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CRI Seminar

Dr. Steven Gottlieb
Distinguished Professor of Physics
Indiana University
Monday March 30, 2009
11:00-12:00 PM
STEW 313

Lattice QCD: a Petascale Challenge

Abstract: Quantum Chromodynamics (QCD) is the theory of Nature's strong interaction. Many of its most interesting properties are difficult to calculate. The lattice approach to QCD allows numerical treatment of the quantum field theory. Advances in computing and algorithms have allowed physicists to make calculations of a precision we only dreamed of a decade ago. They allow us to test the methodology, and are starting to allow us to probe for physics beyond the Standard Model of elementary particle physics. This talk outlines the physics and computational challenges, including information about code performance and recent results.

Biography - Steven Gottlieb's research is in lattice QCD, a numerical approach to the theory of the strong interaction, one of Nature's four fundamentalforces. He has specialized in the inclusion of the effects of dynamical quarks on the calculations. This makes the calculations very challenging, and has lead him to learn much more about numerical methods, computers and computer science than he ever imagined in graduate school. He is a founding member of the MILC Collaboration, which regularly receives one of the largest allocations of time on NSF (Teragrid) resources. He also works with the Fermilab Lattice Colloration, the HotQCD Collaboration and SciDAC funded National Lattice Gauge Infrastructure Project.

Gottlieb received his A.B. from Cornell University and Masters and Ph.D. from Princeton. He was a postdoctoral fellow at Argonne National Lab, Fermilab and UC San Diego. He has been a faculty member at Indiana University since 1985, recently being promoted to Distinguished Professor. He is a fellow of the American Physical Society, Associate Editor in Chief of Computing in Science & Engineering, and recently completed six years as Divisional Associate Editor of Physical Review Letters.

Gottlieb plans to spend the next academic year on sabbatical at NCSAwhere he will prepare for the Blue Waters computer. He supplied one of the three scientific problems for which each proposal to the NSF had to supply performance predictions.

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