre-Advanced Placement, AP, and college courses.

The processes for engaging the educator network, conducting teacher workshops, distributing applications, completing the selection of participants, hosting orientation sessions, and increasing program visibility through press releases were all addressed prior to the summer activities. The 2006 summer program included three academies (GeoFORCE 9th and 10th grades and MSEA 11th grade) and two field courses (9th grade and 10th grade) for the Young Geoscientists program.



MSEA 11th Grade students learn about the basic physical properties of rocks in professor-led labs, Peggy Neill (Jackson School hydrology) leading

Dr. Leon Long and MSEA 11th Grade student

## FVSU MATHEMATICS, SCIENCE, AND ENGINEERING 11TH GRADE ACADEMY (MSEA)

For the third year in a row, the Jackson School hosted FVSU's summer academy for rising eleventh graders. Twenty-seven outstanding students from eight states, four counselors, and four adults participated in the event, which included classes at our Austin campus, field trips to areas of geologic interest, and a closing ceremony.

The week-long MSEA began in the classroom. A pretest determined the initial skill level of each student. Then followed several lectures focused on basic geology. After an orientation describing the local geology, the students went into the field and visited:

- Mount Bonnell
- Shoal Creek
- Barton Springs
- Lake Buchanan
- Spider Mountain
- Enchanted Rock
- Devil's Waterhole
- Texas Memorial Museum

At each site, students referred to a field guide that outlined the key concepts learned there. These guides also proved useful to the students in studying for their final exams.

Celebrating the successful completion of the 2006 program, the students presented a rousing tribute to the sponsors and staff at the closing ceremony. This event, hosted by Jackie Hodges, also featured hilarious student skits recapping the geology lessons learned.

Many people contributed to the success of MSEA. Dr. Leon Long and Peggy Neill from the Department of Geosciences led the students in the field and the classroom. Dr. Tim Taylor, Department of Petroleum and Geosciences Engineering, added a cross-disciplinary perspective to the academy instruction.

Unique to the MSEA experience, enrichment workshops provide students with instruction in ethics and social behavior. Chaperones Hazel Abe and LaRue Goss conducted the workshops, which included daily review sessions. Jackie Hodges, Vicky Halbert, and LaRue Goss, all from Fort Valley State University, handled logistics. Local assistance was provided by Julie Spink. Shavonne Cullers, Stephanie Santiago, Gary Plant, and Kenneth Leonard were counselors for the academy. Appendix C lists the students who participated in the 2006 FVSU summer academy.

## CDEP TRANSFER STUDENTS

Stanley Stackhouse and April Duerson continue to take classes in the geosciences as they work toward their Bachelor of Science degrees. Prince Kwarteng and Alex Tripp, Jr. continue their courses in Petroleum Engineering. April, Stanley, Prince, and Alex were the first students to enter The University of Texas at Austin from the FVSU Cooperative Development Energy Program (CDEP). The Jackson School hosted four potential CDEP scholars, Ben Hobbs, Enrique Perez, LaMichelle Arnold, and Leon Smith, in a two-day visit in April 2006. These students eventually elected to attend the 3+2 Dual Degree Program in Chemical Engineering at Penn State University.

Current FVSU CDEP transfer students and potential CDEP scholars visit UT Austin campus Seen here top of UT Tower

## GEOFORCE TEXAS ACADEMIES OVERVIEW

The 2006 events introduced new teaching methods and tools. Based on observations and analyses of the programs, GeoFORCE organizers isolated areas in need of improvement and proposed solutions:

**Lesson:** Students' attention span and absorption of information decreased dramatically after day 8 of the trip.
**Solution:** Shorten trip from 13 to 8 days (one week).

**Lesson:** Retention of material was low and final test materials were not age appropriate.
**Solution:** Engage College of Education professionals to develop age-appropriate materials that address different learning styles.

**Lesson:** Course content was too broad. Saturated with new experiences, students became overwhelmed.
**Solution:** Provide a concise, easy-to-understand focus for activities and concepts in a familiar format, e.g., field guides (textbooks).

**Lesson:** An inadequate flow of information between instructors and program coordinator resulted in a disparity between how much time was needed to cover a topic and how much time was allocated.
**Solution:** Involve the program coordinator with course layout through meetings prior to each event.

**Lesson:** Instructor time with students was limited due to the large amount of information, resulting in lack of personal assistance.
**Solution:** Appoint two teacher assistants who work with students on a one-on-one basis.

**Lesson:** Chaperones (public school teachers) did not have defined roles, resulting in confusion.
**Solution:** Define roles and assign duties to every adult participating.

Jackie Floyd, ExxonMobil, presents to GeoFORCE 9th Grade Academy

Carlos Guzman, Shell, presents to GeoFORCE 9th Grade Academy

9th Grade students from both the FVSU MSEA program and UT Austin GeoFORCE meet at USGS to learn about careers in the geosciences

## GEOFORCE TEXAS 9TH GRADE ACADEMY

The second 9th Grade Academy was held July 15–22, 2006. Forty new recruits to the GeoFORCE academy track were selected from 108 applications. Selected students represented 14 of the 21 Southwest Texas school districts that are part of the program. Geology instruction was provided by Bureau of Economic Geology field scientist Sigrid Clift, Jackson School graduate students Peggy Neill (hydrology) and Andy Dewhurst (structural geology), rangers at National Historical Parks, Dr. E-an Zen from the University of Maryland, Texas Memorial Museum Non-vertebrate Paleontology Laboratory Collections Manager Ann Molineux, and several presenters at the US Geological Survey headquarters in Reston, Virginia.

Carlos Guzman, geophysicist from Shell Exploration, and Jackie Floyd from ExxonMobil presented to the students. Julie Spink, with contributions from SWTJC staff Nita Reed and Andrea Flores, coordinated the logistics for the trip. SWTJC student counselors Mary Gabaldon, Michael Ponce, Quentin Bell, Marlynn Valenzuela, and Andrea Flores provided additional assistance. University of Texas student and Environmental Science Institute Outreach Lecture Coordinator Jessica Gordon joined the program as a student counselor.

Students met for the first time at the April orientation where they learned about trip destinations and the essential elements, including safety, of a good field trip.

The summer program began with a charter bus ride from the Southwest Texas Junior College campus to The University of Texas at Austin. An orientation reintroduced students to one another through team building games and to GeoFORCE through an overview of the program. After their pretest, the students participated in classes that would prepare them for their first field trip to nearby McKinney Falls to study the rock cycle. Academy members boarded a flight to begin a week of fascinating field trips:

• Washington, D.C. The students learned about the geology and topography of the Atlantic Coastal Plain, the Piedmont Province, the Blue Ridge Province, and the Valley and Ridge Province. In visits to the Lincoln Memorial, National Mall, Vietnam Veterans Memorial, and Korean Veterans Memorial, the students reflected upon events that shaped U.S. and world history. They explored the Smithsonian Museum of Natural History and the ever-popular Air and Space Museum and spent a day at Harpers Ferry National Historical Park, where they joined forces with the FVSU 9th grade MSEA before continuing on to Antietam National Battlefield.

GeoFORCE 9th Grade students explore downtown Washington D.C.memorials.

• Reston, Virginia. The US Geological Survey hosted both groups in a morning of exhibits and presentations from industry professionals. Students saw the igneous and metamorphic rocks of Great Falls, a place of not only geological but also historical significance: lichens on the rocks were alive when George Washington visited in 1785 to plan the building of a canal system around the falls.

Back in Texas, the students visited with and listened to the stories of professionals from Shell and ExxonMobil. Studying hard for their final exam, these young scholars turned in a remarkable performance. (Everyone earned an A and the average score was 96.) The week ended with a jam-packed, activity-filled closing ceremony attended by nearly 250 family members, teachers, and community leaders from South Texas. A complete list of the students who participated in the summer 2006 GeoFORCE 9th Grade Academy appears in Appendix C.

## GEOFORCE TEXAS 10TH GRADE ACADEMY

The inaugural GeoFORCE Texas 9th Grade Academy class returned for the first 10th Grade Academy, June 3–10, 2006. Thirty-nine of the original 40 students graduated into the next track of the program. (The 40th position was filled by an aspiring young scholar from the 2005 Young Geoscientist program.) In addition to the grade requirements, each student was required to write three essays, which were evaluated by Julie Jackson from the College of Education.

