Supercomputing 2008 Theme for Fermilab CD Exhibit

Fermilab: High performance networks with world wide reach, Grid computing, and the race to discover the Higgs.

Scientists at Fermilab carry out research to answer the questions: What is the universe made of? How does it work? Where did it come from?

Increasingly, the answer appears in part to be the Higgs particle.

The Fermilab Exhibit highlights the role played by the application of leading edge technologies in scientific discovery.

High performance networks with world wide reach, grid computing, Peta-scale data management, movement and data modeling are being used to support the scientists in their quests for discovery.

This year at Fermilab, excitement surrounds the quests of two high-energy physics experiments, CDF and DZero, to discover the Higgs particle thought to be hidden within the multi-Petabytes of data collected in matter/anti-matter collisions produced in the laboratory's proton/anti-proton collider.

Additionally this year, Fermilab continues its role of Tier-1 host under which it will receive and store the estimated 4.7 Petabytes of data estimated to be collected each year by the Compact Muon Solenoid detector (CMS) at the Large Hadron Collider in Geneva, Switzerland. Producing data at a rate of 40 Terabytes/second, the CMS detector supplies the data which is then filtered and transferred to Fermilab computing facilities in Batavia, Illinois and other Tier 1 sites around the world.

Researchers—university faculty and students—will continue the quest by analyzing that data, hoping to discover that primary prize—the Higgs particle—through the use of Open Science Grid (OSG) installations at Fermilab and elsewhere.

And lastly, the exhibit shows a model of the Cryogenic Dark Matter Search experiment (CDMS). CDMS attempts to detect very low energy interactions whose signature is that of dark matter interacting with normal matter. In keeping with Supercomputing 2008's musical theme, the model translates the CDMS data into pulses of sound and light, representing in a more sensory way how a dark matter interaction might appear.