

Annual Report 2017

GEOFORCE
T E X A S
JACKSON SCHOOL OF GEOSCIENCES™





Cover Photo
Jeff Paine at Oregon Sand Dunes teaching rising 11th
grade students



This Page:
GeoFORCE Houston 10th grade
cohort at Grand Canyon.

Contents

<i>Letter from the Director</i>	1
<i>Mission</i>	2
<i>Thinking Forward: Lab Visits</i>	4
<i>GeoFORCE Financial Status</i>	8
<i>Endowments and Sponsors</i>	10
<i>GeoFORCE Academies Data</i>	14
<i>College Data</i>	22
<i>GeoFORCE Academies</i>	30
<i>Thinking Forward: Project Based Learning</i>	36
<i>Partnerships</i>	38
<i>Valedictorians and Salutatorians</i>	40
<i>College Program</i>	44
<i>GeoFORCE Student Rewrites Geological History</i>	46
<i>GeoFORCE Outreach</i>	50
<i>GeoFORCE Alumni Outreach</i>	52
<i>2016-2017 Outreach Staff</i>	54

GeoFORCE Texas

Jackson School of Geosciences | The University of Texas at Austin

J.J. Pickle Research Campus

10100 Burnet Road, Building 196 | Austin, TX 78758-4455

Phone: 512-471-4360 | Email: geoforce@jsg.utexas.edu | Website: www.jsg.utexas.edu/geoforce

Letter from the Director

Friends and future friends,

GeoFORCE Texas continues to be a success. In the 2013 Annual Report, GeoFORCE measures of success were listed as: impact on a large number of students from diverse backgrounds, retention of students in the program through high school, high school graduation and college matriculation rates, and number of students studying STEM fields, especially geology and engineering. GeoFORCE has been successful in all four areas. The program has impacted 1,207 students since the first summer of 2005. No matter what life path these students take, they are Earth science literate citizens who have the knowledge to make science-based decisions about Earth resources, the environment and natural hazards at local, state, national, and global levels. GeoFORCE has retained over 90% of students in the program through four years of high school. Of these students, 100% graduate from high school compared to graduation rates of 89.1% for Texas and 83% for the US. Of the GeoFORCE students who graduate from high school 86% matriculate to college compared to 52% for Texas. The students who matriculate to college persist to the sophomore year at a 90% rate versus 84% for Texas, with 52% of these students majoring in STEM. Thinking forward, what's next?



GeoFORCE is working to increase the already successful persistence rate by making the transition to college easier for students. By providing a week-long college experience on the University of Texas campus for seniors, with field experiences in the nearby Llano uplift area, students gain the confidence to be on a college campus and working on group projects in computer labs, and presenting as a group. The 2017 field experience was built on the central Texas academy that Dr. Leon Long led for students from the Fort Valley State University Mathematics, Science and Engineering Academy (MSEA) from 2004 to 2011. To encourage more students to choose geoscience majors, rising 12th grade academy seniors visited a variety of Jackson School of Geosciences faculty, research scientists, and graduate students in their labs to see the multiple opportunities for careers in the geosciences.

Just as there were lessons learned from the first 9th grade academy in 2005 that led to improvements for the second 9th grade academy in 2006, GeoFORCE will make improvements to the 2018 central Texas 12th grade academy based on the experiences and feedback from the 2017 central Texas 12th grade academy. Improvements to the 2006 9th grade academy included reducing the trip from 13 to 8 days, administering age-appropriate quizzes developed by education specialists, providing an easy to understand field guide to focus activities, defining the roles and assigning duties to every adult participating, and adding educational coaches to assist the instructor. We look forward to working with all of the GeoFORCE stakeholders to learn from the past and build on the successes to meet the mission of diversifying the STEM workforce.

Best Regards,

A handwritten signature in black ink, appearing to read 'Samuel L. Moore'.

Samuel L. Moore, Ph.D.
Director of Outreach and Diversity
Jackson School of Geosciences
The University of Texas at Austin

Mission

GeoFORCE Texas takes students across the country from the Texas Gulf Coast to the Grand Canyon, to Oregon and the Texas Hill Country. We teach geology in some of the best field areas in the country, our National and State Parks. The program is academic and rigorous. Our students are challenged by daily quizzes, finals exams, and challenge-based projects.

16

Earned
Masters/Doctorate
Degrees

285

Earned Bachelors
Degrees



564 GeoFORCE
graduates
are currently
attending college

The Jackson School of Geosciences at The University of Texas at Austin provides education and research to enhance our knowledge of the Earth. GeoFORCE, a K-12 outreach program of the Jackson School, is designed to increase the number of students pursuing STEM degrees in college and moving into the future high-tech workforce.

Each summer GeoFORCE takes about 400 high school students on spectacular geological field trips in Texas and throughout the United States. Taught by university faculty, research scientists, area educators and mentored by professional geologists from our industry partners, the trips empower the students by engaging them in something completely different from their home and school environment.

Photo Above:

Rising Juniors at Oregon Sand
Dunes

Measures of Success

1. Impact on a large number of students from diverse backgrounds
2. Retention of students in the program through high school
3. High school graduation and college matriculation rates
4. Number of students studying STEM fields, especially geosciences and engineering




Student examines ground water discharge through the a porous rock in Zion National Park.

Thinking Forward: Recruiting more students to the geosciences

Starting in 2017, rising twelfth graders have the opportunity to visit state-of-the-art high tech laboratories at the Jackson School of Geosciences to learn about the variety of geoscience career options.



Research on minority and ~~nonminority~~ perceptions of the geosciences concludes that outdoor related factors [alone] are not the most effective recruitment tool to the geosciences for minorities and that effective recruitment strategies such include introducing them to laboratory work, computation and modeling,  graphical information systems, and data analysis.

*K. Sherman-Morris and K. S. McNeal.
Understanding Perceptions of the
Geosciences Among Minority and Nonminority
Undergraduate Students, Journal of Geoscience
Education, No. 64, 2016.*



CT SCAN LAB

The Computed Tomography Facility (UTCT) offers scientific researchers across the earth, biological and engineering sciences access to a completely nondestructive technique for visualizing features in the interior of opaque solid objects, and for obtaining digital information on their 3D geometries and properties.

ICP

Inductively coupled plasma mass spectrometry (ICP-MS) is principally used for rapid, precise and accurate trace element (<1000 ppm) determinations in liquid and solid samples, but other applications include isotopic determinations and speciation studies. The power of modern ICP-MS resides in its ability to rapidly measure trace elements at very low detection limits (to sub parts per trillion levels) as well as minor and major elements (at parts per million levels) in the same analytical run on suitably diluted samples.

VISLAB

The Texas Advanced Computing Center (TACC) Visualization Laboratory (Vislab) is a state-of-the-art facility where staff explores the intersection between human perception and large-scale visual analysis through the study of visualization and interactive displays. The Vislab serves as a research hub for human-computer interaction, tiled display software development, and visualization consulting.

Mineral Physics

The Mineral Physics Group at The University of Texas at Austin mainly uses diamond anvil cells (DAC) to study material properties in high pressure-temperature conditions. The DACs are integrated with laser and synchrotron X-ray spectroscopic techniques to probe properties of materials under extreme high pressure-temperature conditions.

Isotope Laser Labs

This newly renovated lab houses a ThermoElectron MAT 253 with associated peripheral devices and instrumentation (TC/EA, GasBench II, ConFlo IV, online silicate laser extraction line, general purpose glass vacuum extraction lines, CH₃Cl purification line). Instrumentation permits measurements of the stable H, C, N, O, S, and Cl isotope ratios of silicate, phosphate, and carbonate minerals, volcanic gases, and water process.

BEG CORE Facility

Located at the J.J. Pickle Research Campus is the Bureau of Economic Geology's (BEG) main repository for core and rock material, donated to the University. More than 700,000 boxes of core and cuttings from wells drilled throughout Texas, the U.S., and the world are available at this facility for public viewing and research.



A group of hikers is seen from behind, walking along a rocky, light-colored trail that runs along the edge of a river. The hikers are wearing various outdoor gear, including backpacks and hats. The river is calm, reflecting the sky and the surrounding landscape. In the background, there is a line of green trees under a clear blue sky. A large, semi-circular orange graphic element is positioned on the right side of the image, partially overlapping the text.

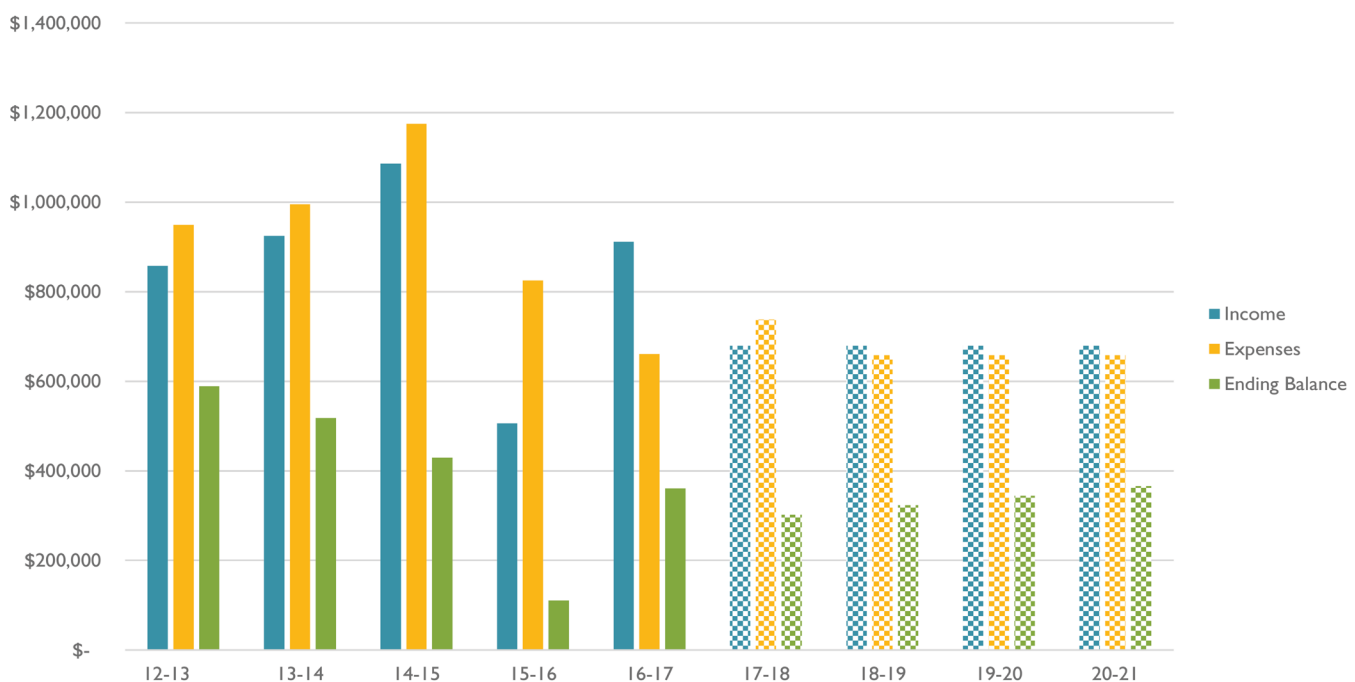
Financial Summary 2016-2017

GeoFORCE Financial Status

GeoFORCE started providing visual “snapshots” of income versus expenses versus the ending balance to provide an “at-a-glance” understanding of the history and projections of GeoFORCE finances. This was done at the request of advisory members to make the big picture of finances easier to read with a glance. In the staff and operations chart, the commitment of the Jackson School is clear as staff and operational support has remained and is projected to remain over \$500,000. The sponsor funded programs chart make it easy to see the impact of the plan put forward in 2012-13 to replace the Houston and Southwest Young Geos with a new more expensive Academy of 40 students each year comprised of students from Houston and Southwest. The plan was that the current Houston and Southwest Academies would be continued in addition to the third mixed Academy, with increased spending on GeoFORCE Grads.