Geology instruction was provided by Bureau of Economic Geology field scientist Sigrid Clift, who was joined by industry professional and Texas Ex Christie Rogers from ExxonMobil. (A perfect match for the program, Christie conducted her undergraduate research at Zion National Park, one of the week's destinations.) The expertise of park rangers at Grand Canyon, Glen Canyon Dam, Sunset Crater and on the rafting trip enhanced the learning experience for the students. Other industry professionals—Patricia Hall and Tina Foster from BP, Max Brouwers from Shell Exploration, and Danielle Carpenter from Chevron—also joined the trip. The staff and counselors from the 9th Grade Academy also supported the 10th Grade Academy.

The summer program started with a group meeting at the SWTJC Uvalde campus, where the students were introduced to the field guides—a welcome addition to the program. Full of useful pictures and figures, these accessible learning tools highlight what the students are going to learn and why it is important.

In line with the overall program structure, the students took a pretest and attended orientation lectures on the field trip destinations. Armed with their field guides, the young scientists traveled to Las Vegas, Nevada. From there, they began the road trip to geological sites of interest across Utah and Arizona. Highlights from this trip included:

• Basin and Range Province, Arizona. Students examined the area's defining characteristics: alternating linear mountain ranges and valleys. Learning that the rocks tell a story of ancient environments, the students were introduced to the concept of uniformitarianism (the present is the key to the past).

Tina Foster, BP, leads group in discussion at Navajo Bridge, Arizona

• Zion National Park, Utah. The trip continued through Hurricane, Utah, and into Zion. There the students saw Mesozoic sand dunes preserved in Jurassic-age sandstone. Christie Rogers shared her abundant knowledge of and enthusiasm for the geology of this site. David Sharrow from Zion NP described the regional geology and explained how past environments and geologic processes created what we see today.

• Glen Canyon Dam, Arizona. A study in the importance of water, this site exemplifies how dams installed along river systems affect the environment. From the dam, students could look down at the rafts that they would be sitting in the next morning.

• Colorado River raft trip, Arizona. Rafting down the Colorado River was an amazing experience. Traveling in pontoons, the students meandered down a river that cuts through the surrounding 700-1,700-foot cliffs of Navajo sandstone. A stop at Lees Ferry gave the young scientists the chance to study two geologic wonders, Balanced Rock and the Navajo Bridge, both excellent examples of differential erosion.

• Grand Canyon, Arizona. In a fascinating hands-on lecture, Jim Heywood pointed out key geological facts about the canyon. Geology was everywhere!

• Wupatki National Monument and Sunset Crater, Arizona. After a visit to the pueblos at Wupatki, the students hiked across a volcanic landscape of frozen magma (basalt) at Sunset Crater.

Upon their return to Texas, the students completed a final exam, learned about the energy industry from BP and Chevron professionals, and prepared for the closing ceremony. Motivated to learn, these students scored an average of 95 on the final exam. More than 230 family members and friends attended this closing ceremony, where the students gave a heartfelt farewell to Doug Ratcliff, one of the key forces of GeoFORCE, who retired from The University of Texas at Austin in August 2006. A complete list of the students who participated in the GeoFORCE Texas 10th Grade Academy appears in Appendix C.

## YOUNG GEOSCIENTISTS FIELD COURSE OVERVIEW

Many outstanding students apply to the GeoFORCE Academies. The Young Geoscientists Field Course was designed to provide an exciting program for applicants who were not selected for the Academy, but whose scholastic records and completion of the rigorous application process indicate aptitude and motivation. The course replicates many of the aspects of the GeoFORCE Academy (a trip away from home, visits to interesting geological sites, and exposure to a college setting), but on a lesser, more local, scale.

Students may move up to the GeoFORCE Academy should any of that program's students choose to leave. We moved three students from this track into the academy program in 2006 to replace one student who chose another summer camp experience, another who was in a car accident three weeks before the event, and a third who was homesick one day into the program. In each instance, we relied on the Young Geoscientists group to find an inspired and motivated replacement who is familiar with the program.


Vulcan Materials Uvalde Asphalt Quarry-Plant Manager, Chuck Beavis (far right)

## YOUNG GEOSCIENTISTS 9TH GRADE FIELD COURSE

The July 11-12 field course was conducted in the Southwest Texas area. Thirty-eight rising ninth graders from ten schools were accompanied by two local math and science teachers, Brett White (Hondo) and Marla Hibbitts (Uvalde), as well as four van drivers and two lifeguards. Bureau of Economic Geology field scientist Sigrid Clift, assisted by Jackson School graduate students Peggy Neill and Andy Dewhurst, led the activities. Marissa Cadena, student intern and incoming University of Texas at Austin freshman in the College of Natural Sciences, also assisted. Students from SWTJC served as lifeguards (Marlynn Valenzuela), qualified van drivers (Valencia Simms, Brittany Martin, Joseph Valenzuela, and Ruben Martinez), and student counselors (Mary Gabaldon, Michael Ponce, Quentin Bell, and Andrea Flores). Many members of the SWTJC staff participated, including Nita Reed, Willie Edwards, Dick Whipple, Ana Marie Darden, Eva Gonzales, and Alma Ruiz. Julie Spink coordinated the program for the Jackson School.

The students experienced a series of lectures that included basic geology and an orientation to the local geology of the Uvalde area. Bureau scientist Scott Rodgers treated them to a demonstration of 3-D visualization technology that allowed them to "fly" through the Edwards underground aquifer from The University of Texas at Austin.

Like Academy students, the Young Geoscientists received field guides that detailed the day-to-day geological concepts that they would learn. Also like Academy participants, these students took daily review quizzes and a final exam.

Young Geoscientists field trips included:

- Black Hole Tuft
- Basalt quarry (Knippa)
- Del Rio outcropping
- Fort Inge/Leona Springs
- Annandale Bat Cave
- Asphalt quarry (Uvalde)
- Big Oak River Camp

At each location students were welcomed by professionals, such as Michael Schutter, Dee Kirkpatrick, and Chuck Beavis at the Vulcan Corporation quarry tours and Bane Walker at Annandale Bat Cave. Mark Martin from Shell accompanied the students for the entire trip, answering a myriad of questions. A list of all students who participated in the Young Geoscientists 9th grade Field Course appears in Appendix C.

Mark Martin, Shell, presents to Young Geoscientists 9th Grade students

Students serch for basalt samples at Vulcan Materials Knippa Traprock Quarry

Young Geoscientist 9th Grade students are led in a discussion about Leona Spring by Sigrid Clift and Peggy Neill

Jackson School graduate student, Andy Dewhurst, helps 9th Grade field course students in identifying their basalt samples

## YOUNG GEOSCIENTISTS 10TH GRADE FIELD COURSE

From June 10-12, Young Geoscientists from the 10th grade Field Course explored the Texas coast. The course introduced 34 students—19 returning from the 2005 9th grade Field Course—to coastal geological concepts, marine biology, and the ecology of the Port Aransas and Mustang Island areas.

Sigrid Clift, Tiffany Hepner, and Peggy Neill, all from the Jackson School, led the activities. Dr. Rick Tinnin from The University of Texas at Austin's Marine Science Institute directed the water research vessel activities. Marissa Cadena and Jennifer Morris, Bureau student interns and incoming freshmen, assisted the program. Brett White (Hondo) and Marla Hibbitts (Uvalde) once again served chaperone detail, and four SWTJC counselors, Mary Gabaldon, Quentin Bell, Michael Ponce, and Andrea Flores, accompanied the students. Julie Spink and Nita Reed handled event logistics.

The students met at the SWTJC Uvalde campus for an orientation. Afterward, they loaded into the charter bus for the four-hour drive to the coast. The next morning, students split into two groups. One group boarded the *Katy*, the Marine Science Institute research vessel, while the other group explored Mustang Island, learning about beach transaction. For many students, this was their first beach visit. In the afternoon, the groups traded places. The evening activities included a review of the day's lessons.

The second day found the group headed to the beach for a profiling activity, set up in four stations. Each station described a different concept and provided hands-on demonstrations. Shell geologist Dominic Druke joined the field course, describing his position at Shell and sharing some of his experiences with the students.

Highlights of the 10th grade Field Course included:

- Mustang Island State Park and Fish Pass
- Port Aransas Wetland Park
- Leona Belle Turnbull Birding Center
- South Jetty and the beach
- Marine Science Institute

A list of all participants in the 10th grade Young Geoscientists Field Course appears in Appendix C.

