HAO Colloquium Series

(Refreshments served)

Speaker: **Mark Cheung, LMSAL**

Time: **1:30–2:30 pm**

Date: **Wednesday, September 4, 2013**

Location: **CG1 – 2126 (also webcast at http://www.fin.ucar.edu/it/mms/cg-live.htm)**

Title: **Data-driven modeling of Magnetic Field Evolution in the Solar Corona**

Abstract:

We present a method for performing data-driven simulations of solar coronal field evolution. The approach is based on magnetofriction, which evolves the induction equation assuming the plasma velocity to be proportional to the Lorentz force. This term in the induction equation has the same form as ambipolar diffusion, which is an agent for current sheet formation. The simulations are driven by temporal sequences of photospheric magnetograms (e.g. from SDO/HMI). In the case of some active region models (e.g. for AR 11158), under certain assumptions, the data-driven simulations produce flux ropes that are ejected from the evolving AR. One observational feature that is reproduced in such models is the enhancement of the horizontal photospheric field at the polarity inversion line following flux rope ejection. The sequence of time-dependent 3D models of the coronal field allows us to not only study topological changes (e.g. relative helicity evolution), but also the mechanisms by which such changes occur. We also present a method for visualizing the model coronal field based on the current density distribution in the computational domain. This method produces mock images that are somewhat reminiscent of EUV images taken by instruments such as SDO/AIA.