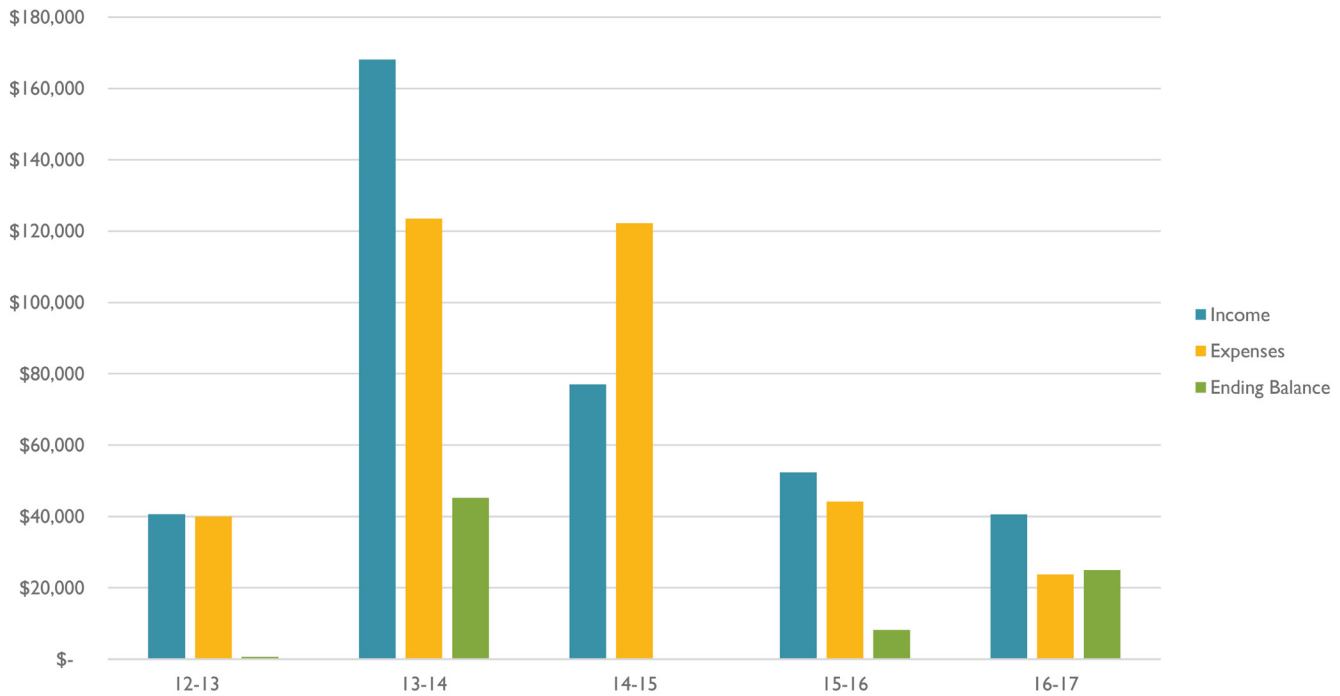
The advisory committee was presented with data about the greater effectiveness of the Academy program versus the Young Geos. The data showed that all Academies were in the field for seven days while Young Geos time varied from two to four days in the field. Academies allowed more time for learning and building self-efficacy as geoscientists and more time for participants to create a community that encouraged high rates of students continuing in GeoFORCE for four years. The chart shows that combined with the increase in spending in the GeoFORCE Grads program (students who completed the final Academy but had not started college), expenses increased the next two years as the remaining Young Geos continued until they completed all four years while adding a combined Academy in 2014 and 2015. As the Young Geos phased out and the decision was made to not add more combined Academies in the current oil and gas price environment, expenses declined and are projected to remain constant by running a Houston Academy and Southwest Academy at each grade level. Any future considerable increases in the market value of oil and gas will allow for reconsideration of returning to the 2012-13 plan to run three Academies at each grade level.

GeoFORCE - Programs (Sponsorship funded)

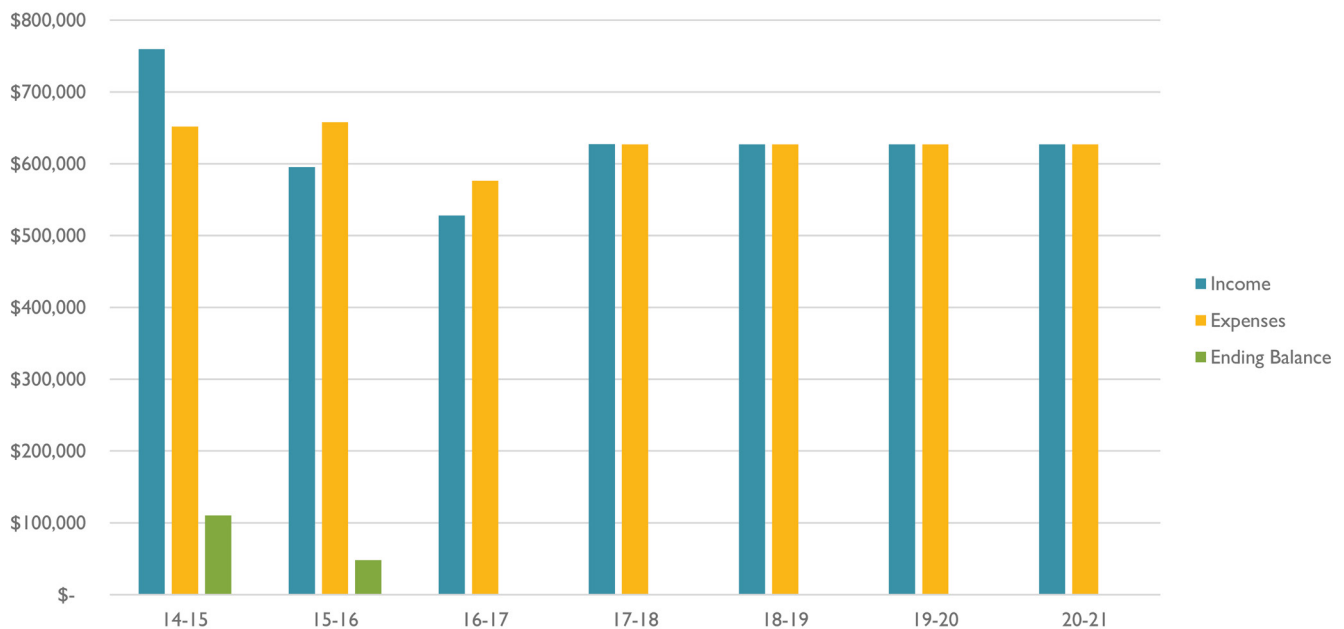


Notes: \$200K of FY1516 gifts arrived in FY1617
 Target ending balance is 50% of one year's expenses per gift arrival fluctuations
 FY1718+ income probability rate set to 75% for most gifts for projections

Contracts and Grants - GeoFORCE



GeoFORCE - Staff and Operations (Jackson / Other Endowments Funded)



Active FY1617 Contracts and Grants are:
 Summer STEM - 26321526 (GEOF-MOORE TXWC 09-30-16)
 Summer STEM - 26321630 (GEOF-MOORE TXWC 09-30-17)



Thank you for all the contributions to support GeoFORCE from our Sponsors and Individual Friends. This support aims to ensure that students in the future have access to the GeoFORCE experience for years to come. We congratulate our GeoFORCE supporters for truly making a difference!

Endowments and Sponsors

GeoFORCE Texas Endowments

- Jesse and Ina Brundrett GeoFORCE Texas Fund
- Darwin Family GeoFORCE Texas Fund
- Friends of GeoFORCE Endowment in Honor of Doug Ratcliff
- Gerson Garcia Endowed GeoFORCE Scholarship Fund
- GeoFORCE Texas Fund
- Deborah Susan Pfeiffer Endowed GeoFORCE Scholarship*
- Janet E. and David I. Rainey GeoFORCE Texas Scholarship
- Students Raising Students GeoFORCE Endowment*
- Stephen P. and Katherine Hubby Weiner GeoFORCE Scholarship*

** new endowment established in 2017*

2016-2017 GeoFORCE donors

Ms. Christine M. Skirius
 Apache Corporation - Employee Match
 Ms. Sara S. Avant-Stanley
 The Bank of New York Mellon - Employee Match
 Mr. Reggie Beasley
 Ms. Tiffany Benavidez
 Dr. Robert L. Boyce
 Ms. Danielle L. Carpenter
 Mr. Charles A. Caughey
 Mr. Edward C. Cazier III
 Chevron Corporation - Employee Match
 ConocoPhillips Company - Employee Match
 Mr. William D. Demis

ExxonMobil Foundation - Employee Match
 Ms. Belle German
 Ms. Gretchen M. Gillis
 Mr. David Luke Gorney
 Ms. Alison M. Hansen
 Ms. Lisa Helper
 Mr. Ben P. Hooper
 Mr. Travis T. Kloss
 Mr. Lawrence H. Maddox
 Mr. Bruno Maldonado
 Ms. Lauren E. Martin
 Dr. Samuel L. Moore
 Ms. Dorothy Slator Paterson
 Mr. Dennis R. Trombatore

Thank you to our
Sponsors for
 continuing to
 support
Gooforce!