Young Geoscientists 10th Grade students explore the beaches and land along Mustang Island

Dr. Rick Tinnin, UT Austin Marine Science Institute, leads a hands-on discussion about the creatures living in the sea and how the sediment at the bottom of the ocean provides for these life forms


Coastal geologist, Tiffany Hepner, leads Young Geoscientists 10th graders in beach profiling exercises at Mustang Island State Park

Young Geoscientists 10th Grade students complete the field course and earn their certificates

Young Geoscientists 10th graders on UT Austin's research Vessel, the *Katy*. For many this is their first time on water

## FINANCIAL INFORMATION

The GeoFORCE Texas program is a strategic priority and a long-term commitment for the Jackson School. To ensure the program's success, the School underwrites the costs, providing the staff time necessary to administer the program. All financial contributions are directly applied to the costs of the program activities.

Sponsorship is critical to funding a program of this magnitude. We rely on our sponsors not only for financial but also human resources. Students' exposure to and interactions with industry scientists—as well as those working in universities and government—are essential to the GeoFORCE experience. From these role models, students learn about the exciting careers that await those who "do the math."

### 2005-06 Program Costs

The following table shows the expenditure of funds for the 2005-06 academic year. Adjusting the budget for the inclusion of the new field guides, these costs are in line with the forecasted 2005-06 expenditures (see Table 4). The field guides, a necessary program element, help students retain information learned during the events. The overall cost of GeoFORCE increased due to the much-needed improvement of daily field guides and to an increase in the numbers of field course students.

**Table 4: 2005-06 Program Costs**

| Activity | Students | Cost ($) |
|---|---|---|
| Spring teacher workshop | NA | 3,000 |
| GeoFORCE 9th grade orientation | 40 | 3,500 |
| FVSU MSEA 11th grade | 27 | 39, 900 |
| GeoFORCE 9th Grade Academy | 40 | 69,100 |
| GeoFORCE 10th Grade Academy | 40 | 69,000 |
| Young Geoscientists 9th grade Field Course | 38 | 8,840 |
| Young Geoscientists 10th grade Field Course | 34 | 12,900 |
| CDEP transfer students | 2 | 32,000 |
| CDEP student site visit | 4 | 3,700 |
| Pre-field guide total | | 241,940 |
| Field guides | | 69,000 |
| Total | 225* | 310,940 |

*Total of participants including teachers, parents, industry professionals, and staff was 390 people.

## 2005-06 SPONSOR CONTRIBUTORS

GeoFORCE Texas would not exist without the strong support of our sponsors. Table 5 details their generous financial assistance to date. In addition, sponsors have provided valuable operational suggestions and participated in academy events. As the program expands to more than 300 students each year, additional financial support will be required. There must be an identified and worthy return on investment for our sponsors.

Key goals of the GeoFORCE program include increasing the number and quality of future geoscientists and assuring widespread acknowledgement of all sponsors. Realization of the first goal will take time, but fulfillment of the second has been immediate and ongoing. The visibility of GeoFORCE Texas and its sponsors is clearly evident. (See Appendix A for examples of newspaper articles associated with the program.) Added to the press coverage is the growing and enthusiastic support of the students, parents, teachers, and community leaders of South Texas.

**Table 5: GeoFORCE Texas Funding**

| | 2004-05 | 2005-06 | 2006-07 | Total |
|---|---|---|---|---|
| **Obligated** | | | | |
| Alcoa | | | 5,000 | 5,000 |
| Chevron | | 40,000 | | 40,000 |
| ConocoPhillips | 20,000 | 41,000 | 43,000 | 104,000 |
| Dominion Exploration | | 10,000 | | 10,000 |
| ExxonMobil | 10,000 | 25,000 | | 35,000 |
| Halliburton | | 10,000 | 20,000 | 30,000 |
| Jackson School | 35,000 | 75,000 | 100,000 | 210,000 |
| Marathon Oil | | 3,000 | | 3,000 |
| Minerals Management Service | | 25,000 | | 25,000 |
| Priority Oil & Gas LLC | 2,000 | | | 2,000 |
| AT&T Foundation | 25,000 | 15,000 | | 40,000 |
| Schlumberger | | 3,000 | | 3,000 |
| Shell Oil Company | 50,000 | 50,000 | | 100,000 |
| Shell E&P Technology Co | 5,000 | 10,000 | | 15,000 |
| Swift Energy | | 10,000 | | 10,000 |
| **Total** | **147,000** | **317,000** | **168,000** | **632,000** |

## ESTIMATED FUTURE COSTS

Table 6 (next page) shows the estimated costs of the program expansion. The increased costs reflect the addition of more academies, more FVSU transfer students, and more students to the Young Geoscientists field courses, as well as new field guides and future revisions to materials. Inflation is calculated at 4 percent.

The cost for the 2006-07 program is estimated to be $386,000.

This includes:

- GeoFORCE 11th Grade Academy, which will travel to the Pacific Northwest
- Young Geoscientists 11th grade Field Course to sites surrounding Austin
- Fall and spring teacher workshops
- Additional students in the 9th and 10th grade Young Geoscientists program
- Additional consideration to be given to funds dedicated to the creation of the two new field guides and to the revisions of current editions.

Negotiated rates on food and lodging, education waivers for National Historic Parks, donations from locations such as Big Oak River Camp, and bulk purchases on common supplies allow us to save money without affecting the structure of the program. We will continue to negotiate the best rates for all line items.

The 2007 summer events will require four graduate instructors and three lead field scientists, plus an additional six counselors to cover the back-to-back events (see Appendix D: GeoFORCE Calendar Forecast through 2008).

## FUNDING GOALS

GeoFORCE Texas is no longer in start-up mode. Following two highly successful summers, the program is on track to exceed its original enrollment projections and shows all signs of establishing itself as a model pipeline initiative for the geosciences.

The program's funding goals are changing accordingly. At a minimum, the program seeks to raise the additional $386,000 required to meet 2006-07 estimated operating costs. This jump of 22 percent over 2005-06 is based on the originally planned expansion of the program.

GeoFORCE's larger goal, however, is to seek greater long-term funding stability to match the program's development.

GeoFORCE will educate and inspire 300 students in 2006-07 and 350 or more when fully enrolled in 2007-08. This is a major commitment to the students and communities of South Texas—and to the geoscience community seeking trained professionals.

To honor these commitments, GeoFORCE is exploring longer-term funding models. We want to ensure the program's longevity throughout the college prepatory years of all current students. With an average cost per student of $1,375, we believe the program is a great value. This is a small price to pay for such a large impact on the lives of future geoscientists.

If you would like to explore longer-term funding opportunities for GeoFORCE, contact program coordinator Julie Spink, 512-471-4360, jspink@mail.utexas.edu, www.jsg.utexas.edu/geoforce.

*Many thanks to all of our sponsors!*








Minerals Management Service





## PLANS FOR 2007

The Jackson School will continue to offer diverse outreach activities, building on its commitment to the GeoFORCE Texas program and therefore to the communities of South Texas and to the future of the geosciences. Plans for 2007 include:

- Continue building relationships with Fort Valley State University and Southwest Texas Junior College.
- Supply program applications earlier. Applications will be available as early as October 6, 2006, and can be submitted starting in November. Teachers can thus distribute applications over a longer period of time. (Applications submitted before January 14, 2007 must be followed up with the submission of second quarter grades for math and science.)
- Establish a career days and science fair calendar for schools served by GeoFORCE. With the help of SWTJC, the Jackson School will implement these activities, providing an opportunity for sponsors and industry professionals to interact with the students in their own environment.
- Sponsor two teacher workshops (fall and spring) complete with materials for the teachers to take back to their classrooms.
- Provide students a field journal for writing daily thoughts. These reflections will serve as the basis for essays to be written after program completion. These essays will in turn be used to communicate the program to the students' communities and to emphasize the generous contributions of our sponsors.

