



A model of success

Summer of Applied Geophysical Experience program turns 25

by Caryn Johansen

“It’s as heavy as a cement truck, but it works like a watch,” said Lawrence “Larry” Braile, a professor from Purdue University. He was referring to the massive, roaring industry-grade piece of machinery called the Vibroseis truck shaking the ground on a mesa near Santo Domingo Pueblo roughly half way between Santa Fe and Albuquerque.

Braile, other instructors, and twenty-four students participated in the Laboratory sponsored Summer of Applied Geophysical Experience (SAGE), which turned 25 this summer.

The machine is what industry calls a truck-mounted vibrator. The Vibroseis truck, through a heavy pad on the ground, sends benign vibrational waves as deep as two to three kilometers into the ground that refract and reflect off layers of higher density, showing the students and the instructor where there is a change in the rock layers, for example.

For the past 25 years SAGE has attracted the best students from around the world interested in geophysics. The application process isn’t difficult; however, students must meet certain academic standards, such as successfully completed courses in physics and math.

SAGE instructors are mostly looking for interest and motivation. A major in geophysics is not required.

Members of the SAGE faculty are among the best in the nation. Additionally, SAGE attracts some of the best companies in geophysics, geology, and geological/mineral exploration. Students at SAGE familiarize themselves with state-of-the-art equipment and the latest software, much of it donated by companies.

Interest, motivation, and dedication drive SAGE. In the dry desert air with a storm looming to the west, a level of focus and eagerness to learn permeated through students and instructors alike.

SAGE is outstanding and long lasting because of its instructors, the core six who have been with SAGE most of the 25 years. The core faculty consists of

- Scott Baldrige of Geophysics (EES-11), co-director
- George Jiracek, co-director and professor of geology from San Diego State University
- Lawrence (Larry) Braile, professor and department head of earth and atmospheric sciences, Purdue University
- Shawn Biehler, professor of earth sciences at University of California, Riverside
- Bernard (Bernie) Gilpin, professor of physics and geology at Golden West College
- John Ferguson, associate professor and program head of the geosciences department at the University of Texas.

According to Baldrige, the faculty is “like a good baseball team. They work together well, and there is a high level of individual commitment.”

Besides the core faculty, several newer staff members from Los Alamos, the U.S. Geological Survey, and Green Engineering consulting firm have joined the program to advance the students’ experience.

In addition, geophysicists from several companies lead field experiments and assist with instructing students.

Since the beginning of the program, a huge focus has been on what could be improved for the next session. How could the students get a more satisfying experience from SAGE?



George Jiracek of San Diego State University and co-director of SAGE explains the principles of a geophysical method called “magnetotellurics” to SAGE students while they take a break during data collection.



Scott Urquhart, left, of Zonge Engineering and Research Organization Inc. explains to students in the Summer of Applied Geophysical Experience (SAGE) program how to perform transient electromagnetic sounding to determine the depth to ground water. SAGE is an educational program designed to introduce students in geophysics and related fields to “hands on” geophysical exploration and research. Photos by Caryn Johansen

The faculty has made SAGE a flexible and adaptable program. SAGE, like any long-surviving program, has undergone changes that have been “more evolutionary than revolutionary,” said Baldrige.

An example of such a change is the size and length of the program. The first SAGE program in 1983 had 42 students and lasted six weeks. In contrast, the 25 SAGE program had 24 students and lasted three weeks, allowing each student to have hands on experience and individual attention without completely exhausting the instructors.

The original SAGE was intended for students of participating faculty only. Now, student diversity is a main goal and is oft cited as one of the most valuable characteristics of the program. Though some of the foreign nationals in SAGE currently are studying in the United States, students from Mexico, Saudi Arabia, Lebanon, Germany, Sweden, and India have participated in SAGE.

The structure of SAGE also has undergone change to ensure each student gets the full experience. Instead of having one big group of students working sequentially from project to project, students are split up into teams and spread out around the area where SAGE is working at the time.

In addition to the major support of the Department of Energy and the National Science Foundation, a significant portion of SAGE is funded by industry involvement. Companies support SAGE with funding, personnel and the latest software and equipment. The Vibroseis truck was donated to SAGE by the executive vice president of Input/Output, a former SAGE student himself.

Companies are in turn invited to send representatives to SAGE to talk to, work with, and help teach students. Representatives promote job opportunities in the field and bring a sense of reality to the work.

“We’re really interested in this experience,” said Betsy Torrez, geoscience recruiting coordinator from ConocoPhillips. “We want to help out and enhance the program here, as well as offer career opportunities.”

After 25 years, SAGE is running like clockwork. It’s had its own “down years,” said Baldrige, but it survived with support from the industries invested in SAGE. And like a fine wine, SAGE is only improving thanks to the faculty’s dedication to providing the students’ with a quality experience, and the general willingness to be flexible.