*Texas 3 Star Energy
 Investment, LLC.*

ExxonMobil



BHP **ConocoPhillips** **Marathon Oil Corporation**

Schlumberger

HALLIBURTON

GEORGE AND MARY
JOSEPHINE
HAMMAN FOUNDATION



**Texas Workforce
Commission**



Vulcan
Materials Company

AEP TEXAS
A unit of American Electric Power



**KINDER MORGAN
FOUNDATION**



Jackson School
Undergraduate
Geological Society

Jackson School
Graduate Student
Executive Committee



Central Texas Chapter





GeoFORCE
Academies
Data
2017

GeoFORCE Academies Data

82%
of 2017
high school
participants are
minorities.

HISPANIC
PARTICIPANTS:

56%

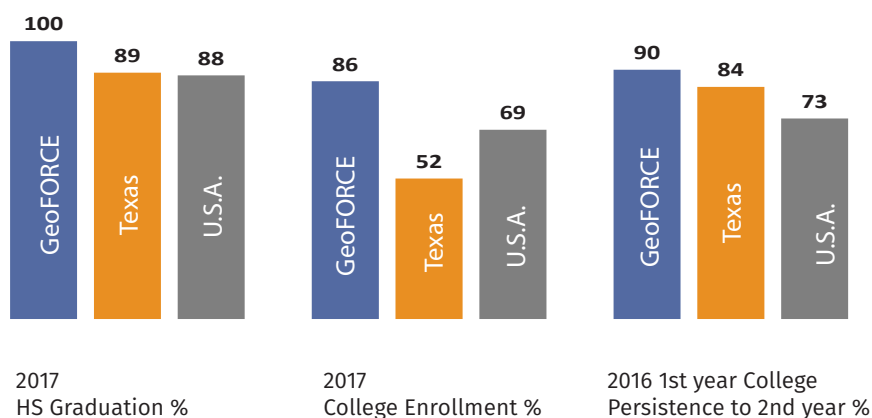
PRIMARILY FROM
SOUTHWEST REGION

AFRICAN AMERICAN
PARTICIPANTS:

17%

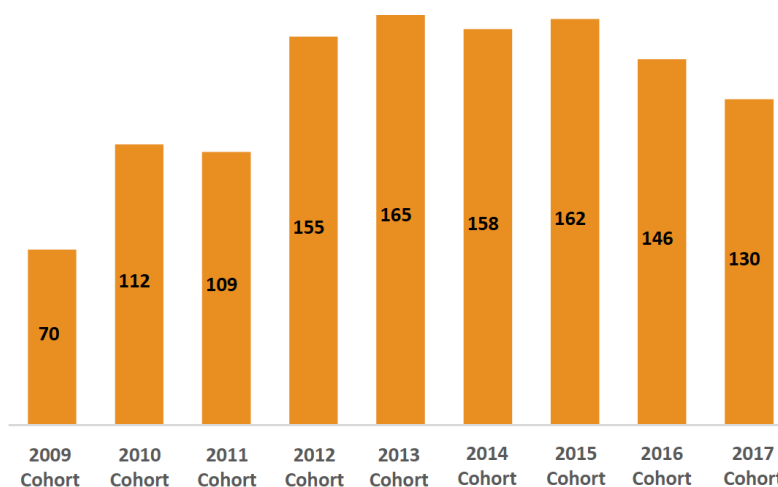
PRIMARILY FROM
HOUSTON REGION

GeoFORCE Academies Post Secondary Outcome Rates vs. State and National



Number of GeoFORCE High School Graduates per Cohort

(cohort year = year of high school graduation)





58%

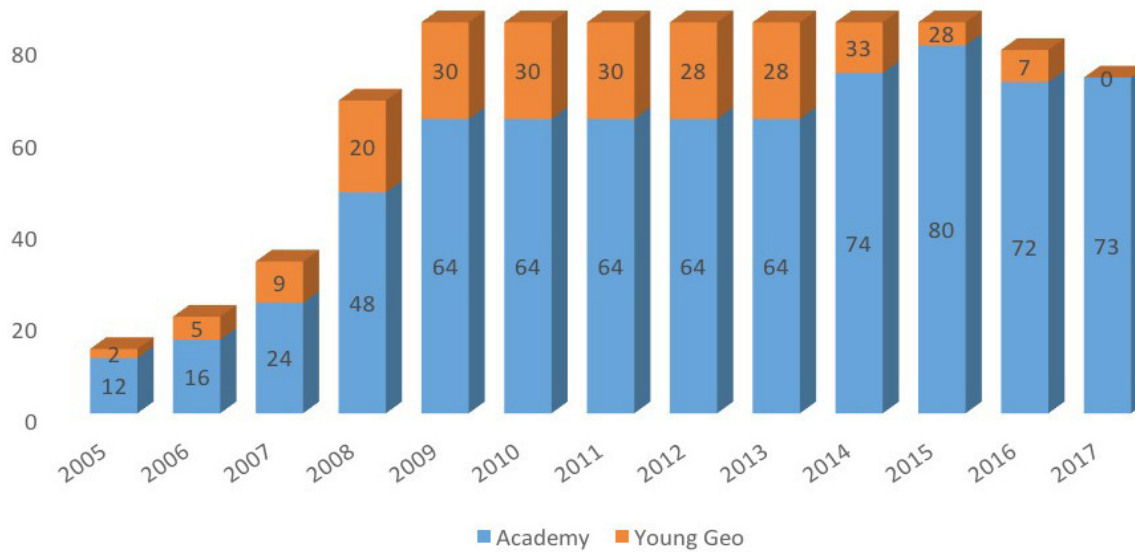
**FEMALE PARTICIPATION DURING SUMMER
2017**

130 Number of
high school students
who graduated from
high school in 2017

378 Number of
high school students
who participated in
GeoFORCE summer
field experiences in
2017

GeoFORCE Academies Data

Total Summer Program Days



Total GeoFORCE Students in the Field









GeoFORCE College Data

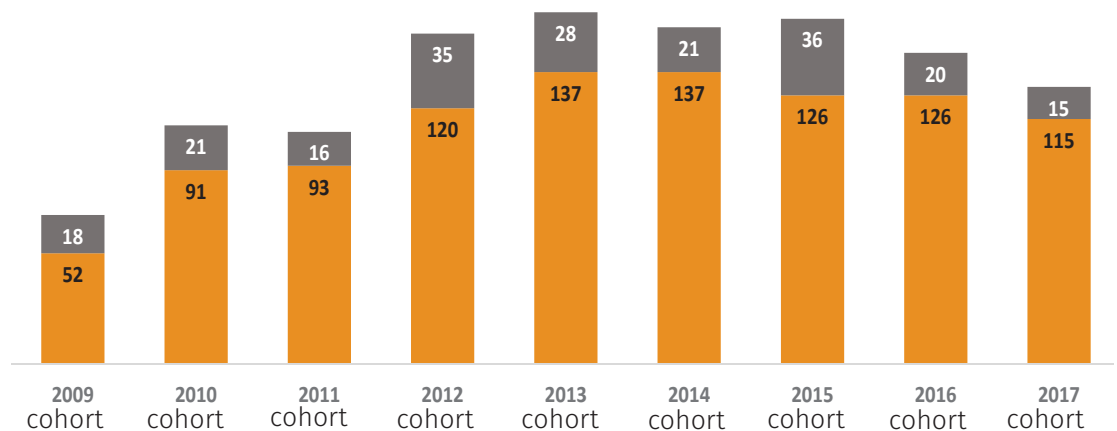
JSG 2017 Alum Izaak Ruiz
2012 GeoFORCE Cohort

564

GEOFORCE ALUM ENROLED IN COLLEGE FOR FALL OF 2017

GeoFORCE uses the National Student Clearinghouse (NSCH) to collect data on GeoFORCE students' post-secondary majors. With this information we have a concise view of what degrees students are pursuing.

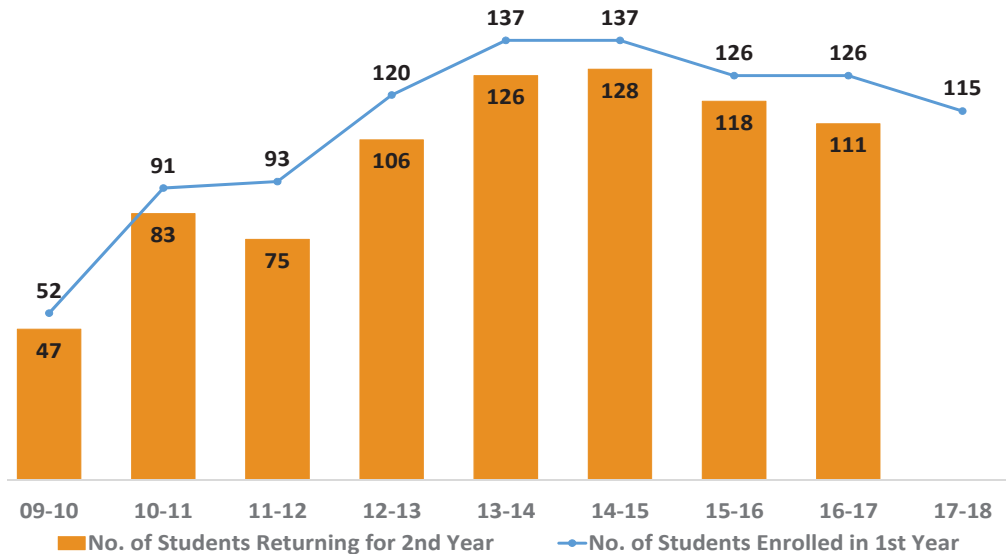
College Enrollment by Cohort
(cohort year = year of high school graduation)



One hundred percent of GeoFORCE students with three or more years in the program have graduated high school. The graph above shows the number of students per cohort that enrolled in college represented by the orange bar. Students who do not have a record with NSCH are represented by the gray bar.