**Table 6: GeoFORCE Texas Estimated Future Costs**

| | 2004-05 | 2005-06 | 2006-07 | 2007-08 | 2008-09 | Total |
|---|---|---|---|---|---|---|
| Fall teacher workshop | 0 | 0 | 4,000 | 4,500 | 4,700 | 13,200 |
| Spring teacher workshop | 2,500 | 3,000 | 3,500 | 3,800 | 4,000 | 16,800 |
| 9th Grade Academy orientation | 3,500 | 3,500 | 3,500 | 3,500 | 3,500 | 17,500 |
| FVSU MSEA 11th grade[1] | 38,000 | 40,000 | 40,000 | 40,000 | 40,000 | 198,000 |
| FVSU CDEP transfer students[2] | -- | 36,000 | 36,000 | 68,000 | 100,000 | 240,000 |
| GF 9th Grade Academy | 68,000 | 70,000 | 73,000 | 73,000 | 73,000 | 357,000 |
| GF 10th Grade Academy | -- | 71,000 | 74,000 | 77,000 | 77,000 | 299,000 |
| GF 11th Grade Academy | -- | -- | 75,000 | 78,000 | 78,000 | 231,000 |
| GF 12th Grade Academy | -- | -- | -- | 68,000 | 70,000 | 138,000 |
| Young Geoscientists 9th grade | 4,500 | 9,000 | 10,000 | 11,000 | 11,000 | 45,500 |
| Young Geoscientists 10th grade | -- | 15,000 | 17,000 | 20,000 | 20,000 | 72,000 |
| Young Geoscientists 11th grade | -- | -- | 15,000 | 17,000 | 20,000 | 52,000 |
| Young Geoscientists 12th grade | -- | -- | -- | 15,000 | 17,000 | 32,000 |
| Field guides | -- | 70,000 | 35,000 | 35,000 | 15,000 | 155,000 |
| Total | 116,500 | 317,500 | 386,000 | 513,800 | 533,200 | 1,867,000 |

Estimated based on previous year's data and 4 percent inflation.

[1] Jackson School contribution.

[2] FVSU CDEP transfer costs include a site visit to The University of Texas at Austin campus for potential scholars. The cost will vary depending on the number of qualified applicants considering the University for a transfer degree in the geosciences. The number of attendees affects the total award to FVSU students.


Advertisement as it appeared in the July issue of Geotimes

*(and welcome aboard Alcoa!)*

Dominic Druke, Shell, accompanies the 10th Grade Young Geoscientists

Christie Rogers, ExxonMobil geologist, assists students in finding fossils at Grand Canyon

Representing 14 different school districts, GeoFORCE 9th Grade Academy students get to know each other

Danielle Carpenter, Chevron, presents to GeoFORCE 10th Grade Academy students

Ranger Floy Healer leads GeoFORCE 10th Grade Academy students through lava flows at Sunset Crater

Grand Canyon Ranger Jim Heywood, educates the GeoFORCE 10th Grade Academy students of the "ways" of the Canyon

GeoFORCE 10th Grade Academy students learn in an outdoor classroom at the Grand Canyon – South Rim Desert View

GeoFORCE 10th Grade Academy students at Zion NHP

Patricia Hall, BP, presents to GeoFORCE 10th Grade Academy students


More than 230 people attend the closing ceremony for the GeoFORCE 10th Grade Academy students


Dave Sharrow, hydrologist and Ranger Zion NHP, leads group in discussion of the age of the nearby rock formations

# APPENDIX A

## Geoscience Training in Full Force

GeoTimes June 2006 www.geotimes.org

Sabrina Cervantez, a ninth grader at Del Rio Middle School in Texas, "loves learning about Earth" and "how our planet actually is," she says. "I want to know how and why things work, how they function, how they do things and why they do it."

Last year, as an eighth grader, Cervantez entered the school science fair with a geology demonstration of plate tectonics, "but it didn't really get me that far," Cervantez says, who at that point had never traveled outside the state of Texas. That soon changed, however, after a teacher encouraged her to apply for GeoFORCE Texas, a new summer program designed to shape the next generation of earth scientists.

First-year GeoFORCE students take a look at geology by learning about the rock cycle. Throughout the program, students learn about geology in classrooms, at museums and in the outdoors. Photos are courtesy of University of Texas at Austin, Jackson School of Geosciences.

In summer 2005, Doug Ratcliff, assistant dean of the Jackson School of Geociences at the University of Texas in Austin, and colleagues launched GeoFORCE. Modeled after the Mathematics, Science and Engineering Academy, created by Isaac Crumbly at Fort Valley State University in Georgia, GeoFORCE selects 40 new students per year who will spend about a week every summer from 9th through 12th grade learning about careers in geology.

Ratcliff hopes that the intense program will address a key issue affecting the geosciences: the declining number of students pursuing degrees in math and science in "non-medicine-type" careers. Medicine is "pumped up by TV and movies," Ratcliff says. "We don't have a show about geologists driving Ferraris." And among Cervantez's classmates interested in math and science careers outside of medicine, Cervantez says that most want to pursue jobs in technology and engineering, not in the geosciences.

After reviewing statements from the students and recommendation letters, Ratcliff and colleagues selected 40 students, including Cervantez, from a pool of top math and science students from school districts across South Texas. "I was screaming my head off, I was so happy," Cervantes says, when she found out she was chosen for the program. The students gathered in Uvalde, Texas, before embarking on a 12-day cross-country trip to meet geoscientists, tour national parks and learn about career opportunities in the geosciences.

Nestled within the busy 12 days was a stop at the U.S. Geological Survey (USGS) in Reston, Va. There, GeoFORCE students explored career options through exhibits presented by participants such as the National Oceanic and Atmospheric Administration, the U.S. Environmental Protection Agency, and of course, USGS.

"The goal is to try to get more students into that math-science pipeline that the nation is really thin on," says Stephen Hammond, a USGS hydrologist who worked to recruit exhibitors. A "huge bubble" of job vacancies will affect almost all federal government jobs, from research to service, as baby boomers prepare to retire, he says.

Cervantez says that prior to GeoFORCE, she was not aware of the "amazing" variety of geoscience careers. She always knew she wanted to be a geologist, but says she thought the field was limited to "certain categories." After visiting USGS, "I just got so excited," she says, "there's hydrology, mineralogy — all these different fields."

Also to help increase numbers of math and science students, Ratcliff and colleagues targeted GeoFORCE toward the mostly Hispanic and underrepresented region of South Texas, from which students have not tracked into the Jackson School in high numbers. Hispanics make up about 87 percent of the population living in the Lower Rio Grande Valley, one of the regions in southern Texas targeted by GeoFORCE, according to Steve Murdock, a demographer for the Texas State Data Center. And from the total population in that area, almost 80 of percent of people over 25 years old had not pursued a post-high school degree. Part of the reason, Ratcliff says, could be that the region is rural and not usually on the trail of college or industry recruiters.

Ratcliff hopes that after four summers of GeoFORCE, the University of Texas, and the Jackson School of Geosciences in particular, will be among the choices of the college-bound students, but knows that there is no guarantee. "I cannot tell you what a kid who is entering the ninth grade will do in four years," he says. "All we're trying to do is make an impression on them and show them what opportunities exist in the geosciences."

Getting students into the field helps to make a lasting impression, says Leon Long, a geologist at the Jackson School who led some of the GeoFORCE field trips. A current college student recently told Long that after attending the introductory geology class trip to study uplift, he decided to major in geological sciences. Getting out into the field "has an enormous impact on these people," Long says.

Last year's program included a trip to Carlsbad Caverns in New Mexico, the deepest limestone cave and the fourth longest in the United States. A guide led a walk through the cave, showing different types of limestone and where the area had once been under the ocean. Cervantez admits she already knew some of the information from reading about different types of geology, "but actually seeing it and actually being able to go out there and get hands-on experience really made it stick in my mind," she says.

A geological field trip outside Taos, N.M., allows students to apply classroom learning to the world around them. GeoFORCE took students, some of whom had never traveled outside of Texas, to get an up-close look at mountains, caves and other geologic features.

Funding for GeoFORCE comes from the program's corporate sponsors, including Shell, ConocoPhillips and BP, among others. The program is an all-expenses-paid event for the students, and the sponsors hope that down the road, they will see returns in that investment with more students deciding to enter geoscience fields.

In addition to providing the funding, however, the sponsors also participate. This summer, when the same group returns for year two of GeoFORCE, they will go river rafting in Glen Canyon in Arizona and Utah, and geologists from the sponsor companies will give presentations about the types of careers in geology.

At the same time, a new incoming class of 40 ninth graders will follow a similar journey that students took the previous year, but pared back from 12 days to one week. And those who do not make it into the GeoFORCE academy can apply to Young Geoscientists, a two-day course that takes students hunting for fossils and digging through quarries that are closer to their homestate, Texas.

