# 2009-2015 Work Plan

## Short-Term Tectonics Priorities

Short-Term Tectonics Working Group priorities for Apr 2009 – Jan 2015.

### Immediate, Urgent goals

- PyLith development (For more details see PyLith Development Plans)
    - Accelerate development via a postdoc
    - Nonlinear rheologies
    - Fault friction via cohesive cells
    - Large deformations

semi-analytic codes (layered elastic and viscoelastic, internal and surface loads) under version control.
cumentation as necessary and provide portability via a standard build procedure.
ish interaction with computational seismology group on meshing issues (e.g., keep up-to-date on the
oment of Geo-CUBIT).

ons

ly constrained and internally consistent physics for the entire seismic cycle
ntire seismic cycle in simulations that capture interseismic deformation, rupture nucleation and
nd postseismic deformation with realistic Earth models (geometrical complexity, material heterogeneity,
neologies). Simulations constrain the fault and bulk rheologies through extensive geodetic, seismic, and
vations. Constraints on fault and bulk rheologies are critical to understanding the behavior of fault
mproving the accuracy and precision of earthquake hazard assessments.

rained and internally consistent physics for tectonics of magmatic systems, geothermal systems, and

ctonic processes with heat and fluid flow, thereby enabling complex rheologies with temperatue
s. Incorporating heat and fluid flow into tectonic modeling significantly expands the range of problems
d permits direct application of additional geophysical constraints. Viscoelastic, elastoplastic, and
s are important for bridging between seismic and tectonic time scales.

modeling of crustal deformation associated with surface loads
of the crust using geodetic and geologic observations of deformation arising from glacial rebound,
ner surface loads.

## l Techniques

ons of using currently available and emerging computational techniques for earthquake modeling.
ons on the geometry of the domain (e.g., topography) and faults or may introduce severe ill-conditioning

l.ii and p4est)
th scale features through local refinement and coarsening of the mesh.

ertainty in parameters based on observations.

blems using high-level tools

on of dislocations and material boundaries within a structured grid. This would permit a structured mesh

enization. Resolution of multiple time scales through slow/fast timescale coupling.

e inputs and outputs of the various stages of modeling (creating the geologic model, meshing the

oftware.

r users but also provides the flexibility and extensibility required by expert users.
Provide funding for expert users to work with code developers to add new features to community codes in

ling codes and tools.

ence developers and vice versa. This could be implemented via some form of travel grants for in-depth

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