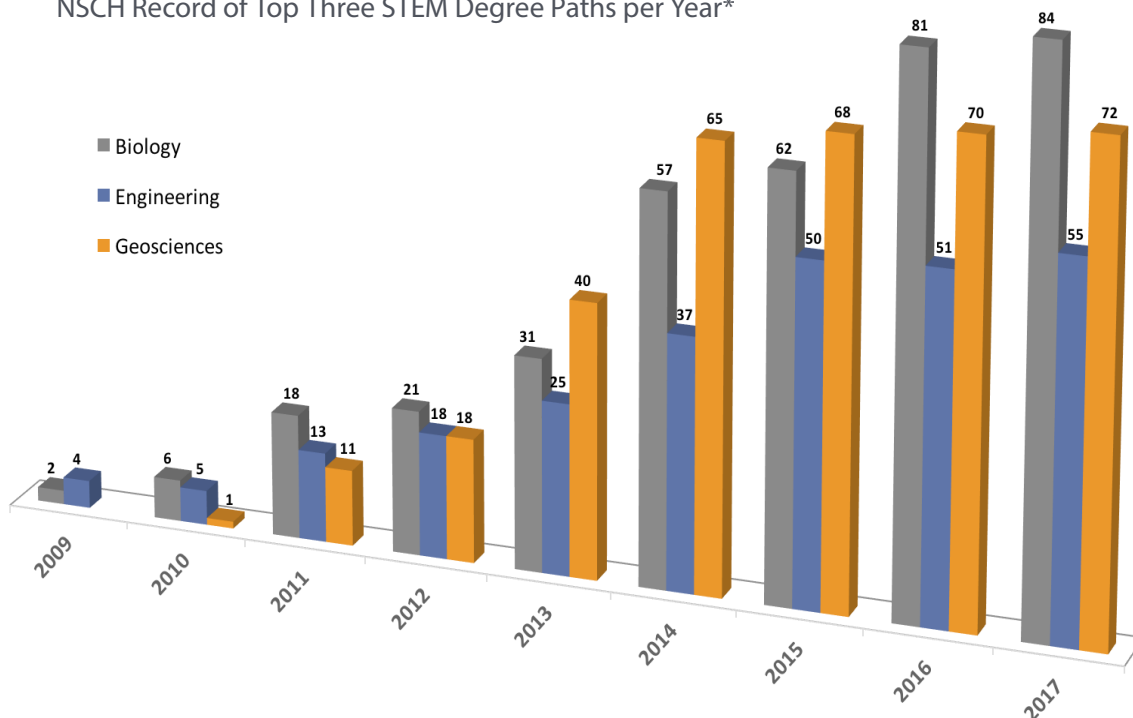
GeoFORCE College Statistics

College Matriculation and Persistence



On average, ninety percent of GeoFORCE students return for their second year of college, compared to Texas' eighty-four percent and the U.S.' seventy-three percent. The above graph shows the number of students entering college in their first year (line) versus those returning their second year (bar).

NSCH Record of Top Three STEM Degree Paths per Year*



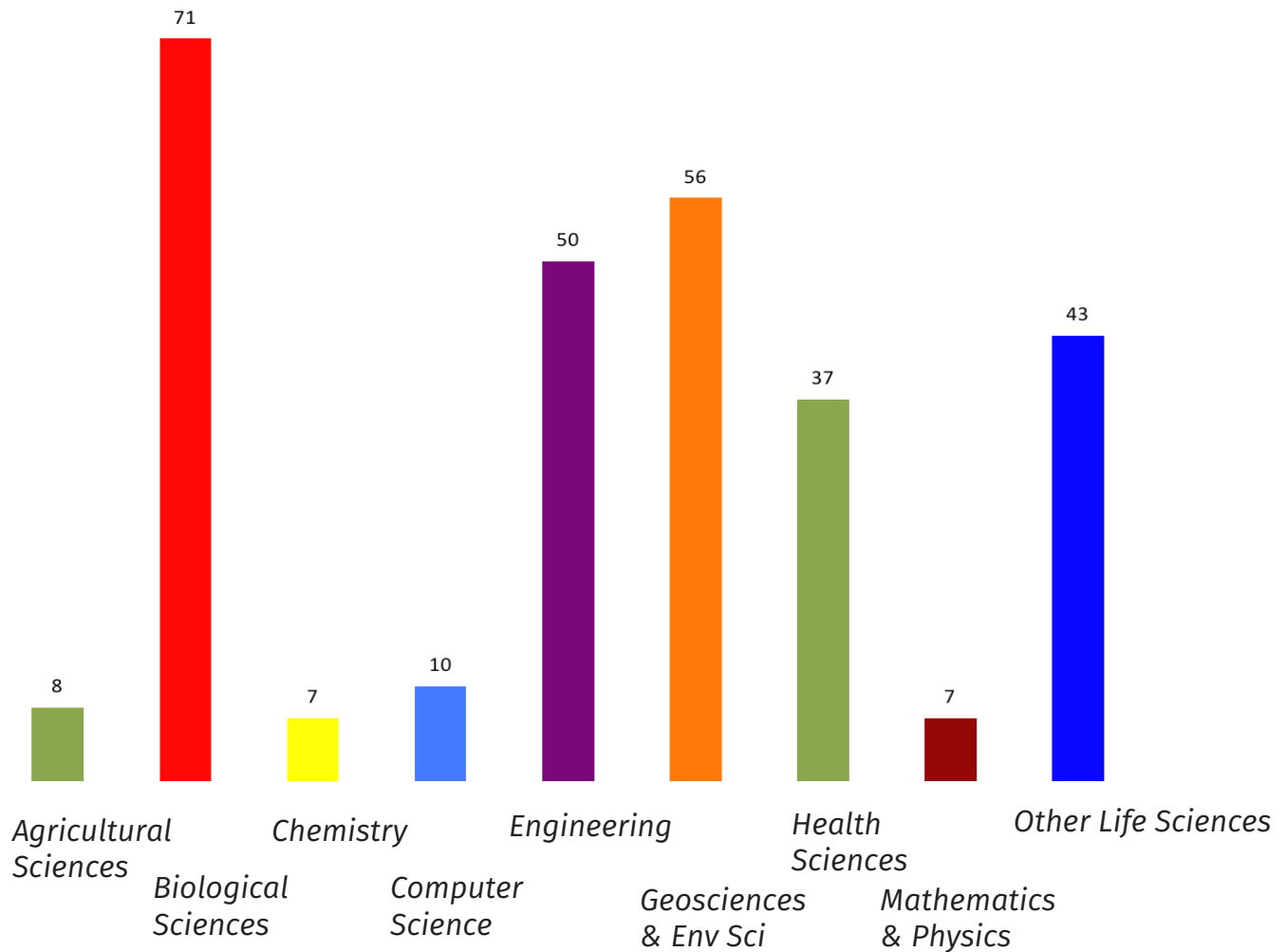
The top three STEM degree paths for GeoFORCE students are biology, engineering, and the geosciences. The graph shows how many students enrolled in each of those degree paths in a calendar year.

(*includes summer term).

(2017 data may change due to Fall and Winter term major changes recorded at the end of 2017)

GeoFORCE Students Pursuing STEM degrees

Number of students enrolled in STEM Majors in Fall 2017



51% of GeoFORCE alum in college are declared STEM majors, almost double the national average (2017).*

* Includes health and nursing degrees which are not part of the National Science Foundation Crosswalk for STEM disciplines.

Universities and Colleges attended by GeoFORCE Graduates

ABILENE CHRISTIAN UNIVERSITY	1	HOWARD PAYNE UNIVERSITY	1	TEXAS A&M UNIVERSITY - SAN ANTONIO	4
ADAMS STATE UNIVERSITY	1	HUSTON-TILLOTSON UNIVERSITY	1	TEXAS A&M UNIVERSITY - KINGSVILLE	7
ALBION COLLEGE	1	INDIANA UNIVERSITY BLOOMINGTON	1	TEXAS LUTHERAN UNIVERSITY	2
AMERICAN UNIVERSITY	1	LAMAR UNIVERSITY - BEAUMONT	10	TEXAS STATE TECHNICAL COLLEGE - FORT BEND	1
AMHERST COLLEGE	1	LANGSTON UNIVERSITY	1	TEXAS STATE UNIVERSITY - SAN MARCOS	30
ANGELO STATE UNIVERSITY	5	LIBERTY UNIVERSITY	1	TEXAS TECH UNIVERSITY, LUBBOCK	6
ASHLAND UNIVERSITY	1	LONE STAR COLLEGE SYSTEM DISTRICT	9	TEXAS WOMAN'S UNIVERSITY	3
BALL STATE UNIVERSITY	1	LOUISIANA STATE UNIVERSITY - AG	3	TRINITY UNIVERSITY	3
BAYLOR UNIVERSITY	4	NEW MEXICO STATE UNIVERSITY-MAIN	1	UNIVERSITY OF ALABAMA	1
BLINN COLLEGE	1	NORTHWEST VISTA COLLEGE	4	UNIVERSITY OF ARIZONA	1
BLINN COLLEGE- BRYAN CAMPUS	6	OCCIDENTAL COLLEGE	1	UNIVERSITY OF CALIFORNIA-LOS ANGELES	2
BLINN COLLEGE- TEXAS A&M HSC CAMPUS	3	OUR LADY OF THE LAKE UNIVERSITY OF SAN ANTONIO	1	UNIVERSITY OF COLORADO BOULDER	1
BOSTON UNIVERSITY	1	PENNSYLVANIA STATE UNIVERSITY	2	UNIVERSITY OF HOUSTON	52
BOWDOIN COLLEGE	2	PITZER COLLEGE	1	UNIVERSITY OF HOUSTON-CLEAR LAKE	1
BRIGHAM YOUNG UNIVERSITY	2	PRAIRIE VIEW A&M UNIVERSITY	9	UNIVERSITY OF HOUSTON-DOWNTOWN	13
BRIGHAM YOUNG UNIVERSITY - IDAHO FALL/ WINTER	1	PURDUE UNIVERSITY - WEST LAFAYETTE	1	UNIVERSITY OF MARY HARDIN-BAYLOR	1
CARLETON COLLEGE	1	RICE UNIVERSITY	6	UNIVERSITY OF MICHIGAN	1
CASE WESTERN RESERVE UNIVERSITY	1	ROSE-HULMAN INSTITUTE OF TECHNOLOGY	1	UNIVERSITY OF MINNESOTA-DULUTH GRADUATE	1
CENTRAL TEXAS COLLEGE-TRADITIONAL	1	RUTGERS -THE STATE UNIVERSITY OF NJ -NEW BRUNSWICK	1	UNIVERSITY OF NORTH TEXAS	4
CLEMSON UNIVERSITY	1	SAINT JOHN'S UNIVERSITY	1	UNIVERSITY OF OKLAHOMA	1
COLBY COLLEGE	2	SAM HOUSTON STATE UNIVERSITY	12	UNIVERSITY OF PUGET SOUND	1
COLLEGE OF THE MAINLAND	1	SAN JACINTO COLLEGE	6	UNIVERSITY OF ST THOMAS	1
COLORADO SCHOOL OF MINES	1	SMITH COLLEGE	1	UNIVERSITY OF TEXAS - SAN ANTONIO	58
COLORADO STATE UNIVERSITY	1	SOKA UNIVERSITY OF AMERICA	1	UNIVERSITY OF TEXAS ARLINGTON	1
CORNELL UNIVERSITY	1	SOUTH PLAINS COLLEGE	1	UNIVERSITY OF TEXAS AT AUSTIN	92
DALLAS BAPTIST UNIVERSITY	1	SOUTHERN METHODIST UNIVERSITY	2	UNIVERSITY OF TEXAS AT DALLAS	1
DARTMOUTH COLLEGE	1	SOUTHERN NEW HAMPSHIRE- 10WEEK	1	UNIVERSITY OF TEXAS AT TYLER	3
DEL MAR COLLEGE	1	SOUTHWESTERN UNIVERSITY	2	UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER SAN ANT	2
DICKINSON COLLEGE	1	ST. MARY'S UNIVERSITY	15	UNIVERSITY OF THE INCARNATE WORD	4
FRANKLIN W. OLIN COLLEGE OF ENGINEERING	1	STANFORD UNIVERSITY	1	UNIVERSITY OF VIRGINIA	1
FRIENDS UNIVERSITY	1	STEPHEN F. AUSTIN STATE UNIVERSITY	4	UNIVERSITY OF WISCONSIN - MADISON	1
FRONT RANGE COMMUNITY COLLEGE	1	SUL ROSS STATE UNIVERSITY	4	VANDERBILT UNIVERSITY	1
GEORGETOWN UNIV - GRAD SCHOOL	1	TARLETON STATE UNIVERSITY	1	WASHINGTON AND LEE UNIVERSITY	2
HARDIN-SIMMONS UNIVERSITY	1	TENNESSEE WESLEYAN UNIVERSITY	1	WASHINGTON UNIVERSITY	1
HAVERFORD COLLEGE	1	TEXAS A&M INTERNATIONAL UNIVERSITY	4	WEST TEXAS A&M UNIVERSITY - GRADUATE	1
HOUSTON BAPTIST UNIVERSITY	2	TEXAS A&M UNIVERSITY	75	XAVIER UNIVERSITY OF LOUISIANA	1
HOUSTON COMMUNITY COLLEGE	34	TEXAS A&M UNIVERSITY - CORPUS CHRISTI	6		
HOWARD COLLEGE	1	TEXAS A&M UNIVERSITY - GALVESTON	2		
				Grand Total	564



