

# Plans for 2011

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Current: numerical exploration of various inversion (DS) flavors, development of software infrastructure, validation on synthetics

Near future: level of physics necessary for field data (cf. Minkoff), first stage trials (MVA - streamer, node), collaboration with industry, academic groups in field data FWI

Next several years: more theory - conventional FWI, DSMVA, nonlinear DSO. Examples: does DSMVA really avoid local minima? Are surface gather, space/time shift extended models the only possibilities? Does full bandwidth data always determine model via FWI? What metric should be used to understand inversion stability for nonsmooth models? Why should FWI “work” when model is physically inadequate and data cannot be fit well?

Recruitment: new students,  $\geq 1$  postdoc

IWAVE & IWAVE++ are *tools*

Importance for us: obvious, provide integrated & extensible modeling/inversion platform for all TRIP projects:

- ▶ “solve once, use many” model
- ▶ community code - help available
- ▶ interface with other processing packages via common data formats - SU, Madagascar, Matlab

Importance for rest of world: currently lacks *extensible, modular, well-documented* modeling & inversion package.

Doesn't have to do everything - just a lot of common things

Advantage: reproducibility - earthquake community has to some extent via E3D, SpecFEM3D,..., various community front-ends - but not integrated with inversion!

## Plans:

- ▶ continue to add physics to standard FD in support of current TRIP research - elasticity, attenuation, anisotropy, convention moment tensor source, surface topography
- ▶ RVL: easier operator composition interface, more optimization (new TR, add TV & L1)
- ▶ world interface - other data formats, eg. RSF for data, GOCAD v0, HDF
- ▶ fault tolerance - intercommunicators
- ▶ integrate into Madagascar