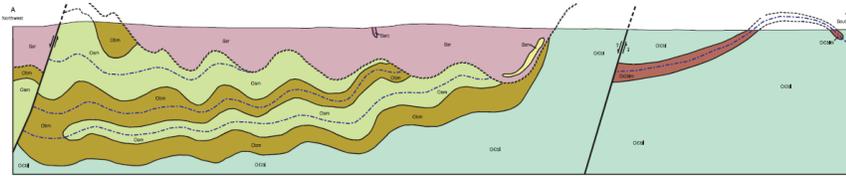


# STRUCTURAL GEOLOGY

Geologic maps are four-dimensional interpretations (remember *time*) including how stratified rocks and plutons have been deformed. Thus, geologic maps must show cross-sections illustrating the nature and sequence of deformations- like this one for the Dill Hill quadrangle.



Eastern Maine hosts the shallow crustal segment of the Norumbega fault system, a (mostly) strike-slip fault that is longer than the San Andreas and was active sporadically for more than 300 million years. Former doctoral advisee, now Professor, Chunzeng Wang and I continue to date the complex polyphase deformation of this Norumbega segment and to compare its deformation mechanics with those in deeper-seated segments to the southwest.

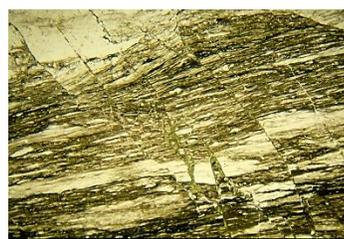
## Deformation features in the Norumbega fault system, eastern Maine



Granite with *dextral* s-c fabric cut by late-stage cataclasite



*Sinistral* shear bands in late-stage cataclasite cutting coarse granite



Photomicrograph of ultramylonite offset by late-stage brittle faults

I recently discovered a zone of intense disruption ~2.5 km wide in east-central Maine that was superimposed on an earlier thrust(?) contact between different stratigraphic sequences. Subsequent work with colleagues at the US Geological Survey and Indiana University show that the late motion may be contemporaneous with the onset of Norumbega activity.

## Post-lithification disruption in the Chester shear zone, east-central Maine



- <Ludman, Allan, 1998, Evolution of a transcurrent fault zone in shallow crustal metasedimentary rocks: the Norumbega fault system of the Northern Appalachians; *Journal of Structural Geology* v. 20, p. 93-107. >
- <Wang, C., and Ludman, A, 2004, Deformation conditions, kinematics, and displacement history of shallow crustal ductile shearing in the Norumbega fault system in the Northern Appalachians, eastern Maine; *Tectonophysics*, v. 384, p. 129-148. >
- <Ludman, Allan, 2010, The Chester shear zone: nature and tectonic significance of kilometers-wide chaos in east-central Maine; *in*, Gerbi, C., Kelley, A, and Lux, D., eds., *New England Intercollegiate Geological Field Conference Guidebook*, p. A2 1-17