After the first summer of GeoFORCE, Cervantez seems to have made up her mind and says that she wants to become a planetary geologist. "It just blows my mind to see that there is this whole other world out there outside our own that we can explore." Time will tell, however, if rafting in Glen Canyon this summer will reveal to Cervantez another yet-undiscovered and equally captivating geoscience career.

Kathryn Hansen

GeoFORCE TX 9th Grade Academy 2005
with Dr. Leon Long at Taos, NM

Education & Outreach

# GEOSCIENCE TRAINING IN FULL FORCE

Kathryn Hansen

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Ratcliff hopes that after four summers of GeoFORCE, the University of Texas, and the Jackson School of Geosciences in particular, will be among the choices of the college-bound students, but knows that there is no guarantee. "I cannot tell you what a kid who is entering the ninth grade will do in four years," he says. "All we're trying to do is make an impression on them and show them what opportunities exist in the geosciences."

Getting students into the field helps to make a lasting impression, says Leon Long, a geologist at the Jackson School who led some of the GeoFORCE field trips. A current college student recently told Long that after attending the introductory geology class trip to study uplift, he decided to major in geological sciences. Getting out into the field "has an enormous impact on these people," Long says.

Last year's program included a trip to Carlsbad Caverns in New Mexico, the deepest limestone cave and the fourth longest in the United States. A guide led a walk through the cave, showing different types of limestone and where the area had once been under the ocean. Cervantez admits she already knew some of the information from reading about different types of geology, "but actually seeing it and actually being able to go out there and get hands-on experience really made it stick in my mind," she says.

Funding for GeoFORCE comes from the program's corporate sponsors, including Shell, ConocoPhillips and BP, among others. The program is an all-expenses-paid event for the students, and the sponsors hope that down the road, they will see returns in that investment with more students deciding to enter geoscience fields.

In addition to providing the funding, however, the sponsors also participate. This summer, when the same group returns for year two of GeoFORCE, they will go river rafting in Glen Canyon in Arizona and Utah, and geologists from the sponsor companies will give presentations about the types of careers in geology.

At the same time, a new incoming class of 40 ninth graders will follow a similar journey that students took the previous year, but pared back from 12 days to one week. And those who do not make it into the GeoFORCE academy can apply to Young Geoscientists, a two-day course that takes students hunting for fossils and digging through quarries that are closer to their homestate, Texas.

After the first summer of GeoFORCE, Cervantez seems to have made up her mind and says that she wants to become a planetary geologist. "It just blows my mind to see that there is this whole other world out there outside our own that we can explore." Time will tell, however, if rafting in Glen Canyon this summer will reveal to Cervantez another yet-undiscovered and equally captivating geoscience career. ○

First-year GeoFORCE students take a look at geology by learning about the rock cycle. Throughout the program, students learn about geology in classrooms, at museums and in the outdoors.

A geological field trip outside Taos, N.M., allows students to apply classroom learning to the world around them. GeoFORCE took students, some of whom had never traveled outside of Texas, to get an up-close look at mountains, caves and other geologic features.

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## Shell representative impressed with program

Posted: Monday, Jul 31, 2006 - 09:11:00 am CDT
Uvalde Leader News

Chaperoning 38 upcoming ninth-graders poking around the rocks of Southwest Texas may not sound like much of a summer vacation to many, but for Shell senior geologist Mark W. Martin it was a great opportunity to see young minds at work in the field he loves.

Martin joined students and instructors on July 11-12 in the second annual Young Geoscientists field study, part of the GeoFORCE Texas Program sponsored by The University of Texas at Austin's Jackson School of Geosciences and Southwest Texas Junior College.

Based out of Shell's Houston office, Martin works with the company's Alaskan exploration group, focusing primarily on interpreting seismic data.

Shell is a major contributor to the GeoFORCE Texas Program. When his company asked for volunteers to help with this summer's ninth-grade field study in the Uvalde area, Martin signed on.

"I've always enjoyed this area ever since I used to come out here with my dad when I was a kid," Martin said. "It was fun to come back and take a closer look at some of the area's rich geology."

Martin said he is quite impressed with the entire GeoFORCE Texas Program, which includes summer academies to sites across the U.S., along with local two-day field studies.

"This is a great program that opens up the subject of geology to these students. It's a unique outreach program that has significant and lasting benefits," Martin said.

During the two-day field study at sites around Uvalde County, Martin said GeoFORCE instructors did an excellent job.

"Students receive a lot of information but not an overload; just the right amount," Martin said. "The kids are out exploring the geology right here in their backyard. They are looking at rocks and making observations, which is a big part of what geologists do."

Martin said he feels a program like GeoFORCE Texas is long overdue.

"I've heard talk about starting an outreach program like this for years, but nothing ever got off the ground," Martin said. "I commend the Jackson School and Southwest Texas Junior College for getting GeoFORCE Texas going and I'm glad Shell can help."

Martin said he believes the program has benefits far beyond simply recruiting future geoscientists. "Aside from better preparing students for careers in the industry, GeoFORCE also makes students aware of their surroundings. It's important for their personal growth to know about the Earth's history.


Mark Martin, Shell, presents to Young Geoscientists 9th Grade students

"I hope my children will have the opportunity to participate in a program like this one when they become of age," said Martin. "With GeoFORCE, everybody wins."

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830-278-3335 / 830-278-9191 (fax)

## The USGS Exposes Youth to the Future of Science

Released: 7/25/2006
By Jessica Robertson

On July 18, the USGS welcomed over 80 rising ninth-graders to Reston, Va., for a 3-day journey of understanding and exposure to its community and the array of opportunities offered in the world of science.

These students are enrolled in two summer academic academies: Mathematics, Science and Engineering Academy (MSEA), through Fort Valley State University (FVSU) in Fort Valley, Ga., and GeoFORCE, through the Jackson School of Geosciences at the University of Texas at Austin. "The goal of the USGS is to keep youth interested in science, provide them with an avenue to interact with scientists, and hopefully inspire them to carry this enthusiasm back to their peers and communities," said Steve Hammond, Acting Chief, Science Information and Education Office. Both academies collaborated with the USGS to address the under-representation of minorities and females in the fields of math, science, and engineering, by providing young minds an opportunity to apply classroom theory to the field, while sneaking a glimpse into the possibilities of their future.

The USGS, as well as the academies, are, "dedicated to the understanding of mathematics, engineering, and science as an option for their future," said Ivette Torres, USGS Mineral Industry Analyst and committee co-chair for this event.

On their first morning in Virginia, both academies were accompanied by counselors and USGS scientists for a field trip to Harpers Ferry National Historic Park in West Virginia. Later that evening, GeoFORCE explored Antietam National Battlefield, Md., and MSEA ventured to Great Falls Park, Va., where they were escorted by Walter McDowney, Great Falls Park Site Manager.

Each trip focused on historical and environmental contexts, as well as the area's geological aspects. "We don't realize we are learning because we are having fun at the same time," said first-year GeoFORCE student Jeff Sitgreaves.

The USGS held a reception dinner the evening of July 19, introducing the two academies and formally welcoming students to the community. The program included guest speaker Bob Doyle, Deputy Director of the USGS, as well as a FVSU MSEA scholar Brianna Hammond, who is the daughter of Steve Hammond.

Through middle school, Brianna assisted the program by handing out flyers and setting up events at the USGS. With the encouragement of her father, she later joined MSEA. Brianna, now a junior counselor for the younger kids, provided a student's perspective on the academy and said that for her, "The main motivation for staying in the program is the people you meet."

The following morning, July 20, students found the USGS's main lobby and hallway filled with exhibitors from the Geology, Geography, Biology, and Water Resources Disciplines, as well as the Eastern Region Human Resources office and the Science Information and Library Services. Guest exhibits were hosted by the Smithsonian, NASA, and the Environmental Protection Agency. That evening, MSEA continued their visit with a tour of D.C. and its national monuments, while GeoFORCE journeyed through Great Falls.

USGS scientist presents to 9th Grade MSEA and GeoFORCE students

For over two decades, FVSU, a Historically Black College and University, has hosted MSEA for high school students, recruiting as far away from Georgia as Alaska. MSEA is directed by Dr. Isaac Crumbly, Associate Vice President for Collaborative Programs and FVSU Cooperative Development Energy Program Director.

After competing with other well-known universities to recruit students, Dr. Crumbly decided to "grow our own students" said Assistant Director Jackie Hodges. Since 1992, the USGS has been a sponsor of MSEA, providing internships and scholarships to students. "DOI overall has been very supportive ... and I am just appreciative," said Dr. Crumbly.

