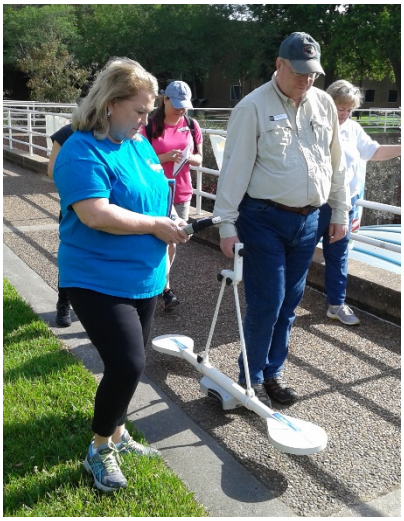
2017 AAPG Convention and Exhibition Earth Science Educator Program
April 1-4, 2017
George R. Brown Convention Center, Houston, Texas

SNAPSHOT



Through a generous grant from the American Association of Petroleum Geologists (AAPG) Foundation, fifty-two middle- and high-school educators, predominantly from the Houston region, participated in the 2017 AAPG Convention and Exhibition (ACE) Earth Science Educator Program in celebration of the 100th AAPG Anniversary. The events, designed specifically for educators, crossed four days and included two field trips, a full-day symposium, participation in the ACE opening reception, a technology demonstration at a local petroleum company, a mentor program that paired industry professionals with educators, and attendance of ACE. Through their continued work in the classroom over the next decade, participating educators will bring information about the geosciences and the petroleum industry to approximately 80,000 students.[1] Overall, participants ranked their experiences as excellent and indicated activities met their expectations.

The Educator Program was designed by a committee of educators, including two AAPG Foundation Teachers of the Year, and industry professionals. Program objectives, identified by committee members from past AAPG Educator Programs, included:

1. enabling middle- and high-school teachers and community college faculty to address student academic preparedness by providing standards-based information and experiences that they can use in their classrooms;
2. transferring technically sound information about the industry through interaction with industry professionals;
3. providing information about the broad range of industry careers and specific career pathways that students can pursue; and
4. encouraging and empowering educators to access to AAPG assets following their experience by building relationships between industry professionals and educators.

Designed to serve as a model that can be adapted for future years, the efforts started with clear objectives, integrated educators into the committee, outlined a strategic approach to programs, and included documentation of the development and implementation process.

[1] Based on the number of students currently being taught as reported by participants and extrapolated to a ten-year teaching career for each participant.

2017 PARTICIPANT DEMOGRAPHICS

The target audience of middle and high-school teachers teaching Earth-science or related subjects was achieved and the content has the potential to reach more students than predicted.

- Of the 52 participants, 25 (42%) teach middle school, 22 (48%) teach high school, 4 (8%) teach in other organizations, such as the Energy Center and Harris County Department of Education (HCDE), and 1 (2%) teaches elementary school. A minimum of 5 (10%) of the teachers are known to also teach at community colleges. **The attendees report that they reach 8,029 students per year, suggesting they could reach approximately 80,000 students in the course of 10 years**.
- Of the 46 participants reporting information for the different subjects they teach, 22 (48%) teach earth science or earth and space science as one of their subjects; 21 (46%) teach chemistry and/or physics and/or astronomy; 10 (24%) teach aquatic science and/or biology; 6 (13%) teach environmental science; 1 teaches computer science and engineering; and 11 (24%) teach general science (all but one being a middle-school teacher).

T**he primary geographical area served was the Houston region**

- Collectively, the attendees reported representing 14 school districts in Texas, with 21 (44%) of the teachers working for Cypress Fairbanks Independent School District (ISD), 12 (25%) for Houston Independent School District (ISD), and the remainder representing Barbers Hill, Clear Creek, Fort Bend, Galveston, Humble, Katy, Lamar, Pasadena (3), Pearland (2), Santa Fe, Spring Branch, and Waller ISDs.

The content will be shared with students of ethnicities traditionally not represented in the oil and gas industry.

