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SUPERCOMPUTER JOBS

Research projects running on UT's Ranger

Scientists in a variety of fields are building computers models that use new machine.

By Kirk Ladendorf
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Time machine

UT astrophysicist Volker Bromm is modeling the first billion years of the universe, when the first giant stars were formed and when the first heavy elements (such as uranium) were created within stars. Using a supercomputer helps Bromm's team develop a richer, more complex model that studies a large section of the universe, but is also able to zoom in and measure the interactions of millions of particles.

Particle physics

University of Arizona physicist Robert Sugar is studying the forces that hold the nuclei of atoms together. His work involves modeling the interactions of subatomic particles.Biological machine

Klaus Schulten, computational biophysicist at the University of Illinois, is using information from electron microscopes and X-ray crystallography to help create models of the internal workings of cells and proteins. A supercomputer is needed to handle the enormous detail of studying interactions among various cellular structures, including chromatophores.

Nanoelectronics

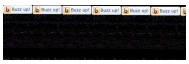
Bhagawan Sahu of the UT Microelectronics Research Center is studying nanomaterials, including graphene, a form of graphite, that might one day be used in tiny electrical devices. Tremendous computing power is required to simulate the electrical properties of new microscopic graphene structures and look for advantages over today's workhorse electronics substrate, silicon.

Human blood flow

George Karniadakis, an applied mathematician at the Massachusetts Institute of Technology, is building a three-dimensional, microscopic-level model of how blood flows through the billions of tiny vessels in the body.

Turbulence

P.K. Yeung, aerospace engineering scientist at the Georgia Institute of Technology, is building a more detailed model to help scientists understand how to do better aerodynamic design and how to predict the dispersion of pollution from an industrial accident. The work requires models that calculate simulated turbulence over billions of points in three dimensions.

Vote for this story! 

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