

## **SCEC's Program of Earthquake System Science in Southern California**

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The Southern California Earthquake Center (SCEC) coordinates an extensive research program in earthquake system science involving more than 500 scientists at 55 research institutions. The Center strives to attain a physics-based, predictive understanding of earthquake phenomena through interdisciplinary studies of fault system dynamics, earthquake forecasting and predictability, earthquake source physics, and ground motions; and it seeks to apply this understanding to improving seismic hazard analysis and reducing earthquake risk. The major research issues of earthquake science are true system-level problems: they require an interdisciplinary, multi-institutional approach that attempts to model the nonlinear interactions among many fault-system components, which themselves are often complex subsystems. SCEC attempts to advance earthquake system science through a comprehensive program of system-specific studies in Southern California. It thus operates on the premise that detailed studies of fault systems in different regions, such as Southern California and Turkey, can be synthesized into a generic understanding of earthquake phenomena. International partnerships are clearly necessary to achieve this synthesis. This presentation will review the current 5-year research program (SCEC2, 2002-2007) and outline the mechanisms the Center has employed to transform research into practical knowledge. It will also describe the science plan approved by the National Science Foundation and U. S. Geological Survey for the next 5-year phase of the Center (SCEC3, 2007-2012). The plan includes the establishment of a new infrastructure for conducting and evaluating scientific earthquake prediction experiments, the development of a uniform time-dependent earthquake rupture forecast for California, a major study of the Southern San Andreas Fault, and end-to-end ("rupture-to-rafter") earthquake simulations that incorporate built structures into the geologic environment. The plan also calls for expanded international partnerships with Turkey and other countries seeking to reduce seismic risk.