- Of the participants reporting school demographic data, 3 teach in private schools, 2 teach in magnet schools, and 41 (87%) teach in public schools. 10 of the public schools receive Title I[2] funds. 41 (87%) teach in schools that serve a population underrepresented in science, technology, engineering, and math (STEM) careers. Thirty (64%) serve Black / African American students, which range from greater than 15% to 55% of the student population. Forty-one (87%) serve Hispanic / Latino students, which range from greater than 20% to 98% of the student population.

The goals of the participants were met.

[2] Schools enrolling at least 40 percent of children from low-income families are eligible to receive Title I funds for schoolwide programs designed to upgrade educational programs to improve achievement for all students, particularly the lowest-achieving students.

- Pre-conference feedback from participants indicated the most valued aspects they hoped to achieve by attending the conference included acquisition of activities, materials, and ideas that can be used in the classroom; based on evaluation data, these goals were met. Also highly ranked was developing an understanding of the different aspects of industry; these goals were met based on evaluation feedback.

PLANNING

The Earth Science Educator Program Committee included classroom teachers, including two former AAPG Foundation Teachers of the Year, district and regional science specialists, industry professionals, and geoscientists. The committee worked closely over 16 months to design a program to:

- Focus on educators, rather than students, to multiply the impact;
- Align all program activities with the program objectives, the ACE anniversary theme *100 Years of Science Fueling 100 Years of Prosperity*, and with the Texas Essential Knowledge and Skills in science.
- Offer a buffet of opportunities at different technical levels to allow individual participants to craft their most effective experience;
- Integrate exploration of industry careers throughout the offerings;
- Provide Continuing Education and Gifted and Talented credits;
- Offer programs in association with ACE and in the convention venue to underscore the connection to AAPG and maximize interaction with convention attendees;
- Leverage ACE opportunities (e.g., book signings, Sunday general presentations, membership participation in educator activities, partnerships between educators and members, etc.); and
- Include evaluation of all activities to inform future programs.

AAPG EARTH SCIENCE EDUCATOR PROGRAM ACTIVITIES

Activities offered to educators included two field trips, a full-day symposium, participation in the ACE opening reception, a technology demonstration at a local petroleum company, a mentor program that paired industry professionals with educators, and attendance of ACE.

Field Trips

Trip 1: Ground Penetrating Radar (GPR) of the Hockley Fault, Northwest Houston

Leader: Dr. Shuhab Khan, Professor, Department of Earth and Atmospheric Sciences, University of Houston

Assistants: Ms. Diana Krupnik, Ms. Juhi Aggarwal, Ms. Wanda Crupa, Graduate Students, Department of Earth and Atmospheric Sciences, University of Houston

Dr. Khan began with a one-hour classroom presentation to introduce the technology and the origin of Houston's faults and the regional geology that influences them. Instructed by Dr. Khan and his graduate students, 16 participants used the GPR and

Electromagnetic Induction (EMI) equipment to collect data along short transects on the University campus. Following the field trials, Dr. Khan and his students led the participants to several stops in northwest Houston to observe the physical expression of faults on the landscape and architecture, and to collect GPR and EMI data along several transects across the faults. Dr. Khan and his team are processing the transect data and will share the data with all participants in the near future. In addition, for interested participants, he offered to go to their classrooms with the equipment to allow students to collect and process data from their school grounds.

"I will use my first-hand experience to talk to students about it. This was a very important experience for me. I teach remote sensing."

"This experience will help me explain subsidence to students and explain to them Houston has fault lines."

Field Trip 2: Morphology and Sedimentology of Panther Creek, Montgomery County Preserve

Leader: Dr. Erik Scott, E&P Geoscience, LLC

Assistants: Tami LongJohn, Graduate Student, Department of Earth Science, Rice University, Alicia Staszyc, Graduate Student, Department of Earth and Atmospheric Sciences, University of Houston

Dr. Scott began with an in-field orientation before leading the 20 attendees (all with appropriate footwear!) on a trek within the stream bed of Panther Creek. The creek provides a natural laboratory in which participants can interact with the dynamic nature of river systems and expand their understanding of river processes firsthand. This field trip also served as a model for student trips to Panther Creek or to a stream local to participants' schools. At three sites – a steam confluence, a meander bend, and a bridge – participants explored the features associated with meandering streams, influences of stream morphology, the processes of sediment movement and deposition and resultant sedimentary structures, and the influence of man-made structures.

