

How does an earthquake start, continue, and stop?

- Clarification of what physical properties determines rupture
 - Geometry, rock type, gouge, fluid state
- Result of successful answer
 - The nature of asperities and barriers
 - Mapping likely next asperities to break
 - Which way does rupture run
 - And thus, the pattern of damage

Deformation at all scales

- Fractal nature of faults across range of scales
- Reconcile lab, numerical, and exhumed fault constraints with seismic and geodetic observations.
- Are mechanisms for interplate, intraplate, and deep earthquakes different?
- Constitutive laws that explain the full range of earthquakes from slowest earthquakes to the fastest events and the smallest to the largest.
- Necessary for progress on identification of earthquake hazard potential and hopes for earthquake prediction.

Illuminating the dark shadows of episodic tremor and slip

- How it works
 - Slipping, bubbling, squirting, crackling
- ETS relation to regular earthquakes
 - Are the Ide-Beroza and Kanamori-Anderson observations universal?
- The implications for hazard and mitigation
 - Delineating the locked zone
 - Unsteady loading of megathrust

And more ...

- Large RAMP facility to record aftershocks immediately after a large event. ~100 sensors.
 - (in reserves in the field, perhaps measuring noise continuously, tremor, site effects in urban areas)
- Arrays of boreholes near the fault.
- Borehole array.