The Jackson School modeled GeoFORCE after MSEA's training and classes in earth science. Torres explained that GeoFORCE, in its second year of involvement, "creates opportunities for Hispanic-American students, who otherwise may not have exposure outside their home town." The money raised through GeoFORCE goes directly to the students, and a two-day field course is also provided to those who applied but were not initially selected for the program.

"Hammond assisted the Jackson School's Bureau of Economic Geology in the reviewing the GeoFORCE field guidebooks," said GeoFORCE Program Coordinator Julie Spink. "The guidebooks give the students a day-to-day breakdown of the geological concepts, land features, and field trip stops they will learn about."

MSEA, GeoFORCE, and the USGS are collaborating to nurture the potential they recognize in so many young minds. "I like meeting other GeoFORCE and MSEA students because we are all different but have the same questions and interests," explained first-year GeoFORCE scholar Jorge Melchor.

This program is a volunteer effort on behalf of the USGS, especially committee chair Katrina Burke. A total of $75,000 a year is donated by the USGS to FVSU's academic academy, with this being their fifth USGS visit. The USGS hopes to continue the program and impact the academic outlook and life journey of future generations. For MSEA scholar and Junior Counselor Luther Harris, this program is about "knowing you have something to strive for."

## GeoFORCE students study in national parks

Posted: Thursday, June 29, 2006
Frio-Nueces Current

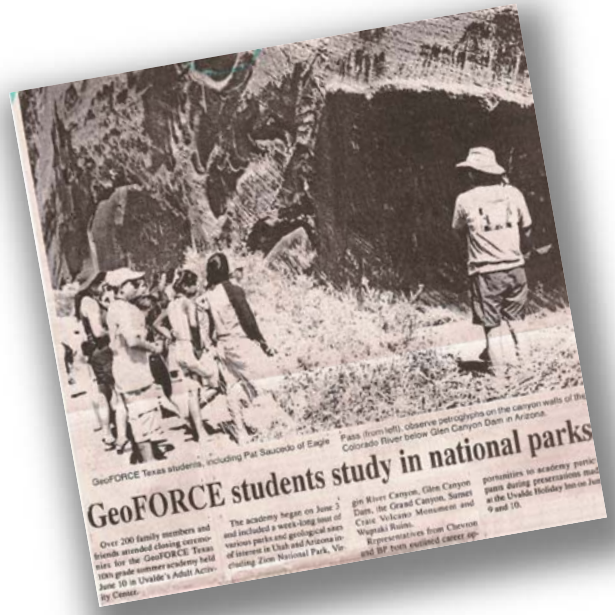
Over 200 family members and friends attended closing ceremonies for the GeoFORCE Texas 10th grade summer academy held June 10 in Uvalde's Adult Activity Center. The academy began on June 3 and included a week-long tour of various parks and geological sites of interest in Utah and Arizona including Zion National Park, Virgin River Canyon, Glen Canyon Dam, the Grand Canyon, Sunset Crate Volcano Monument and Wuptaki Ruins.

Representatives from Chevron, and BP both outlined career opportunities to academy participants during presentations made at the Uvalde Holiday Inn on June 9 and 10. Funding for summer academies is provided by industry sponsors Shell, ConocoPhillips, ExxonMobil, Chevron, BP, AT&T Foundation, Dominion, Halliburton, Marathon, Minerals Management Service, Schlumberger, and Swift Energy Company.

A total of 40 students from high schools across Southwest Texas were selected in 2005 to be participants in the program designed to inspire students to pursue the geosciences. The University of Texas at Austin's Jackson School of Geosciences manages the GeoFORCE Texas Program in partnership with Southwest Texas Junior College.

Representing Eagle Pass were Isaac Jimenez, Pat Saucedo, Debbie Duran, Andrea Rodriguez, Elsa Garza, Karen Trevino, Kaitlin Rodriguez, Oscar Fuentes and Natalia De Los Rellez.

Through week long summer academies featuring geology-based field trips, research projects and course work led by university professors, GeoFORCE Texas hopes to expose students to the geosciences in ways that motivate them to actively pursue geology as a future course of study.


GeoFORCE Texas students, including Pat Saucedo of Eagle Pass (from left), observe petroglyphs on the canyon walls of the Colorado River below Glen Canyon Dam in Arizona.

GeoFORCE students study in national parks

Over 200 family members and friends attended closing ceremonies for the GeoFORCE Texas 10th grade summer academy held June 10 in Uvalde's Adult Activity Center.

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PRESENTATION TO GEOFORCE—BP senior geologist Patricia Hall discusses career options with members of the GeoFORCE Texas 10th grade summer academy class. Hall made her presentation on June 9 at the conclusion of the week long summer academy.

## Young scientist explore area's geology

Posted: Thursday, July 27, 2006
Hondo Anvil Herald

Area ninth graders explored some of the rich geology in Uvalde County on July 11-12 as participants in young Geoscientists, a two-day field sponsored as part of the GeoFORCE Texas Program.

Hondo students participating were Jacob Boehme, Ashley Bragg, Christina Gauna, Breana Herrera, Ross Jones, James Knape, Daniella Martinez, Katherine Rainosek, and Taylor Sunderman, Hondo Junior High science instructor Brett White also accompanied the group.

Sponsored by Southwest Texas Junior College and the University of Texas at Austin's Jackson School of Geosciences, with corporate support from Shell, ConocoPhillips, ExxonMobil, Chevron, BP, AT&T Foundation, Dominion, Halliburton, Marathon, Mineral Management Service, Schlumberger and Swift Energy Company, the program is aimed at recruiting prospective geoscientists from the 11-county area served by SWTJC.

"This program gives students a chance to learn about some the exciting geological sites and formations right in their own backyard," said SWTJC Dean of Technology and Institutional Advancement Blaine Bennett. "Hopefully this will inspire them to look into further study of the geosciences."

A total of 38 area students, who will be entering ninth grade this fall, took part in the two-day event hosted at SWTJC. Students represented nine Southwest Texas school districts including Brackettville, Cotulla, Crystal City, Dilley, Eagle Pass, Hondo, Nueces Canyon, Utopia and Uvalde.

On the first day of the field study, students visited a site on the Frio River just off Garner Field Road where there was once a volcanic crater. The group also took a tour of the Vulcan Materials rock quarry in Knippa, directed by assistant plant manager Mike Schutter.

Lunch was served at the Uvalde Historical Commission's Ft. Inge Park where students sat along the Leona River and learned about river ecology and the Edwards Aquifer. They also learned that Mount Inge is composed of remnants from an extinct volcano.

Later in the day John Andrews, with the Jackson School's Bureau of Economic Geology, gave a 3-D virtual tour of the Edwards Aquifer and the Big Bend National Park to the group.

After dinner, students were taken to the Annandale Ranch, to watch the nightly exodus of millions of Mexican free-tail bats from a large cave along the Frio River watershed.

The first event of day two was a visit to the Vulcan Materials Uvalde Plant located off Highway 90 west of Uvalde. Chuck Bevis, Vulcan plant manager, gave an overview of the plant's operations and then took students on a tour of the quarry. Students examined and collected fossils imbedded I the limestone material used to make rock asphalt.

GeoFORCE Young Geoscientists 9th Graders at Vulcan Materials Knippa Quarry

Following the trip to the Vulcan plant, an examination of the upper Nueces River canyon and an overview of the two-day field study was made at Big Oak River County Park. Students then enjoyed lunch and swimming in the Nueces River.

A closing session was held on the SWTJC Uvalde campus in the college's Tate Auditorium. Program participants received a certificate of completion, a Shell cap and a rock kit.

"This was a great group of students. I was impressed with their intelligence and attentiveness," said GeoFORCE Texas program coordinator Julie Spink. "I know they went home with an increased awareness of the area's geology."

Participants in this year's Young Geoscientists program will be invited back next summer for a two-day field study in Port Aransas.

