

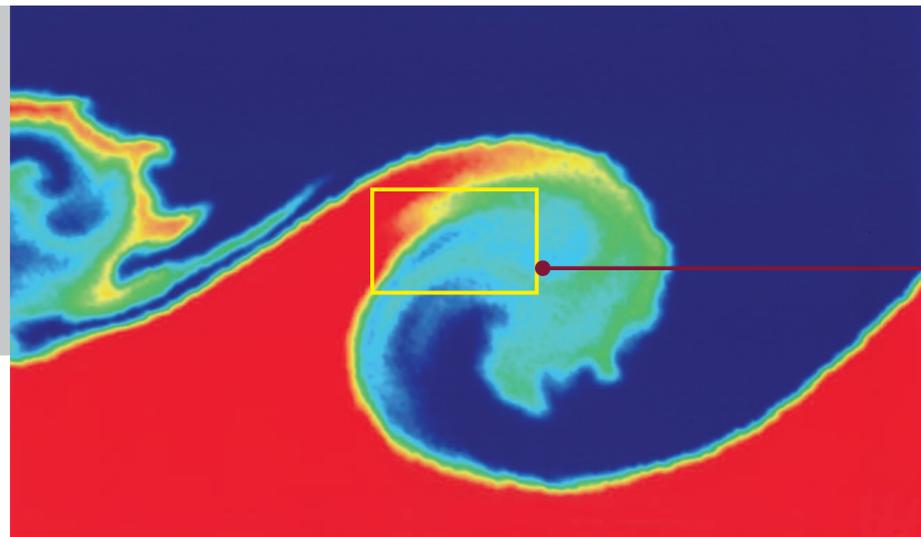
Resolving important weapons science issues with the world's most powerful computers



The annual international Gordon Bell awards consistently recognize Lawrence Livermore National Laboratory and the National Nuclear Security Administration's Advanced Simulation and Computing Program's preeminence in high-performance computing to applications in science.

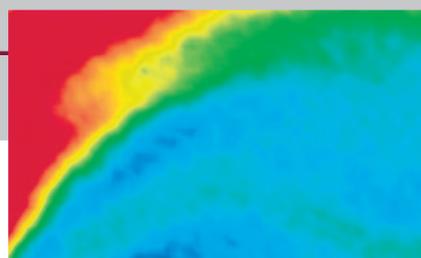


Can a computer make waves?



The 2007 international Gordon Bell award for peak performance recognized **first-of-a-kind simulation of a Kelvin-Helmholtz instability in molten metals.**

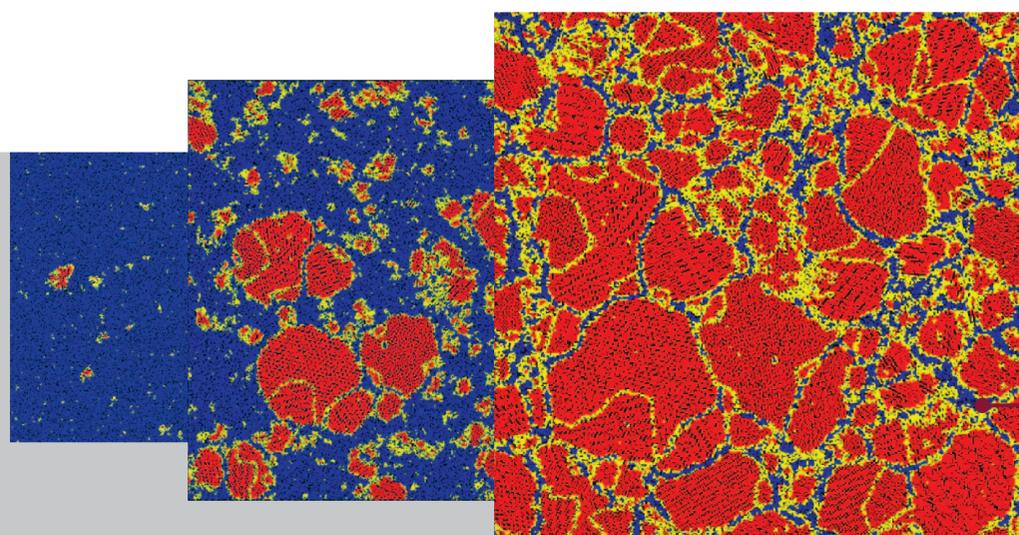
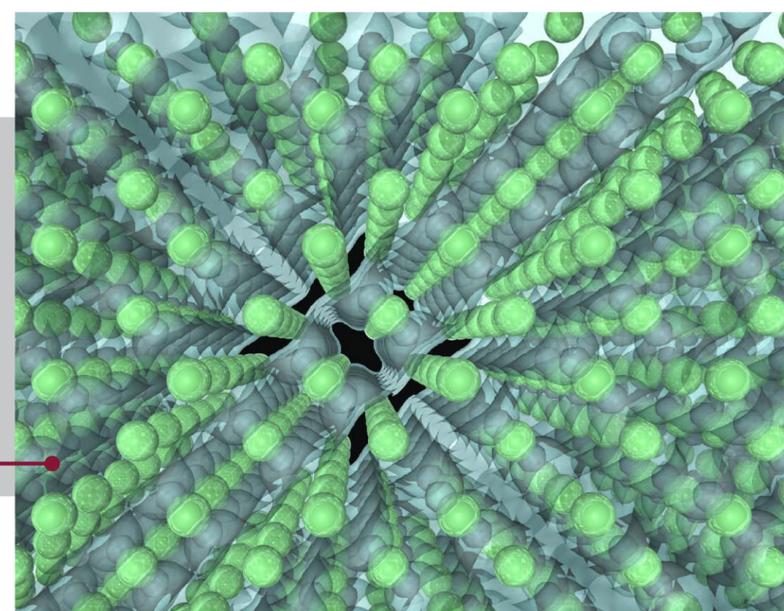
Scientists can now predict how a wave forms, atom by atom, using the computing power of the Advanced Simulation and Computing Program's BlueGene/L. The result? A much-needed understanding of the motion of fluid and the interactions of the fluid with its boundaries.



Can a computer rock heavy metal?

The 2006 international Gordon Bell award for peak performance recognized **large-scale electronic structure simulation of the heavy metal molybdenum.**

How do scientists know the properties of a material under conditions where data are unavailable or unclear? They run quantum simulations of unprecedented scale and speed on the Advanced Simulation and Computing Program supercomputer, BlueGene/L.



The 2005 international Gordon Bell award for peak performance recognized **pioneering materials science simulations.**

Advanced Simulation and Computing scientists used BlueGene/L to identify the scale of simulation needed to understand how molten, metallic tantalum solidifies. The result? About sixteen million atoms were necessary. Prior to the availability of BlueGene/L, scientists could simulate only tens of thousands of atoms, creating a non-realistic result.

Can a computer freeze molten metal?

Other Lawrence Livermore Gordon Bell award winners

1998 Performance First Prize: Very high-resolution simulation of fluid turbulence in compressible flows. Sustained 1.18 teraFLOPS on short run on 5832 CPUs on ASCI Blue Pacific, 1.04 teraFLOPS sustained on one-hour run, 600 gigaFLOPS on one-week run on 3840 CPUs.

2006 Performance Special First Prize: The BlueGene/L Supercomputer and Quantum Chromodynamics.