

# UCCS Mathematics

## Colloquium

Thursday October 27th, 2011

UC 307

12:30 pm – 1:30 pm

(Refreshments at 12:15 pm)

**Dr Hector Lomeli, University of Texas-Austin**

### Parameterization of Invariant Manifolds for Lagrangian Systems with Long-range Interactions

Abstract: We generalize some notions that have played an important role in dynamics, namely invariant manifolds, to the more general context of difference equations. In particular, we study Lagrangian systems in discrete time. We define invariant manifolds, even if the corresponding difference equations cannot be transformed in a dynamical system. The results apply to several examples in the Physics literature: the Frenkel-Kontorova model with long-range interactions and the Heisenberg model of spin chains with a perturbation. We use a modification of the parametrization method to show the existence of Lagrangian stable manifolds. This method also leads to efficient algorithms that we present with their implementations. (Joint work with Rafael de la Llave.)

Heisenberg Spin Chain

