LEARNING THROUGH EXPERIENCE

Undergraduate Research and Training at CTEMPs

Hands-on field experience helps students connect classroom concepts to real geophysical questions, while building the technical and professional skills needed for graduate study and careers in the geosciences.

Students and collaborators during a CTEMPs field activity involving near-surface geophysical instrumentation.

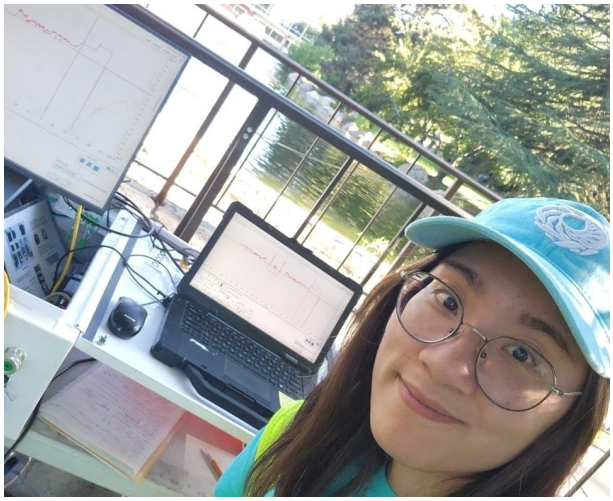
CTEMPs provides undergraduate students, researchers, and professionals with opportunities to learn modern geophysical and environmental-monitoring methods through field experiments, collaborative projects, workshops, and data analysis.

From the classroom to the field

For many undergraduate students, an internship or field project is the first opportunity to work directly with research-grade instruments. At CTEMPs, students can participate in preparing equipment, deploying sensors, collecting and documenting observations, reviewing data quality, troubleshooting field challenges, and discussing how measurements relate to subsurface processes.

These experiences show students that successful geophysical research requires more than operating an instrument. Careful planning, teamwork, safety, communication, accurate field notes, and the ability to adapt to changing conditions are all essential parts of an experiment.

Students monitor incoming distributed acoustic sensing data during a field experiment.



EarthScope RESESS intern Allison Kim checks field data and instrument performance during acquisition.

EarthScope RESESS interns at CTEMPs

CTEMPs has hosted undergraduate students through the EarthScope RESESS program, allowing interns to explore several areas of geophysics while working with researchers and students from different institutions.

Last summer, EarthScope RESESS intern **Allison Kim** gained experience with distributed acoustic sensing (DAS), broadband seismometers, geophones, electrical resistivity tomography (ERT), instrument deployment, and active-source data collection. Allison is now continuing her education as a graduate student at Baylor University.

> *"My time with CTEMPs was an incredibly rich learning experience. Our multi-interrogator DAS experiment and fiber-optics workshops were memorable experiences where I learned not only about DAS and seismometer applications, but also engaged in deployment and active data collection alongside fellow researchers from institutions all over the world."*
>
> **— Allison Kim, former EarthScope RESESS intern**

In summer 2026, Bella Chuchro, also an EarthScope RESESS intern and an undergraduate geology and geophysics student at Virginia Tech, is gaining experience with several methods, including gravity measurements, ERT, and DAS. Her internship is designed to expose her to different instruments, field settings, data-processing approaches, and scientific questions so she can better identify the areas of geophysics that best match her interests and career goals.

Exploring multiple methods and research questions

Near-surface geophysical problems often benefit from more than one type of observation. By working across several projects, students begin to understand both the strengths and limitations of different methods. DAS can record strain or vibration continuously along a fiber-optic cable; distributed temperature sensing (DTS) can provide continuous temperature observations along a fiber-optic cable; ERT can image contrasts in subsurface electrical properties; and gravity measurements can help characterize changes in subsurface mass or water storage.

Students also see how active-source tests, positioning information, environmental sensors, and careful field documentation contribute to interpreting a geophysical dataset. Exposure to multiple approaches helps them decide whether they are most interested in field instrumentation, computational analysis, hydrology, seismology, geodesy, environmental geophysics, or fiber-optic sensing.

A field team prepares equipment and conducts an active-source measurement.

EarthScope RESESS intern Bella Chuchro performs a controlled hammer-source test for geophysical data acquisition.

Collaboration with University of Nevada, Reno undergraduates

CTEMPs also works with undergraduate students in geology, geophysics, and related fields at the University of Nevada, Reno. Students collaborate on different research projects and contribute to equipment preparation, field surveys, sensor installation, data organization, analysis, visualization, and communication of results.

Working as part of a research team allows students to learn from faculty, staff, graduate students, visiting researchers, and one another. Their participation also strengthens CTEMPs' projects by bringing curiosity, new perspectives, and thoughtful questions into the field and laboratory.

Training for researchers and industry professionals

CTEMPs' training extends beyond undergraduate education. Researchers, technical staff, and industry professionals can also participate in workshops, demonstrations, and collaborative field activities to learn more about near-surface geophysics and environmental monitoring, especially DAS and DTS.

Practical training can cover experiment design, fiber deployment, instrument configuration, coupling, spatial sampling, data management, quality control, processing, and interpretation. Activities can be adapted for participants who are new to fiber-optic sensing as well as those seeking more advanced experience for research or operational applications.

To learn more about CTEMPs student research opportunities, workshops, or professional training, please contact the CTEMPs team.

Preparing the next generation of geoscientists

Through hands-on research and collaborative learning, CTEMPs helps students and professionals build technical confidence, discover new interests, and connect geophysical measurements with real scientific and societal questions.