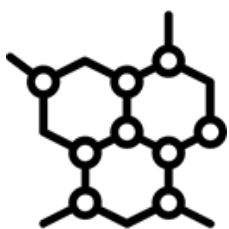
10%

GeoFORCE students declared **Geology** as a major in 2017.



11%

GeoFORCE students declared **Engineering** as a major in 2017.

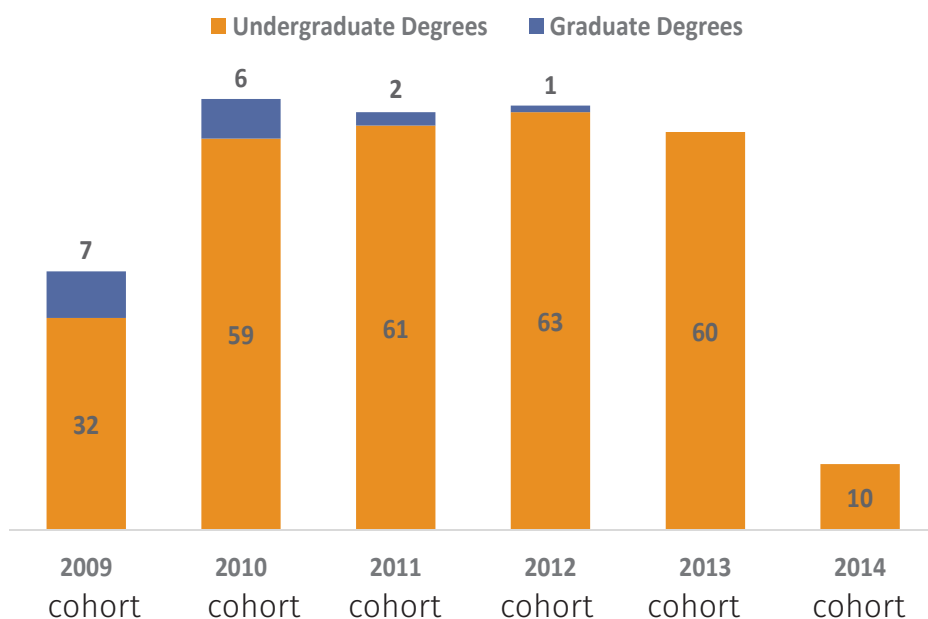


14%

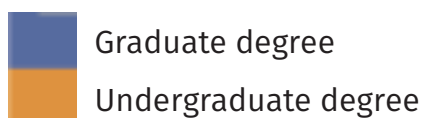
GeoFORCE students declared **Biology** as a major in 2017.

GeoFORCE College Statistics

Undergraduate and graduate degrees earned-to-date by cohort
(cohort year = year of high school graduation)



NSCH Degree Data



Data for Cohorts 2014-2017 is currently not available as they are still in the process of completing school.



416



Number of Degrees earned
by GeoFORCE college
students

16

Number Doctorate and
Masters Degrees earned
by GeoFORCE college
students

78

Number of
Associates
Degrees earned
by GeoFORCE
students


286

Number of Bachelors Degrees earned by
GeoFORCE students

37

Number of
Certifications and
Trade School Degrees
by GeoFORCE
students



A group of students wearing yellow GeoFORCE Academy t-shirts are hiking up a steep, rocky trail. The trail is composed of large, reddish-brown rocks. In the background, a steep, rocky cliff face rises, dotted with small green shrubs and trees. The sky is clear and blue. A large, semi-circular orange graphic element is positioned on the right side of the image, containing the text "GeoFORCE Academies 2017".

GeoFORCE Academies 2017

9th Grade Academies

Students are introduced to basic geological terms and processes while provided with opportunities to experience life on a major university campus.



Austin Field Stops

- Mt. Bonnell
- McKinney Falls State Park
- Barton Springs Pool
- Roy G. Guerrero Colorado River Park
- UT Austin Campus

Texas Gulf Coast Field Stops

- UT Marine Science Institute's Katy Research Vessel
- Goose Island State Park
- Mustang Island State Park
- Galveston Island State Park

Geological Topics:

Rivers, erosion, sediment transport, coastal erosion, barrier islands, sea-level change, uniformitarianism, superposition



Houston
June 17-23, 2017

40
Students



Coordinator
- Larry Savoy
Instructor
- Steve Seni
Educational Coach
- Cynthia Maye
Corporate Guest
- Jess Swafford (BP)

Southwest
June 3-9, 2017

44
Students



Coordinator
- Larry Savoy
Instructor
- Tiffany Caudle
Educational Coach
- Lauren Oefinger



10th Grade Academies



During the second summer of GeoFORCE, we inspire students to “think like a geoscientist,” and apply geological concepts in real time. Students learn about sedimentary structures, processes, and environments.

Arizona Field Stops

- Grand Canyon National Park
- Balanced Rock
- Navajo Historic Bridge
- Glen Canyon Dam
- Wupatki National Monument
- Sunset Crater Volcano National Monument
- Horseshoe Bend Overlook

Utah Field Stops

- Checkerboard Mesa
- Zion National Park

Geological Topics:

Geologic time, law of superposition, lateral continuity, cross bedding, unconformity, monocline, antecedent drainage, mass wasting, uniformitarianism, differential erosion, cinder cone, stratovolcano, sedimentary rocks



Houston
June 3-9, 2017

36

Students



Coordinator
- John Hash
Instructor
- Jaime Barnes
Educational Coach
- Tamika Ervin

Southwest
June 10-16, 2017

41

Students



Coordinator
- Matt Hofer
Instructor
- Peter Flaig
Educational Coach
- Matthew Moreno
Corporate Guests
- Nabel Eldam
(Marathon)
- Chelete Burnett
(Anadarko)





11th Grade Academies

During the third summer, we introduce students to volcanic structures, processes, and environments. We compare and contrast West Coast and Texas Gulf Coast coastal processes, all while reinforcing the geological concepts from previous summers.

Oregon Field Stops

- Columbia River Gorge
- Mount Hood
- Newberry National Volcanic Monument
- Crater Lake National Park
- Salt Creek Falls
- Multnomah Falls
- Oregon Coast
- Oregon Coast Aquarium

Washington Field Stops

- Mount St. Helens

Geological Topics:

Plate tectonics, subduction, volcanoes, crosscutting relations, igneous rocks, magma, lava, fissure, vesicular texture, pyroclastic flow, caldera, columnar basalt, longshore current.





Houston
July 8-14, 2017

37

Students

Coordinator

- Larry Savoy

Instructor

- Jeff Paine

Educational Coach

- Danielle Chambers

Corporate Guests

- Bill Magee (Shell)
- Bud Scherr (Valence)
- Jessica Schubert (Chevron)

Southwest
July 15-21, 2017

41

Students

Coordinator

- Chris Graham

Instructor

- Chelsea Mackamand-Lofland

Educational Coach

- Michael Arratia

Corporate Guests

- Joshua Payne (Shell)
- Bonnie and Mike Loudin (ExxonMobil, Retired)

Mixed
July 22-28, 2017

40

Students

Coordinator

- John Hash

Instructor

- Jeff Paine

Educational Coach

- Phil Caggiano

Corporate Guests

- Gabriela Depine (Shell)
- Chris Lerch - (BHP)



12th Grade Academies

GeoFORCE Texas piloted a project-based model of instruction with the 2017 rising 12th grade students. We encouraged the students to apply their previous field course knowledge on a challenge scenario with four overarching themes: Fluvial Process and Erosion, Cultural and Economic Geologic Significance, Geohazards (Past and Present), and Life through Time.



Central Texas Field Stops

- Pedernales Falls State Park
- Barton Springs Pool
- Inks Lake State Park
- J. J. Pickle Research Campus
- Enchanted Rock State Natural Area
- LCRA Redbud Center
- Tom Miller Dam
- Jackson School of Geosciences Research Labs
- Longhorn Caverns State Park

Geological Topics:

Fluvial processes, erosion, geohazards, ancient environments, ancient organism, economic geology.



