UC Davis students win geothermal energy contest

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A virtual reality model of a patch of New Mexico has won a team of UC Davis students first place in a national competition, sponsored by the U.S. Department of Energy, to develop skills and knowledge in geothermal energy.

The UC Davis team, including graduate students Scott Bennett, Austin Elliott, Andrew Fowler, Maya Wildgoose and Amy Williams, as well as undergraduates Leslie Barnes, Carolyn Cantwell, Samuel Hawkes, Rachael Johnson, Rita Martin and Kevin Renlund, chose to build a three-dimensional model of the Valles Caldera region in New Mexico using the virtual reality facilities at UC Davis' Keck Center for Active Visualization in Earth Sciences.

"In two dimensions your knowledge is limited," Bennett said. "We could bring together disparate data to get the big picture."

The finals of the competition were held in Santa Fe, N.M. on June 23. Eleven teams from universities around the country, including Stanford, Texas A&M and the Colorado School of Mines, presented projects that they had developed since mid-January. The teams had been charged with assessing the geothermal energy potential of the Rio Grande Rift area in south-central Colorado and central New Mexico.

"The competition was very strong," said Peter Schiffman, a UC Davis geology professor who advised the team. "They worked very hard and came up with some interesting results."

Geothermal energy draws on water heated deep underground to drive turbines and generate power. Relatively untapped as a source of power in the U.S., it has a small environmental footprint, generates power consistently around the clock and produces no greenhouse gases. "Geothermal is going to be part of the sustainable energy mix," Schiffman said.

Using the KeckCAVES, the students could visualize geological structures, fluid-flow pathways and subsurface temperature profiles beneath the ground in a single immersive 3-D model.

The team drew on old published data from previous drilling of the Valles Caldera area, which is now a national preserve and closed to energy exploration. But the same immersive 3-D techniques could be used elsewhere to visualize geothermal energy resources.

"It used to be that good geology students were those that could think in three dimensions -- now we don't have to guess how things look," Fowler said.

Although the data was from the early 1980s, the 3-D visualization did reveal some new geothermal features of the Valles Caldera, for example in the relationships between temperature and faults or indicative geothermal minerals. More significantly, the 3-D approach helps geologists bring multiple types of information together in one place.

"It makes collaboration much easier, because everyone is looking at the same thing," Cantwell said.