Introduction of Speaker
Dr. Andrew Freed is specialist of the study for the rheological structure modeling using the postseismic crustal deformation. He also working about the earthquake triggering modeling caused by stress change of static and viscoelastic flow in many cases all around the world.

Lecture Abstract
The subduction of the Pacific Plate beneath North America induces broad scale stressing of the Alaskan crust that has led to the development of the highest mountains in North America, the highest slip rates along some of the longest strike-slip faults on Earth, and widespread seismicity that includes the 1964 M9.2 Alaska earthquake, the second largest ever recorded. These features are a consequence of deformation associated with three primary processes, interseismic loading due to subduction of the Pacific slab, large earthquakes, and postseismic relaxation of a viscous lower crust and mantle. How these mechanisms contribute to the contemporary deformation and stressing rates in the Alaskan crust is not well understood. Here we use two GPS velocity fields, one observed prior to the M7.9 2002 Denali earthquake and observed after, to constrain a 3-D viscoelastic finite element model of the relevant mechanisms to gain insight into how these processes are shaping Alaska today.

Report
The lecture enhanced our knowledge about the viscous flow in the upper mantle and its related process earthquake triggering. His introduction of lecture is constructed carefully for the students. He talked three topics in this lecture. The first one is the Southern California related topics, which include 1992 Landers earthquake and 1999 Hector Mine earthquake. The question of how the strength of the plates varies spatially and temporally is a fundamental one of the wide interest in geology. Based on this question, he constructs the Finite Element Model (FEM Model) for the Landers and Hector Mine earthquake. He compared two models, one is so called “Jelly sandwich” and one more models so called “Crème Brulee” model. He pointed out the it is difficult to explain postseismic displacement patterns based on the “jelly sandwich” model based on the far-field data sets. The next topic is about the 2002 Denali earthquake. He construct the very complex 3D FEM model for the explain postseismic deformation after the mainshock. It is forward modeling; he found the reasonable depth dependent rheological structure by grid search approach. His results show some “end member” for the rheological structure. I think it is very important approach for the understanding the rheological structure. The finally, he talked about the 2010 Haiti earthquake. His colleagues pointed out capable of a Mw7.2 earthquake if the entire strain accumulated since last major earthquake was released in a single event today in 2008 paper. It is very impressive result for the long-term earthquake forecasting.