# APPENDIX B

## Program Cost Summaries by Event

### FVSU MSEA 11th grade cost summary

| | |
|---|---|
| Closing ceremony for 60 people | 1,243 |
| Event and instructor costs | 2,559 |
| Field Guide (first year production) | 2,986 |
| Flights | 14,909 |
| Food | 4,181 |
| Ground transportation | 4,755 |
| Insurance | 158 |
| Lodging | 7,521 |
| Participant stipend | 2,700 |
| Supplies | 763 |
| Student fee | -1,951 |
| Total | 39,824 |

### GeoFORCE 10th Grade cost summary

| | |
|---|---|
| Closing ceremony for 250 people | 4,191 |
| Counselors | 3,000 |
| Event and instructor costs | 11,851 |
| Flights | 16,168 |
| Food | 5,552 |
| Ground transportation | 8,718 |
| Insurance | 399 |
| Lodging | 14,956 |
| Participant fee | 1,000 |
| Supplies | 3,272 |
| Total | 69,107 |

### GeoFORCE 9th Grade cost summary

| | |
|---|---|
| Closing ceremony for 250 people | 4,564 |
| Counselors | 3,000 |
| Event and instructor costs | 5,873 |
| Flights | 21,776 |
| Food | 6,198 |
| Ground transportation | 8,651 |
| Insurance | 399 |
| Lodging | 16,284 |
| Participant fee | 1,000 |
| Supplies | 1,366 |
| Total | 69,111 |

### Young Geoscientists 10th Grade cost summary

| | |
|---|---|
| Counselors | 900 |
| Event | 2,897 |
| Food | 1,597 |
| Ground transportation | 2,715 |
| Insurance | 160 |
| Lodging | 4,255 |
| Supplies | 193 |
| Awards | 157 |
| Total | 12,874 |

### Young Geoscientists 9th Grade cost summary

| | |
|---|---|
| Awards | 157 |
| Counselors | 900 |
| Event | 1,360 |
| Food | 1,211 |
| Ground transportation | 2,199 |
| Insurance | 152 |
| Lodging | 2,289 |
| Supplies | 571 |
| Total | 8,839 |

# APPENDIX C

## List of Student Participants by Event

### Fort Valley State University MSEA 11th Grade
### June 18 – June 24, 2006

| Name | City | State |
|---|---|---|
| James Cortez | Anchorage | AK |
| Amanda Jackson | Anchorage | AK |
| Elias Heard | Brighton | CO |
| Tramond Baisden | Atlanta | GA |
| Brittany Brisco | Gordon | GA |
| Stephen Brown | Warner Robins | GA |
| Jaroskey Bullard | Vienna | GA |
| Chantenique Cheatham | Snellville | GA |
| Kimber Cooks | Waycross | GA |
| Luther Harris | Atlanta | GA |
| Jamesa Hogges | Macon | GA |
| Julian Johnson | Fort Valley | GA |
| LaTosha Jones | Warner Robins | GA |
| Brittany McCrary | Atlanta | GA |
| Jabari Nyomba | College Park | GA |
| Janee' Parlor | Kathleen | GA |
| Judson Simmons | Milledgeville | GA |
| James Tarrant | Fort Valley | GA |
| Kayla Tennyson | Warner Robins | GA |
| Kimberly Tennyson | Warner Robins | GA |
| Ke'Andrea Towns | Vienna | GA |
| Dachele Williams | Atlanta | GA |
| Adrianna Nelson | Lecompte | LA |
| Omar Ferguson | Orange | NJ |
| Kareem Hall | Houston | TX |
| Brianna Hammond | Sterling | VA |
| Bradley McKnight | Camas | GA |

### GeoFORCE Texas 9th Grade Academy
### July 15 – July 22, 2006

| Name | School | State |
|---|---|---|
| Brooklyn Gose | Brackett | TX |
| Jeffrey Sitgreaves | Brackett | TX |
| Thomas Scott Lackey | Carrizo Springs | TX |
| Dominique Zvorak | Del Rio | TX |
| Daniel Enriquez | Eagle Pass | TX |
| Raquel Espinoza | Eagle Pass | TX |
| Alexis Magana | Eagle Pass | TX |
| Eric Munt | Eagle Pass | TX |
| Ruben Recio | Eagle Pass | TX |
| Guillermo (Josh)Villasenor | Eagle Pass | TX |
| Stephanie Campos | Cotulla | TX |
| Angela (Angel) Rodriguez | Cotulla | TX |
| Dessirae Ayala | Cotulla | TX |
| Hannah Windham | Leakey | TX |
| Elias Alvarez | Dilley | TX |
| Kimberly Demaree | Dilley | TX |
| Sharayah Gonzales | Hondo | TX |
| Jordan Michelle Hicks | Nueces Canyon | TX |
| Eryn Freitas | Pearsall | TX |
| Jayme Grander | Pearsall | TX |
| Alina Herrera | Pearsall | TX |
| Kristen La Buhn | Pearsall | TX |
| Aracely Reyes | Pearsall | TX |
| Josh Gonzales | Pearsall | TX |
| Sondee Camille Splawn | Rocksprings | TX |
| Christopher Lee Graham | Sabinal | TX |
| Maricruz Bustamante | Crystal City | TX |
| Victoria Gomez | Crystal City | TX |
| Yonelle (Leigh) Aromin | Uvalde | TX |
| Ezequiel Cardona | Uvalde | TX |
| Adriana Jarosek | Uvalde | TX |
| Antonio (T.J.) Martinez Jr. | Uvalde | TX |
| Gregorio (Greg) Martinez II | Uvalde | TX |
| Caleb McBride | Uvalde | TX |
| George Melchor | Uvalde | TX |
| Martha Ortiz | Uvalde | TX |
| Julia Quiroga | Uvalde | TX |
| Brittney Sanchez | Uvalde | TX |
| Athena Sevilla | Uvalde | TX |
| Cornelluis (Neil) Tobias | Uvalde | TX |
| Alex Talley | Uvalde | TX |

**GeoFORCE Texas 10th Grade Academy**
**June 3 – June 10, 2006**

| Name | School | State |
|---|---|---|
| Samantha Moore | Brackett | TX |
| Jacob Schroeder | Brackett | TX |
| Justin Treviño | Cotulla | TX |
| Siobhain Alvarado | Cotulla | TX |
| Jairo Chavez | Cotulla | TX |
| Ramon Lopez III | Crystal City | TX |
| Alexandra Perez | Crystal City | TX |
| Adriana Vargas | Crystal City | TX |
| Sabrina Cervantez | Del Rio | TX |
| Elyana Barrera | Del Rio | TX |
| Rosalie Rodriguez | Dilley ISD | TX |
| Aaron Cason | Dilley ISD | TX |
| Isaac Jimenez | Eagle Pass | TX |
| Andrea Rodriguez | Eagle Pass | TX |
| Oscar Fuentes | Eagle Pass | TX |
| Karen Treviño | Eagle Pass | TX |
| Elsa Garza | Eagle Pass | TX |
| Debbie Duran | Eagle Pass | TX |
| Kaitlin Rodrigues | Eagle Pass | TX |
| Ramon Saucedo | Eagle Pass | TX |
| Natalia De Los Rellez | Eagle Pass | TX |
| Andres (Andy) San Miguel | Hondo | TX |
| Karyssa DeLeon | Hondo | TX |
| Victoria Herndon | Nueces Canyon | TX |
| Jonathan Cubriel | Pearsall | TX |
| Benjamin Martinez | Pearsall | TX |
| Melanie Lynch | Pearsall | TX |
| Karina Robledo | Pearsall | TX |
| Joseph Arrevalos | Rocksprings | TX |
| Miranda Garcia | Rocksprings | TX |
| Mary (Katie) Bales | Sabinal | TX |
| Carlos de la Torre | Sabinal | TX |
| Michelle Rodriguez | Uvalde | TX |
| Andrew Nunez | Uvalde | TX |
| Felipe Villanueva | Uvalde | TX |
| Nazarey Ortiz | Uvalde | TX |
| Schaefer Edwards | Uvalde | TX |
| Hilary Prado | Uvalde | TX |
| Rosa Arellano | Uvalde | TX |
| Marissa Vara | Uvalde | TX |

