Future directions for rupture dynamics in SCEC

Single-event simulations:
- useful for ground motion prediction and related questions (e.g., near-fault and near-surface yielding)
- open challenge is **validation** (comparison to data), but *how to do this*?
  - comparing one simulation to data from one earthquake – issues with nonuniqueness
  - alternative: developing and validating a ***WORKFLOW*** for generating ensemble set of rupture realizations (with stochastic prestress and/or fault roughness) and associated ground motion – and comparing statistics of synthetic ground motion, stress drop, etc., with real data from (multiple?) events

Cycle simulations (eventually in 3D with inertial dynamics):
- provide self-consistent prestress, useful for questions like likelihood of multisegment ruptures, branching, etc. – for which inertial effects (and prestress) are essential
- simulations with viscoelastic and inelastic rheologies enable realistic remote loading (vs. backslip) for complex fault networks, permitting self-consistent slip rates that are not imposed a priori