One thing I learned on this field trip: *"stream morphology and formation of ripples. Loved being outside with first-hand experience."*

"When I take my students on field trips and stream table experiments I have a background knowledge to teach now."

Symposium

Based on suggestions by classroom educators on the Committee, a symposium of concurrent 90-minute sessions was planned in place of a one-day single-topic workshop often held for teachers during past ACEs. The symposium format offered diverse opportunities, aligned with the program objectives, ACE themes, and science TEKS, from which the participants could select sessions that addressed their needs. Sessions encompassed those that concentrated on technical content for educators who would independently integrate information into their curriculum and those with classroom activities aligned with content offered during the session. In addition, sessions were divided to address the different science TEKS of middle- and high-school classrooms. Participants explored recent discoveries and where and how the industry will be accessing petroleum resources in the next two decades, they learned how the industry is evolving in light of new technology and a diversifying energy economy, and they increased their understanding of careers in the petroleum industry.

	Room 1	Room 2	Room 3
9:00 – 9:45 a.m.		**Registration / Breakfast**	
9:45 – 10:00 a.m.		**Welcome**	
Session A			
10:00 – 11:30 a.m.	**A Changing World for Petroleum** Grades 9-14 / Technical Presentation	**Seeking Oil and Gas in 2017 and Beyond** Grades 9-14 / Technical Presentation (with activity)	**Careers: A Path for Students to the Geosciences Paycheck** Grades 6-14 / Panel Discussion
11:30 a.m. – 12:30 p.m.		**Lunch**	
Session B			
12:30 -2:00 p.m.	**Roving Robots and Extreme Machines, New Frontiers of Earth Exploration** Grades 6-8 / Hands-On Activities	**Why Seismic Matters in Our Hunt for Resources** Grades 6-12 / Hands-On Activities	
2:00 – 2:15 p.m.		**Afternoon Refreshment**	
Session C			
2:15 – 3:45 p.m.	**Roving Robots and Extreme Machines, New Frontiers of Earth Exploration** Grades 6-8 / Hands-On Activities	**Seeking Oil and Gas in 2017 and Beyond** Grades 9-14 / Technical Presentation (with activity)	**A Changing World for Petroleum** Grades 9-14 / Technical Presentation

Agenda of concurrent Symposium session content and type, and number of participants.

Selected responses to the question, "How did you benefit from being part of the 2017 AAPG Earth Science Educators Symposium?" included:

I enjoyed hearing from experts about how I can incorporate geology related experiences in my classes.

Several activities will apply to my classes. I also have ways to encourage my students in career paths.

Built a much stronger foundation of current affairs in field and hands-on thinking to share with students. Getting up-to-date information so vital.

Excellent speakers and facilitators. This was an incredible program. Thanks for having on Saturday and Sunday so I could attend and not miss school. Field trip to Panther Creek great. Thank you for this opportunity. My students will benefit directly.

The symposium opened my mind to a new way of thinking about geology.

Found new opportunity for field trip / hands on application. Good exposure with oil and gas technologies since it's so important to our area.

Resources for classroom / school. Partnerships with professionals. Idea sharing!

Not only for my students but also improved my own knowledge and understanding.

Conference Participation

Fifteen spaces were created each day for teachers to attend ACE on Monday and Tuesday at the student rate. This was an experimental program to increase participant awareness of AAPG, activities of its members, and current state of the industry, and to encourage connections between educators and industry. In addition, the “meeting mentors” program paired a teacher with an interested industry professional to provide a forum for one-on-one interactions and encourage the development of a longer-term relationship.