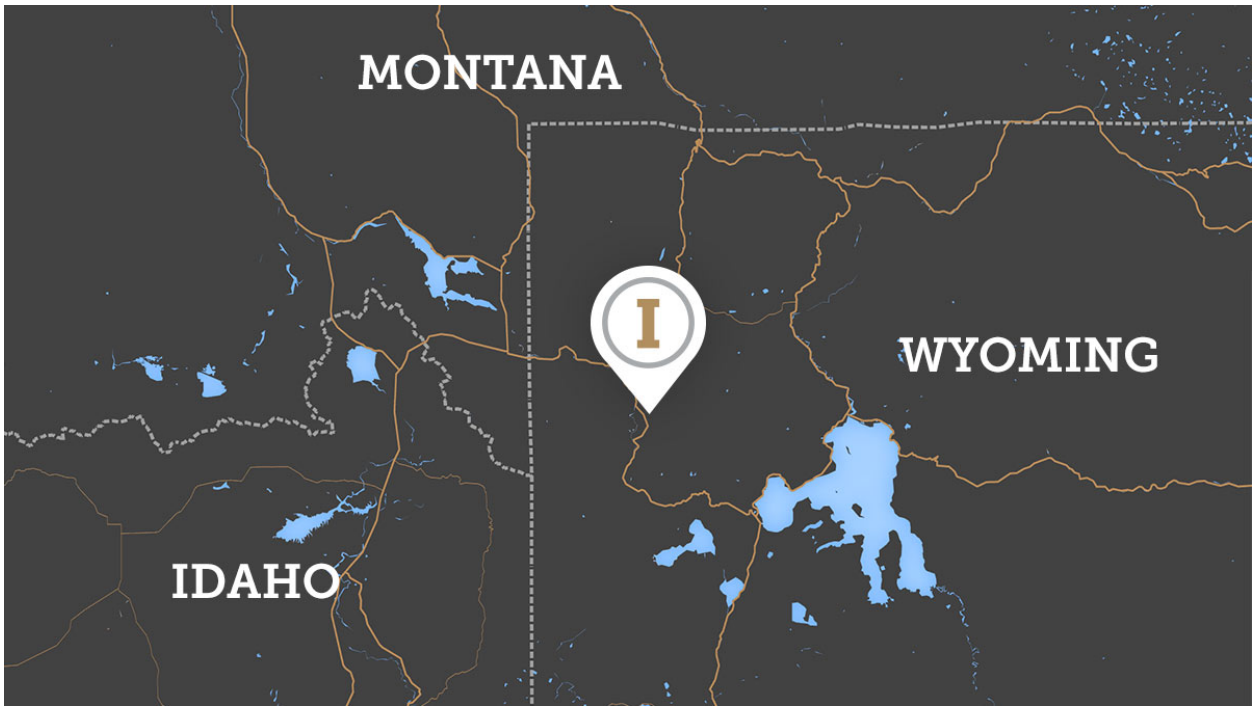
It's Hard Not to Be in Awe of Yellowstone National Park

Article by Tara Roberts, University Communications and Marketing

But when people like Adam Price look over the landscape of geysers, mud pots and vents, they don't just see beauty. They see science.



Research location at the Lower Geyser Basin.

"As far as you can see, there are geothermal features," Price says.

Price — a UI senior from Pagosa Springs, Colorado — was among a group of geological sciences students who went to Yellowstone last summer to experience the park's wonder while uncovering its scientific secrets.

Jerry Fairley, a hydrogeology professor in the UI College of Science, led the project, which was funded by the National Science Foundation and involved undergraduate and graduate students from UI, Lewis-Clark State College and Washington State University.

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It's easy to convince students to study in Yellowstone, Fairley says. It's a chance to have fun, develop skills and gain hands-on experience in their field in one of the most incredible places on earth.

"It gives them that idea that life can be like National Geographic," he says. "You don't have to just read about it. You can go out and do that stuff."

The work is exciting, but hard. The students' mission was to measure heat coming up from the enormous volcano beneath Yellowstone, which meant spending hours taking careful, systematic measurements across swaths of land in the park's Lower Geyser Basin.

This fieldwork helped the students prepare for their careers or graduate school by giving them a preview of life as a working geologist.

"Everything is hypothetical until you're out in the field and put your hands on it," says UI senior Meg Aunan of Coeur d'Alene.

Their measurements provide a glimpse into ways the world beneath Yellowstone affects the surface. Earlier studies focused on the way underground magma heats water in hot springs, but the students' work revealed that the magma has a dramatic heating effect on the land around the springs, too.

The data also help explain how different kinds of hot springs form. The ground around springs that are acidic, like mud pots, is particularly hot, indicating a fracture in the Earth's crust that allows water to shoot to the surface, boiling on its way up and triggering a chemical reaction that forms the acid.

The students' contributions to understanding Yellowstone's inner workings helps geologists around the world deepen their knowledge of how volcanic activity shaped the globe, and how it might change the future. [continue reading the story below].

Measuring Yellowstone's Heat, a Photo Slideshow

Photos courtesy of Jerry Fairley. All work was performed under an approved Yellowstone Research Permit (YELL-2014-SCI-6034) allowing special access to thermal areas. [To view all images, hover on the image above to enable slideshow toggles or swipe on your mobile device.]

Yellowstone's Supervolcano

Whether you've heard the news in scientific journals or on the front of tabloids, you probably know: Yellowstone National Park is nestled inside one of the world's biggest volcanoes.

> The volcano has had three major eruptions in the past 2 million years and last erupted about 174,000 years ago.

According to the National Park Service, the Yellowstone Caldera "was created by a massive volcanic eruption approximately 640,000 years ago." The volcano has had three major eruptions in the past 2 million years and last erupted about 174,000 years ago.

The Yellowstone Caldera is one of a handful of similar volcanic features around the world, says UI hydrogeology professor Jerry Fairley. Two others are found in the United States: Long Valley Caldera in California, and Valles Caldera in New Mexico.

Across geologic history, volcanic forces helped create the Earth's mineral and precious metal deposits, and eruptions affected the world's climate. In recent times, small volcanic eruptions disrupt air travel and affect weather.

In the event Yellowstone erupted, Fairley says, the Earth would experience the equivalent of nuclear winter.

But despite occasional rumors that Yellowstone is "overdue" for an eruption, Fairley says not to worry.

"We have an opportunity to observe this and think about it," he says. "We don't know what's going to happen. 10,000 years goes by in a blink when you're a geologist."

"We don't have many connections to the deep subsurface," Fairley says. "We're talking about something that's happening 100 miles below us. We don't know that much about the interior of the Earth. Everything we do know, or think we know, is based on little thin threads of evidence."

On a practical level, understanding subsurface heat sources and their influence on the surface is important for developing renewable geothermal energy resources — a research area in which many of the Yellowstone project students are particularly interested.

Cary Lindsey, a third-year doctoral student from Mississippi, came to UI to work with Fairley, who involves students in his geothermal research not only at Yellowstone, but also at locations around the world.

Lindsey says she appreciated the chance to work in Yellowstone, which for many years was largely closed to university researchers, and to see a side of the park most people never get to see.

"If you're a geothermal geologist, working in Yellowstone is kind of the dream," she says.

And it has added bonuses, too.

"You're sitting out doing fieldwork and a bison traipses across where you're working — it's pretty great," Lindsey says.