

## Seventeen Years of the New Mexico Supercomputing Challenge

David Kratzer, HPC-3

In an effort to increase the future pool of talented scientists, the Los Alamos National Laboratory (LANL) Theory, Simulation, and Computation Directorate and the High-Performance Computing (HPC) Division support the New Mexico Supercomputing Challenge (Challenge), a program that offers a unique opportunity to students in New Mexico. Since 1990, teams of New Mexico high school students have worked for a school year to develop a HPC computational science project. More than 7,100 students and 1,200 teachers have participated in the program.

The Challenge has as its mission to improve students' understanding and use of technology by developing their skills in scientific inquiry, modeling, computing, communications, and team work. Each team of up to five students and a sponsoring teacher defines and works on a single computational project

of its own choosing. They submit a proposal at the beginning of the school year, prepare an interim report in December, present a preliminary report of their work in February, and submit a final written report in April. The teams come to LANL at the end of April for oral presentations of their projects and are given tours of the Laboratory. An awards ceremony takes place the next day where scholarships, savings bonds, trophies, and other awards are given to participating students, totaling more than \$90,000 in 2006 and 2007, in large part annual contributions of \$80,000 by the Computing, Computational, and Statistical Sciences (CCS) Division.

Challenge participants learn team work, time management skills, how to research a scientific topic, how to use a computer as a tool to model or simulate their project, and how to present their results orally, in written form, and by posting a web page.

Laboratory employees serve as team mentors, help judge the projects, and give talks and demonstrations to the Challenge participants when they come to Los Alamos for the year-end Expo and awards ceremony.

During the summers, a two-week institute for teachers is held to give the teachers professional development to better prepare them to sponsor Challenge teams.

*For more information, contact David H. Kratzer [dhk@lanl.gov](mailto:dhk@lanl.gov) or visit <http://www.challenge.nm.org>.*

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Fig. 2. One of the LAHS Challenge teams (l. to r.) Ben Batha, Ryan Marcus, mentor Neale Pickett, Daniel Cox, and William Phillips.

Photo by S. King

Fig. 1. Students receive training in Mathematica at the 2007 Challenge Kickoff Conference.



In a recent check, over 40 past Challenge participants are current LANL staff members and another 50 have been employed by LANL at some point. Neale Pickett, CTN-5, Network Engineering, is a past participant who remains involved in the program. In 1991, as a student at Albuquerque Academy, he and three teammates submitted a project on solar magnetic pole reversal, inspired by one of the students watching a PBS Nova episode on the subject. The model didn't work, but the simulation, done on the Connection Machine, went well, Neale recalls, and he and his team took first place in the very first Challenge.

Seventeen years later, with a degree from New Mexico Tech, Neale is a computer security programmer at LANL and mentor for the Los Alamos High School (LAHS) 2007 Supercomputing Challenge team. The four LAHS students are applying the traveling salesman problem to the Mars Rover route, computer networking efficiency, and nano-medicine delivery.