Houston

July 8-15, 2017

24

Students

Southwest

Jul. 27-Aug. 3, 2017

38

Students

Mixed

July 22-29, 2017

37

Students

Coordinator

- Edgar Garza

Instructors

- Alison Mote

- Glenn Sharman

Educational Coaches

- Kiara Gomez

- Cynthia Maye

- Enrique Reyes

Coordinator

- Chris Graham

Instructor

- Michael Arratia

Educational Coaches

- Kiara Gomez

- Marla Hibbitts

- Enrique Reyes

Corporate Guests

- Mark Martin (Shell)

- Christine Skirius (BHP)

Coordinator

- Matt Hofer

Instructor

- Vanshan Wright

Educational Coaches

- Mercy Browder

- Rocio Castillo

- John Elkem

- Lauren Oefinger

- Michelle Ribelin

Corporate Guests

- Ana Pape

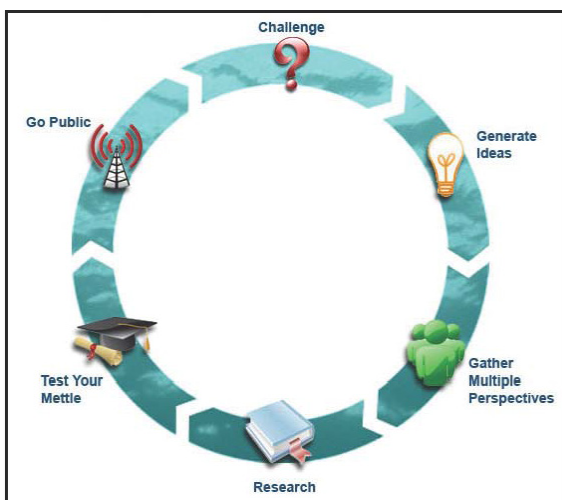
(ExxonMobil)



Thinking Forward: Teaching students to think like scientists using the Legacy Cycle inquiry framework.

GeoFORCE is designing a new capstone experience for the 12th Grade Academy. The approach, which is based on the Legacy Cycle inquiry model, organizes content in a framework that facilitates learning and engages students in tasks that allow them to develop the foundational skills that geoscientists use in their practice. Students are presented with a challenge that represents a problem or real situation. They work in teams to address the challenge, progressing through six stages, or categories of activities (see Ellins graphic) as they build an understanding of the geology, tectonic setting, and geomorphology of the field area.

Activities take place both outdoors in the field and indoors in a lab or a classroom where students can conduct experiments and have access to resources, including online materials, for learning about the field location. Assessments within the challenge provide formative feedback to learners and instructors. A team of instructors comprising a lead instructor and five instructional coaches or educational coaches-in-training (graduate or undergraduate students) facilitate teaching and learning. Instructional team members function as mentors and coaches—observing learners in action, providing feedback, and identifying and correcting misconceptions. In the final challenge stage student teams “Go Public”, delivering oral presentations in which they share their results and showcase products developed to satisfy the challenge with fellow learners and a panel of geoscience experts. This serves as the final assessment. The best “Go Public” presentations are posted to the GeoFORCE website to create a legacy of participants’ work to inspire the next group of students.



Legacy Cycle Stages (Ellins et al.,2010)





Selection of the Legacy Cycle model for the GeoFORCE 12th Grade Academy is informed by theories of how people learn best, new knowledge about field learning gleaned from geoscience education research, and best practices in engaging minorities in geoscience and other STEM disciplines.

Dr. Katherine Ellins

References

- Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.) (2001). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press. p. 384.
- Bransford, John (2017). What is the STAR Legacy Cycle?, IRIS Center, Vanderbilt Peabody College, available at <https://iris.peabody.vanderbilt.edu/module/hpl/cresource/q2/p07/>, accessed October 24 2017.
- Ellins, K.K., McCall, L.R., Amos, S., McGowan, R.F., Mote, A., Negrito, K., Paloski, B., Ryan, C. & Cameron, B (2010). Water Exploration: An online high school water resources program, Abstract ED 23B-0717, presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17.
- Kastens, K. A., C. A. Manduca, C. Cervato, R. Froderman, C. Goodwin, L. S. Liben, D. W. Mogk, T. C. Spangler, N. A. Stillings, & S. Titus (2009). How Geoscientists Think and Learn, *Eos*, 90 (31): 265-272.
- Schwartz, D. L., S. Brophy, X. Lin, X., & J.D. Bransford (1999). Software for managing complex learning - Examples from an educational psychology course: *Educational Technology Research and Development*, 47 (2): 39 -59.
- Wolfe, B.A. and E.M. Riggs (2017), Macrosystem Analysis of Programs and Strategies to Increase Underrepresented Populations in the Geosciences, *Journal of Geoscience Education*, 65: 577-593.

Geoscience Education Consulting for 12th Grade Academy Project-based Learning



Dr. Katherine Ellins, JSG Program Director for Geoscience Education Research, is acting as an educational consultant to GeoFORCE to develop instruction in the new 12th Grade Academy. Dr. Ellins is the 2017 recipient of the Neal Miner Award for exceptional contributions to the stimulation of interest in the Earth sciences. The award is presented by the National Association of Geoscience Teachers (NAGT). Dr. Ellins is known for producing high-quality, professional development programs for teachers in Texas and across the country. As NAGT notes in presenting the award, Dr. Ellins' desire to build community, leadership, and knowledge among teachers about Earth science has provided forward-thinking professional development opportunities in geoscience education for over 200 teachers who teach science in schools with significant numbers of students underrepresented in STEM.

Partnerships

GeoFORCE maintains strong partnerships with universities, school districts, industry, and government organizations that share our values and goals. Together we are better at serving the needs of our target population and furthering our objectives.

Southwest Texas Junior College (SWTJC)

The partnership with Southwest Texas Junior College is the cornerstone of the southwest region's success. SWTJC helps with every aspect of implementing GeoFORCE from building relationships with local school districts to providing logistical support for GeoFORCE events in the area.

Houston Independent School District (HISD)

HISD supports our partnership in the Houston region by giving us access to middle schools for recruiting and to high schools for our outreach programs. We have used HISD facilities for meetings and as drop-off and pick-up locations. Most importantly, individual principals and teachers have gone out of their way to make GeoFORCE possible for their kids.

University of Alaska Fairbanks (UAF)

GeoFORCE Alaska currently is working with their second student cohort, completing their second summer in 2017. We continue to collaborate with and support this growing GeoFORCE program as it develops into the second GeoFORCE program in the nation.

Fort Valley State University (FVSU)

We remain closely connected to FVSU, where the model for GeoFORCE was framed. We continue to work together to bring opportunities to students of color. Isaac Crumbly and Jackie Hodges run the Fort Valley programs.

Amigos de las Americas

GeoFORCE has collaborated with Amigos de las Americas to provide two GeoFORCE students the opportunity to gain essential education and life experience, leadership training, and an entirely new network of friends by living and working in amazing communities throughout Central and South America.

COMPANY/ ORGANIZATION	INDIVIDUAL
Anadarko	Robert Talley (Retired)
Anadarko	Chelete Burnett
Anadarko	Keith Mahon
Baker Hughes	Scott Schmidt
BHP	Chris Lerch
BHP	Christine Skirius
BP	Kira Diaz Tushman
BP	Larry Thomas
Chevron	George Hildebrandt
Chevron	Joni Baird
Chevron	Karen Rawls
Chevron	Danielle Carpenter
Cobalt	Edward Cazier
ConocoPhillips	Melissa Loyd-Furnas
Drillinginfo	Mark Nibbelink



COMPANY/ ORGANIZATION	INDIVIDUAL
Drillinginfo	Allen Gilmer
ExxonMobil	Reginald Beasley (Retired)
ExxonMobil	Mike Loudin (Retired)
ExxonMobil	Nick Way
ExxonMobil	Julie Cogswell- Maher
Halliburton	Abayomi Olufowoshe
Houston ISD	Yolanda Evans (Retired)
Houston ISD	Karla Auzenne
Houston ISD	Hortense Campbell
Marathon Oil	Richard Deene
Marathon Oil	Dan Oakes
Marathon Oil	George Laguros
Marathon Oil	Erin Roehrig
Newfield	Christina Venditti
Schlumberger	Susan Rosenbaum
Schlumberger	Paula McCann Harris
Schlumberger	Joel le Calvez
Shell	Mike Alvarez
Shell	Denise Butler (Retired)
Shell	Mark Martin
Southwest Texas Junior College	Blaine Bennett (Retired)
Texas Workforce Commission	Emily Clodfelter
Valence Operating Company	Bud Scherr

COMPANY/ORGANIZATION	INDIVIDUAL
Austin Core Research Center, Bureau of Economic Geology	Linda Ruiz McCall
Barton Springs Pool	Carlos Nunez
Colorado River Alliance, Red Bud Center	Daniela Pennycook
Colorado River Discovery	Kris Sams-Kenney
Crater Lake National Park	John Duwe
Crown Point Vista	Dorothy Brown-Kaiser
CT Lab, Jackson School of Geosciences	Richard Ketcham
Enchanted Rock State Natural Area	
Glen Canyon Dam	Nikki Jaborski
Grand Canyon National Park	Barbara Kippen
Goose Island State Park	Janelle Rand
High Pressure Lab, Jackson School of Geosciences	Jung-Fu Lin
ICP-MS Lab, Jackson School of Geosciences	Nathaniel Miller
Inks Lake State Park	Kristin Rodgers
KATY Research Vessel	Captain Stan Dignum
Longhorn Caverns	
Marine Science Institute	Amanda Taylor
Morphodynamics Lab, Jackson School of Geosciences	Dr. Jim Buttles
Mt. Hood National Forest- Timberline Lodge	Kim Nylund
Mt. St. Helens	Kristine Cochrane-Bell
Newberry National Volcanic Monument	Karen Gentry
Pacific Northwest Region Forest Service	
Stable Isotope Lab	Jaime Barnes
Sunset Crater/Wupatki National Monument	Steven Rossi
Pedernales Falls State Park	Jim Cook
Texas State Aquarium	Stacy Treviño
Zion National Park	Patti Vanscyoc

Valedictorians and Salutatorians

Our graduating GeoFORCE students leave a legacy of success. Their perseverance and hard work sets the stage for further leadership in their college endeavors.

We congratulate our GeoFORCE students, the Class of 2017 Valedictorians & Salutatorians!



