

THE UNIVERSITY OF TEXAS AT AUSTIN
TEXAS ADVANCED COMPUTING CENTER **TACC**

Anticipating “The Big One”

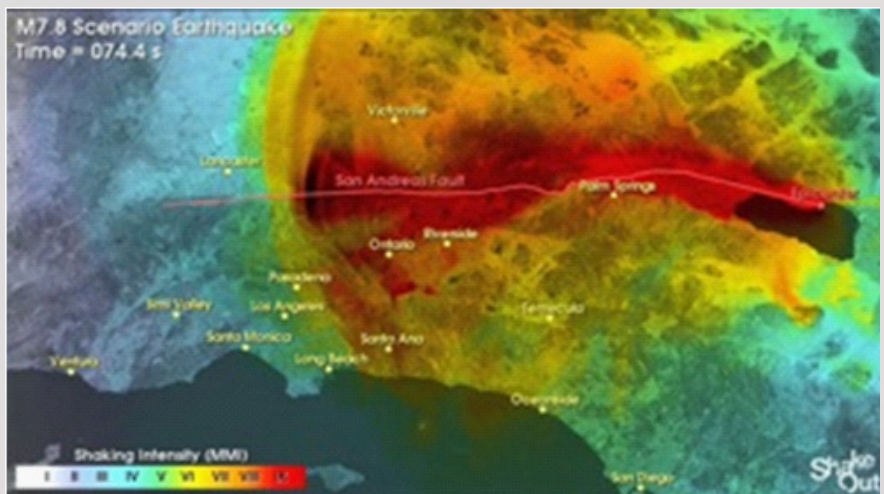
TACC’s Ranger supercomputer helps the Southern California Earthquake Center simulate its most realistic earthquake to date

In the next thirty years, there will be an earthquake in California on a scale that hasn’t been experienced in 150 years — one that is expected to cause as many as 2,000 deaths, 50,000 injuries, and \$200 billion in damage.

The Great Southern California ShakeOut — a collaboration between the United States Geological Society, the National Science Foundation, and the Southern California Earthquake Center (SCEC) — provided detailed information to the public about what would happen in the event of a magnitude 7.8 earthquake, and asked Californians to “drop, cover, and hold on,” practicing the behavior that could save their lives during an actual event.

The Shakeout project was an extraordinary success from an emergency preparation perspective — more than five million people participated.

Equally impressive was the computational simulation of the earthquake that predicted how a massive upheaval would impact the topography of the 500-square-mile Los Angeles basin. “ShakeOut D,” performed on the Ranger supercomputer at the Texas Advanced Computing Center (TACC), modeled the impact



A view of southern California with seismic waves radiating outward as the rupture propagates towards the northwest along the San Andreas fault. Simulations developed by the SCEC ShakeOut Simulation workgroup.

with 100-meter resolution over a three-dimensional area, approximately 600 kilometers long by 300 kilometers wide by 80 kilometers deep. It stands as a milestone for seismology and for computational science.

The overall effort required hundreds of the nation’s top seismologists, thousands of years of collective research, and the combined computational capability of supercomputers including Ranger at TACC, Kraken at the National Institute of Computational Sciences, and Datastar and Intimidata at the San Diego Supercomputer Center. All three supercomputer sites are part of the National Science Foundation TeraGrid, the nation’s largest open scientific discovery infrastructure.

“We know that strain is accumulating on the San Andreas Fault, the stresses are increasing, and we expect that sucker to go at any time.”

Thomas Jordan, director of the Southern California Earthquake Center

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