

# New Mexico Science and Engineering Fair 2008

## New Mexico Bureau of Geology and Mineral Resources

### Excellence in Geoscience Award

On April 4 and 5 middle and high school students from across the state participated in New Mexico's 56th annual Science and Engineering Fair on the campus of New Mexico Institute of Mining and Technology in Socorro. The New Mexico Bureau of Geology and Mineral Resources is proud to be among the more than 50 organizations, companies, and individuals who sponsor special awards recognizing New Mexico students' contributions and hard work. For the ninth consecutive year the bureau presented its "Excellence in Geoscience" Award to a New Mexico student in the junior division (grades 6 through 9) and senior division (grades 9 through 12). *New Mexico Geology* is pleased to acknowledge this year's recipients by printing the abstracts of their research.

This year's winners of the bureau's Excellence in Geoscience Award are Megan Alice McMillan in the junior division and Kristina Dahm in the senior division. They will receive cash awards of \$100.00 (senior division) and \$80.00

(junior division), certificates, and one-year subscriptions to *New Mexico Geology*.

The bureau's junior division award winner, Megan Alice McMillan, placed second in her division in the category Environmental Sciences. She also received an invitation to enter the Society for Science and Public Middle School Program's national science fair, which is awarded to junior high school students for good science and the ability to communicate about science.

The bureau's senior division award winner, Kristina Dahm, also received a New Mexico Science and Engineering Fair scholarship, a \$700.00 book award for use at New Mexico Institute of Mining and Technology, which is awarded to all graduating seniors entered in the state science fair.

For a more complete list of the 2008 New Mexico Science and Engineering Fair exhibitors and their awards, go to the Science Fair Web site, <http://nmt.edu/~science/fair>, and click on "Results 2008."

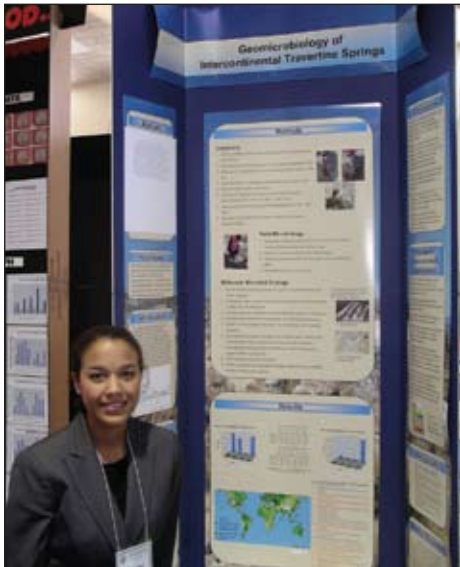
#### Geomicrobiology of intercontinental travertine springs

by Kristina Dahm

Rio Rancho High School, Rio Rancho  
Winner, Senior Division

In 2005 chemistry samples were taken at Tunnel Springs and Las Huertas Creek in Placitas, New Mexico. The major anions and cations were calcium and bicarbonate. Bacterial cultures from Tunnel Springs revealed closest relatives from cold, fresh water environments, such as Crater Lake, Oregon, and subglacial sediment. In 2006 chemistry samples were taken from San Ysidro, New Mexico. The

major anions and cations were sodium, bicarbonate, and sulfate. The bacteria from San Ysidro revealed closest relatives from salt water environments such as sediment deep beneath the ocean, the Great Barrier Reef, chimneys at hydrothermal vents, and sea ice in Antarctica. The energy sources at the San Ysidro travertine springs are similar to those at hydrothermal vents beneath the ocean. This similarity furthers interest for research on New Mexico's travertine springs. Further research is currently being done on calcium carbonate precipitating springs from the Australian Outback. Comparing the microbiology of these Australian springs and New Mexican springs is the future goal of this project.



#### Contamination water model

by Megan Alice McMillan

Mountain View Middle School, Rio Rancho  
Winner, Junior Division

I did this experiment to determine how fast a release of contamination would migrate to a pumping well. I used two different soil types, fine-grained and medium-grained sand, for the contamination to travel through to two types of aquifers. I believed that the contamination in medium-grained sand would travel quickest to the well because it is more permeable than the fine-grained sand.

Two models of identical size and shape, but different soil and deep aquifer well types, were built. Each model had two aquifers, unconfined and confined. Both models had wells in the unconfined aquifer and in the confined aquifer, but the wells in the confined aquifer

were completed differently. Recharge to both aquifers was provided through tubing with water added when pumping rates decreased. Dyed water was used to represent contamination. There were two contamination release points located at different distances from the wells. The wells were pumped by siphon. I measured the pumping rate before and during the experiment. I measured how far the contamination migrated through the soils and how fast it reached the pumping wells.

Contamination migrated through the medium-grained sand the quickest. Contamination never went through the confining layer or contaminated the confined aquifer. Data collected proved that my hypothesis was correct. The more permeable the soil the quicker the contamination migrated to the well. The confining layer, which was the least permeable, was the most protective, and the contamination could not migrate through.