Dawn Smith
Yates High School
Salutatorian



Dante Angelo Tarzona
Washington High School
Salutatorian



Haleigh Boyds
Utopia High School
Salutatorian



Jacklyn Perez
LaPryor High School
Valedictorian



Joaquin Palacio
Rocksprings High School
Valedictorian



Jose Pedro Jimenez
C.C. Winn High School
Valedictorian



Sofia Rodriquez
Leakey High School
Valedictorian



Pigg Quinten
Leakey High School
Salutatorian



Mara Martinez
Cotulla High School
Valedictorian



Tamara Breiten
Hondo High School
Valedictorian



Chelsea Chapa
Crystal City High School
Salutatorian

Valedictorians and Salutatorians



Cameron Moore
Sabinal High School
Valedictorian



Allison Dungo
Uvalde High School
Salutatorian



Erik Chavarria
C.C. Winn High School
Salutatorian



Josh Velasquez
Carrizo Springs High School
Valedictorian



Kayleigh Karre
Sabinal High School
Salutatorian



Cheyenne Hibbitts
Bracket High School
Valedictorian



Lois Owolabi
Carrizo Springs High School
Salutatorian



Aspen Williams
Knippa High School
Valedictorian



Roxanne Rodriguez
Dilley High School
Valedictorian



Yliana Hernandez
Crystal City High School
Valedictorian

THE UNIVERSITY OF TEXAS AT AUSTIN

JACKSON

SCHOOL OF GEOSCIENCES

Exceptional Preservation and the Fossil Record

Chad M. Ellison^{1,2*}, Leah Hudson¹, Taylor V.¹ Department of Geological Sciences, The University of Texas at Austin² Department of Integrative Biology, The University of Texas at Austin

* Authors for correspondence (chad_ellison@utexas.edu)

Background

Exceptionally preserved soft tissue in Konservat-Lagerstätten provide rare yet significant insight into past behaviors and physiological processes. Assessments of these records only focus on marine Lagerstätten or chemically heterogeneous tissues from across the globe.

We investigate the distribution of tetrapod integument and investigate the relationship between integumentary structures through time and marine depositional environments.

We assess the influence of abiotic and biotic controls on the distribution of Lagerstätten from the Permian to the present using a multivariate statistical framework.

We investigate the preservation potential of different Lagerstätten and differences explained by abiotic or biotic factors.

How do different Lagerstätten influence the distribution of novel integumentary structures?

Methods

We analyze data for tetrapod Konservat-Lagerstätten (n = 100) for environment, integument types, country of origin, and time period.

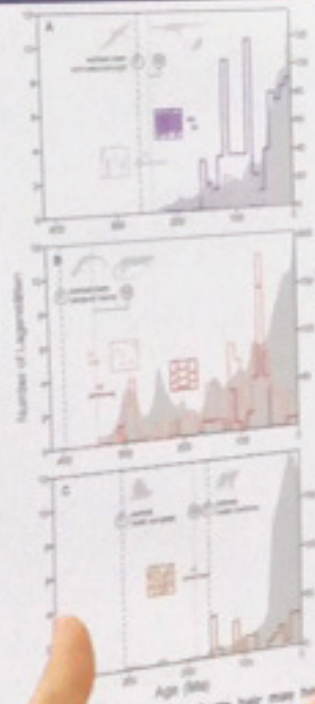
Chi-squared tests were used to compare the distribution of integument types (per 10Ma bin) with previously proposed Lagerstätten types (e.g., rock outcrop area, clade diversity, sea level, and depositional environments. Accounted for non-normal distributions using a Quasi-Poisson distribution) and autocorrelation. Used backwards stepwise removal of non-significant ($p < 0.05$) terms.

Bayesian analyses (methods¹⁹) assess the probable timing of first appearance of novel integumentary types.



Figure 2.3 Overview of Lagerstätten distribution across different depositional environments. The map shows the distribution of Lagerstätten types across different depositional environments. The legend indicates: Lacustrine (green), Fluvial (yellow), Other terrestrial (blue), and Extraterrestrial (red). The map shows a high density of Lagerstätten in the Northern Hemisphere, particularly in North America and Europe.

Results



Gap analyses indicate that the first appearance of novel integumentary types is associated with the Permian-Triassic boundary, rather than the Permian-Triassic boundary.



Figure 2.5 Distribution of Lagerstätten types across different depositional environments. The pie chart (B) shows the distribution of Lagerstätten types across different depositional environments. The legend indicates: Lacustrine (n = 10), Fluvial (n = 20), Other terrestrial (n = 30), and Extraterrestrial (n = 40).

Fossil Record of Tetrapod Integument

Watts¹, Hector Garza¹, Julia A. Clarke^{1,2*}
¹University of Texas at Austin, Austin, TX 78713
²University of Texas at Austin, Austin, TX 78713
 hgarza@utexas.edu and julia_clarke@jsg.utexas.edu



all, Konservat-Lagerstätten are not distributed
 time and space. Pins show relative numbers in
 tectonic environments (colors of pin) and absolute
 age (size of the pin).

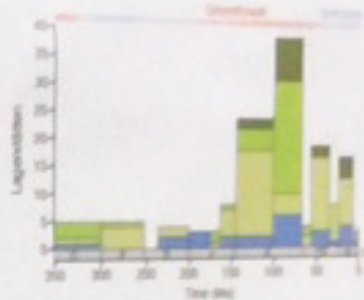


Figure 4 | Tetrapod Konservat-Lagerstätten deposits are primarily associated with lacustrine environments, with fossil deposits being twice as common in the Late Cretaceous. Few Lagerstätten in the Triassic and earlier. Diverse Lagerstätten counts are significantly associated with higher global sea levels ($p < 0.001$) and higher $\delta^{18}O$ values ($p < 0.001$).

Conclusions

- Konservat-Lagerstätten are statistically unevenly distributed through time and space. Their distribution is explained by predominantly abiotic factors (e.g., global sea level variation).
- Gap analyses, taking into account variation in sampling among integumentary types, indicate hair and filaments may have originated much earlier than implied by earliest records, while feathers originated close to their earliest known occurrence.
- The frequency of Lagerstätten in different depositional environments varies by time period, with lacustrine environments being the primary environment for preservation with the exception of fluvial environments during the Late Cretaceous.
- Variation in preservation potential among integuments biases the reconstructed first origins of novel integumentary structures in the fossil record in different ways.
- Collecting intensity seems to strongly influence the spatial distribution of these Lagerstätten.

References and Acknowledgements

1. P. Wilson, D. Briggs, *Science* **251**, 521-526 (2001).
 2. G. Rehrig, *Paleogeography, Paleoclimatology, Paleoenvironment*, **301**, 39-74 (2002).
 3. J. Schaffhausen, M. LaFreniere, *PLoS ONE* **10**, 175-176 (2015).
 4. C. Marshall, *Paleobiology* **18**, 1-12 (2000).
 5. C. Marshall, *Paleobiology* **20**, 839-840 (2004).
- Acknowledgements: Funding for this work was provided by the National Science Foundation (Grant EAR-1201002) (JAC). We thank Drs. Peter H. Ravn, Hiding (Gordon) Gotsch, and Dr. Charles Lagerstätten. The Clarke Lab undertook early data collection and discussion, especially with Prof. Dr. Lauren Engelen, and Dr. Zhenjie Li.

...much earlier than implied by earliest records, while
 ...occurrence. Integument preservation is better explained
 ...present early solely in trace fossils as contrast for
 ...mammary, *Megascopus mammarylatus*, 151 Ma
 ...grown without (A, 241 Ma), tetrapods (B, 344 Ma)
 ...the different types of fossilized integuments.

GeoFORCE
 College

College Program

GeoFORCE Texas students continue to pursue higher education, overcoming challenges and expanding their opportunities.

GeoFORCE College

GeoFORCE has 564 students attending colleges across the nation. Since our first high school graduates started college in the fall of 2009, our college matriculation continues to stay steady.



More students are interested in diverse disciplines and are engaging in many career-building activities while pursuing their higher education. GeoFORCE continues to offer opportunities for students to build their portfolios and gain invaluable experience through internships, philanthropy, and mentoring while in college.

Scholarships

For many GeoFORCE high school seniors, getting into college is a challenge, but it only sets the stage for a more formidable obstacle, paying for it. GeoFORCE is fortunate to have donors who understand this problem.

The GeoFORCE College Scholars Partnership was started with a generous donation to fund 120 GeoFORCE STEM majors. This partnership is open to participation by other donors. The program continues to promote the funding opportunity to all available potential donors. The goal is to provide financial resources to GeoFORCE alumni who are outstanding students and have demonstrated the potential to become future leaders in their fields.

GeoFORCE Texas Scholarship Endowments

- Gerson Garcia Endowed GeoFORCE Scholarship
-  Deborah Susan Pfeiffer Endowed
- GeoFORCE Scholarship*
- Janet E. and David I. Rainey GeoFORCE Texas Scholarship
-  Students Raising Students GeoFORCE Endowment*
- Stephen P. and Katherine Hubby Weiner GeoFORCE Scholarship*

* new endowment established in 2017

Externships

GeoFORCE corporate ~~sponsor~~ provide one half to a full day externships for GeoFORCE college students. Students have the opportunity to meet with several employees of the corporation hosting the externship and talk with them about a day in the life of their company. Some companies provide students structured learning experiences to provide the students with a feel for working on teams and providing solutions to customer needs. This year externship hosts included Shell, Marathon Oil, Schlumberger, and ConocoPhillips.