**Young Geoscientists 9th Grade Field Course**
**July 11 – July 12, 2006**

| Full Name | School | Town |
|---|---|---|
| Jaleel Proulx | Brackett | TX |
| John (Chris) Blake | Brackett | TX |
| Cody Clark | Brackett | TX |
| Charles Conoly | Brackett | TX |
| Grace Ibarra | Eagle Pass | TX |
| Aniceto Cantu | Eagle Pass | TX |
| Andres Kashani | Eagle Pass | TX |
| Mariana Trevino | Eagle Pass | TX |
| Romeo Torres Jr. | Eagle Pass | TX |
| Roberto Trevino | Eagle Pass | TX |
| Victor Zapata | Eagle Pass | TX |
| Dessirae Nicole Ayala | Cotulla | TX |
| Gabriel Lee Saenz | Cotulla | TX |
| Caitlyn Storey | Cotulla | TX |
| James Talbert | Cotulla | TX |
| Jose Gonzales | Dilley | TX |
| Eryn Patterson | Dilley | TX |
| Ashley Bragg | Hondo | TX |
| Taylor Sunderman | Hondo | TX |
| Ross Jones | Hondo | TX |
| James Knape | Hondo | TX |
| Katherine Rainosek | Hondo | TX |
| Daniella Martinez | Hondo | TX |
| Christina Guana | Hondo | TX |
| Breana Herrea | Hondo | TX |
| Gwenda Austin | Nueces Canyon | TX |
| Stephanie Campuzano | Crystal City | TX |
| Tomas Rivera | Crystal City | TX |
| Christopher Vanderveer | Utopia | TX |
| Teresa Gaitan | Uvalde | TX |
| Jonathan Gutierrez | Uvalde | TX |
| Benjamin Miller | Uvalde | TX |
| Carlos Prado, Jr. | Uvalde | TX |
| Christine Reyna | Uvalde | TX |
| Kaitlyn Samarripa | Uvalde | TX |
| Mauricio Daniel Sanchez | Uvalde | TX |
| Kyle Felan | Uvalde | TX |
| Alexandra Jean Talley | Uvalde | TX |

**Young Geoscientists 10th Grade Field Course**
**June 10 – June 12, 2006**

| Name | School | State |
|---|---|---|
| Emily Calk | Brackettville | TX |
| Harmony Pettett | Brackettville | TX |
| Jacob Schroeder | Brackettville | TX |
| Jared Howard-Tomchesson | Charlotte | TX |
| Yomeida Sanchez | Cotulla | TX |
| Andrew Valles | Cotulla | TX |
| Nadia Sulaica | Del Rio | TX |
| Javier Amaro | Del Rio | TX |
| Joshua Smith | Del Rio | TX |
| Melerie DeLeon | Dilley | TX |
| Abram Garcia | Dilley | TX |
| Mysia Proctor | Dilley | TX |
| Crystal Torres | Dilley | TX |
| Luciano Esquivel | Eagle Pass | TX |
| Janel Maurer | Eagle Pass | TX |
| Melissa Jimenez | Eagle Pass | TX |
| Stephanie Sanchez | Eagle Pass | TX |
| Raquel De La Cruz | Eagle Pass | TX |
| Gerardo Fisher | Eagle Pass | TX |
| Liliana Jimenez | Eagle Pass | TX |
| Azia Ledesma | Eagle Pass | TX |
| Abigail Rodriguez | Eagle Pass | TX |
| Brittany Luce | Nueces Canyon | TX |
| William (Jackson) Cook | Rocksprings | TX |
| David Palacio | Rocksprings | TX |
| Timothy Wade | Rocksprings | TX |
| Kimberly Albarado | Uvalde | TX |
| Jessica Cantu | valde | TX |
| Victor Cervantes | Uvalde | TX |
| Kimberly Estrada | Uvalde | TX |
| Emilio Fernandez | Uvalde | TX |
| Sergio Gallegos | Uvalde | TX |
| Ricardo Rodriguez | Uvalde | TX |
| Martin Vasquez | Uvalde | TX |

# APPENDIX D

## GeoFORCE Texas Summer Calendar Forecast through 2008

Information based on current Texas Education Agency school calendar.
This information will shift with legislation regarding the start of the school year.

### June 2007

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| | | | | | 1 | 2 |
| | | | | | | GF 10th |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| GF 10th | GF 10th | GF 10th | GF 10th | GF 10th | GF 10th | GF 10th |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| YG 10th | YG 10th | YG 10th | YG 10th | | | |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| MSEA 11th | MSEA 11th | MSEA 11th | MSEA 11th | MSEA 11th | MSEA 11th | MSEA 11th |
| | | | | | GF 11th | GF 11th |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| MSEA 11th | GF 11th | GF 11th | GF 11th | GF 11th | GF 11th | GF 11th |
| GF 11th | | | | | | |

### July 2007

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | YG 9th | YG 9th | YG 11th | YG 11th | YG 11th | GF 9th |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| GF 9th | GF 9th | GF 9th | GF 9th | GF 9th | GF 9th | GF 9th |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

**June 2008**

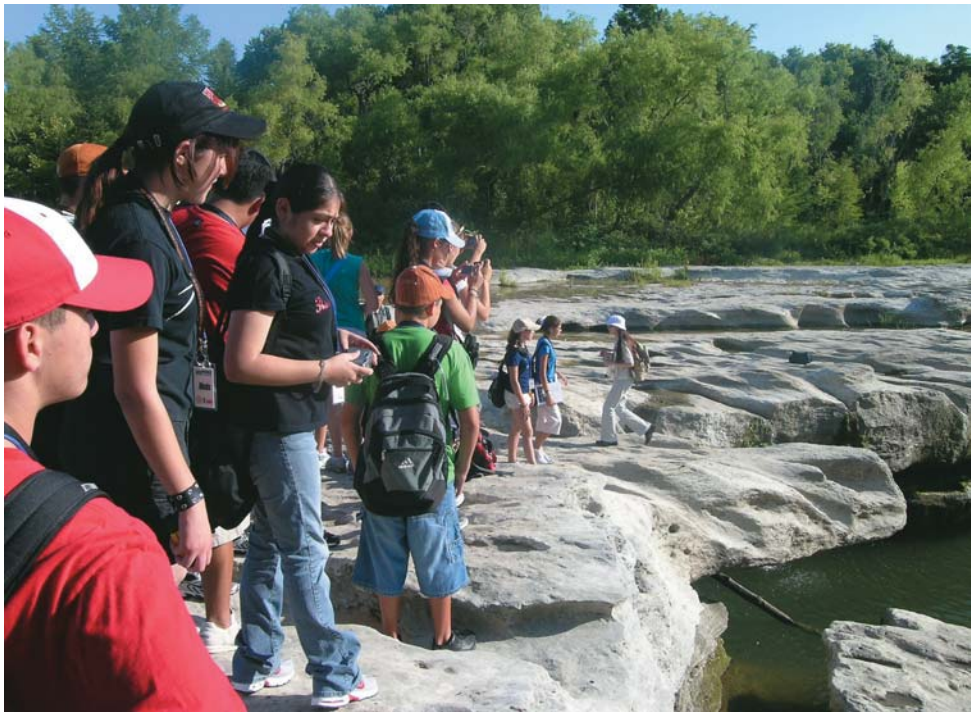
| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| | | | | | | May 31 |
| | | | | | | GF 10th |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| GF 10th | GF 10th | GF 10th | GF 10th | GF 10th | GF 10th | GF 10th |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| YG 10th | YG 10th | YG 10th | YG 10th | | | |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| MSEA 11th | MSEA 11th | MSEA 11th | MSEA 11th | MSEA 11th | MSEA 11th | MSEA 11th |
| | | | | | GF 11th | GF 11th |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| MSEA 11th | GF 11th | GF 11th | GF 11th | GF 11th | GF 11th | GF 11th |
| GF 11th | | | | | | |
| 29 | 30 | | | | | |

**July 2008**

| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| | | | | | | |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | YG 9th | YG 9th | YG 11th | YG 11th | YG 11th | GF 9th |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| GF 9th | GF 9th | GF 9th | GF 9th | GF 9th | GF 9th | GF 9th |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| | YG 12th | YG 12th | YG 12th | | | GF 12th |
| 27 | 28 | 29 | 30 | 31 | August 1 | August 2 |
| GF 12th | GF 12th | GF 12th | GF 12th | GF 12th | GF 12th | GF 12th |

GeoFORCE 9th Grade Academy experience Great Falls NHP with Dr. E-an Zen, University of Maryland

FVSU MSEA 11th Grade students explore Enchanted Rock – one of the many geological sights of interest throughout the week



GeoFORCE 9th Grade Academy students explore McKinney Falls in Austin, Texas

On day one of all GeoFORCE Academies, students learn about field safety and take a pretest

Ann Molineux and Andy Dewhurst leads the 9th Grade Academy in a discussion at the Geology building rock garden

9th Grade Young Geoscientists students "fly" through the Edwards Aquifer in a Bureau of Economic Geology presentation by Scott Rodgers

GeoFORCE 9th Grade Academy students at Smithsonian Air and Space Museum