JSG Alum Leslie Jordan,
GeoFORCE 2012 Cohort, at
2017 Schlumberger Externship



2016-2017 GeoFORCE Externships Experience Partners



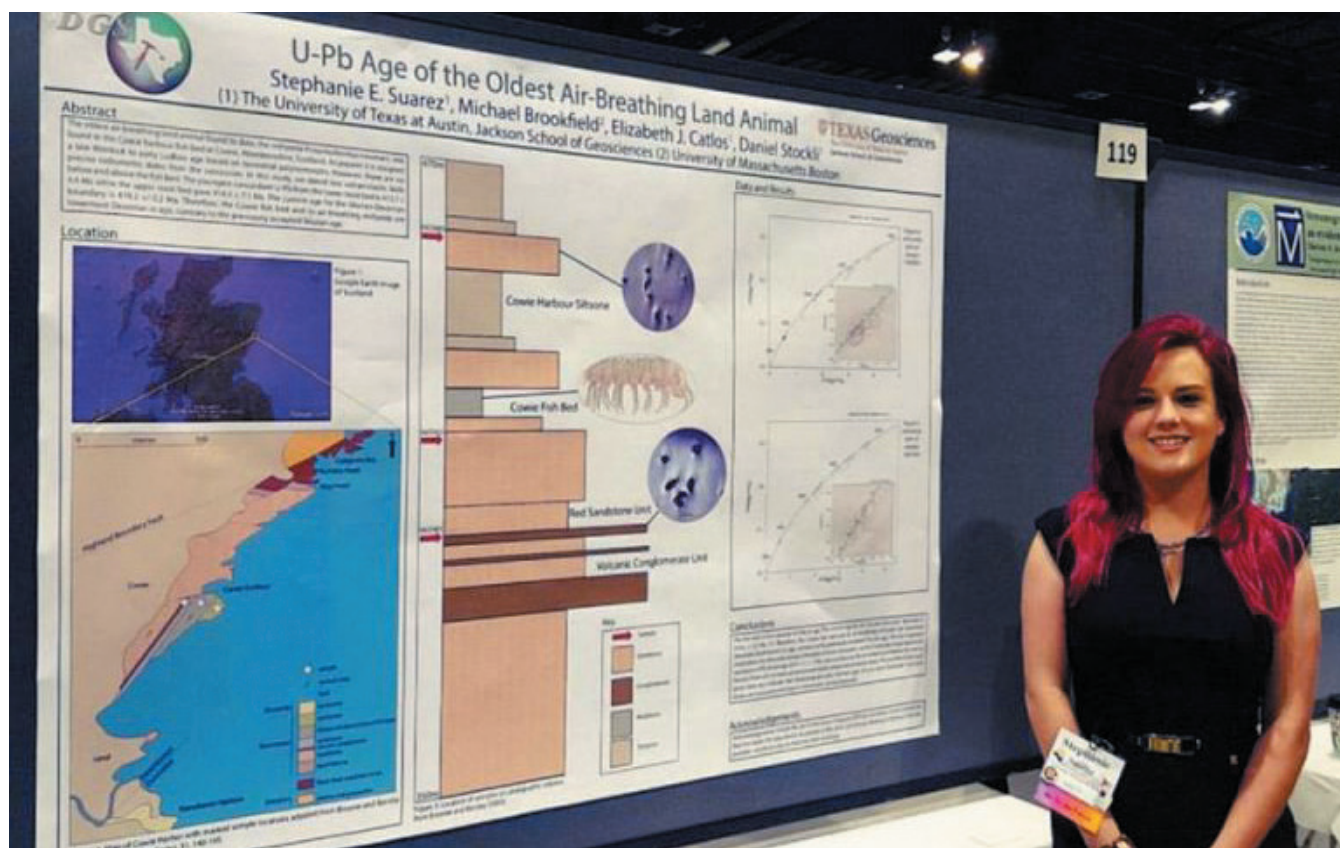

Marathon Oil
Corporation.


ConocoPhillips

Schlumberger

Former GeoFORCE student rewrites history and proves ancient millipede was not the first air breather on land

-Story excerpt from "Ancient Animal Thought to be First Air Breather on Land Loses Claim to Fame" and "Celebrating the Class of 2017: Stephanie Suarez". (JSG Website News, July 5, 2017).



Some good scientific sleuthing by Stephanie Suarez at The University of Texas at Austin has helped rewrite one of the earliest chapters in the planet's evolutionary history. The research has shown that the millipede thought to be the world's oldest known air-breathing land creature is in fact about 14 million years younger than previously thought and cannot be the original land breather.

The paper was published June 28 in the journal PLOS ONE. The study focuses on a species of millipede called *Pneumodesmus newmani*, which was thought to have been breathing air on solid ground during the late Silurian period some 428 million years ago. All other animal fossils discovered before this time have been from animals that lived and breathed under water. "When I attempted [to date the sample], the ashes clumped together, and no zircons sank to the bottom," Suarez said. "It was very messy and unsuccessful."

Undeterred, Suarez combed scientific literature looking for ideas and came across a 2014 study led by Gregory Hoke of Syracuse University that pioneered a method of isolating nonclay components from clay-rich material by constructing and using an ultrasonic clay separator.

"I had to get creative," Suarez said. "We have a very small sonicator in our lab that we use to clean thin sections. I used that, a Tupperware container and some hydrogen peroxide. It worked. I was very excited."

Ultimately, Suarez was able to collect 74 zircons to be analyzed and dated. More than 10 of the zircons were younger than 428 million years ago, with the youngest being about 414 million years old. This places the specimen in a completely different geologic era, the Devonian, a classification that bursts the millipede's uniqueness. Many fossils of land-breathing organisms, mainly insects and arthropods, have been recovered from this era.

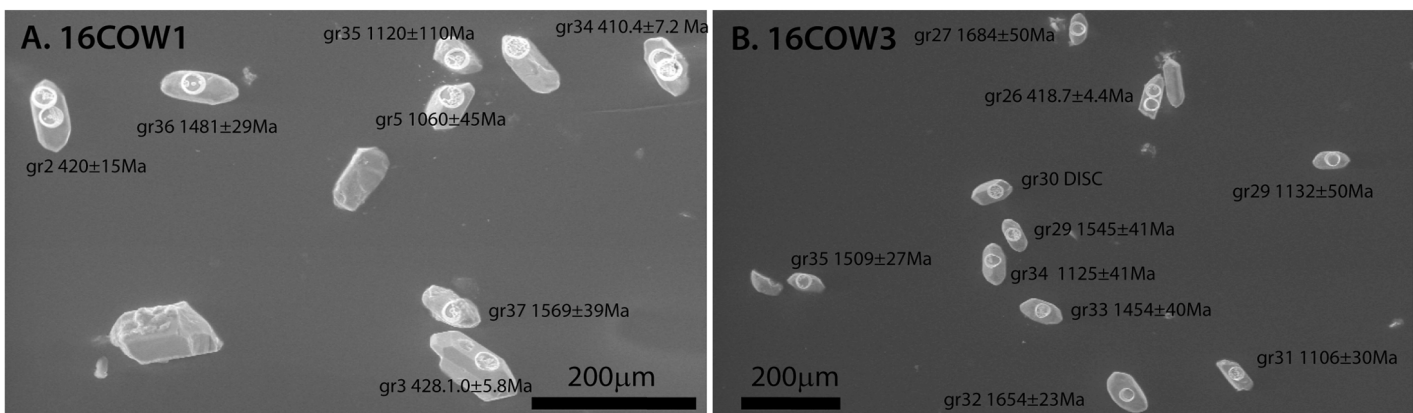
Suarez's supervisor, Liz Catlos expects the results to raise a few eyebrows, but she said the beauty of published science is that others can replicate the experiment. The handful of zircons found to be younger than 428 million years old definitely show that the *Pneumodesmus newmani* specimen was not the first organism on Earth to breathe air while on land.

"This wasn't it," Catlos said. "We have to keep looking."

Jackson School Professor Daniel Stockli was a co-author on the study. Funding was provided by the Geological Society of America South Central Section.

Growing up in a low-income household, Suarez was determined to become the first in her family to graduate from college. Soon she will head to graduate school at the University of Houston, where she will prepare for her future career at NASA or perhaps in the oil and gas industry. "My mom is very proud and tells me that I'm self-made. What amazes her even more is that I work and go to school. There's a lot of sacrifice for time, but I know it will pay off."

Her best advice to girls who aspire to become scientists is to stay the course. "To young girls, I want them to know that anything's possible. They just need to be resilient and get through their obstacles. Even if they're just inching, they have to keep going."



Examples of zircon grains used in a University of Texas at Austin study that showed the animal thought to be the oldest land-based air breather is younger than thought. Grain numbers and ages are indicated by the numbers. University of Texas Jackson School of Geosciences





GeoFORCE Outreach 2017

GeoFORCE Outreach



High School Senior Events

GeoFORCE hosts Career Day for all GeoFORCE seniors to consider possible career paths. Companies provide panels consisting of various employees to give insight to all the employment opportunities provided.

College Admissions Workshops

GeoFORCE provides college admission workshops to high school juniors and seniors along with their parents. GeoFORCE staff provides information concerning the college admission process, financial aid and scholarship opportunities. Several presentations focus on academic success, future career preparation and time management. A panel of college students are invited to provide high school students the opportunity to ask questions about college life in general and about future internships and other career-development opportunities.

PSAT and SAT Prep

GeoFORCE continues to provide PSAT/SAT workshops to our students. We feel this is another opportunity to prepare students for college readiness.

Educator Professional Workshops

Educator Professional Workshops

Without dedicated teachers GeoFORCE would not be able to recruit the outstanding students we have in the program. Our educators are our greatest recruiters for the program.

During the recruitment phase, teachers help to identify and encourage students they believe to be great candidates. They guide students through the application process and monitor these students throughout their high school years once they are accepted in the GeoFORCE program. This process is why we recruit education professionals to assist on our GeoFORCE Academy field courses every summer as Educational Coaches.

GeoFORCE hosts workshops every year for teachers from our target schools. Educator Professional Workshops are free and available to our math and science teachers. They provide educators with hands-on field experience to STEM topics, as well as lessons they can take back to their schools.



GeoFORCE Alumni Outreach

Former GeoFORCE participants have given back their time to GeoFORCE by serving as counselors, trail drivers, field coordinators, Houston Energy Day volunteers, and recruiters at their old high schools. The GeoFORCE college graduates on the adjacent page were hired as GeoFORCE summer staff in 2017.



~~Enrique Reyes~~ Class of 2010, now a science teacher in the San Antonio School District, serving as an Educational Coach for the 2017 GeoFORCE 12th Grade Academy. Enrique is teaching a student to record their geological observations into a KMZ file in preparation for his final presentation.



Larry Savoy
Class of 2010
2017 coordinator



Chris Graham
Class of 2010
2017 coordinator



Edgar Aguilar
Class of 2012
2017 coordinator



Enrique Reyes
Class of 2010
Educational Coach



Teresa Gaitan
Class of 2009
2017 Trail Driver



Dennis East
Class of 2010
2017 Trail Driver

2016-2017 Outreach Staff



Dr. Sam Moore, Director of Outreach and Diversity

For more than 20 years Dr. Moore has provided leadership in engaging faculty with K-12, undergraduate, and graduate students. Along with GeoFORCE, Sam also oversees Jackson School outreach programs to increase participation in the geosciences.



Lindsay Stephens, Senior Program Coordinator

Oversaw the GeoFORCE College Program, which includes statistics, college leadership opportunities, and scholarship management. Served as a field experience evaluator.



Edgar Garza, Outreach Program Coordinator

Coordinates the GeoFORCE College program and scholarship program. Assists with the High School Program, along with GeoFORCE's social media presence. Also serves as a field experience evaluator.



Matt Hofer, High School Program Coordinator

Oversees logistics and operations for all high school program field courses and events. Coordinates the Southwest Academy field courses.



John Hash, Coordinator

Coordinates the Houston Academy field courses, assists with development activities for GeoFORCE and college transition initiatives for the College program.



Alison Hansen, Administrative Assistant

Coordinates all aspects of the accounting and human resources process to ensure the program runs smoothly.



Selene Alba, Media Coordinator

Assist in all aspects of media for GeoFORCE, including, video content, digital design, social media and website design.



Daniel Campos, Office Assistant

Maintains office operations by handling logistical and organizational support tasks. Ensures trip supplies and equipment are properly maintained and serviced.

*Above are current part time employees



