



# ***TIMES Seminar***

**The Institute for Multidisciplinary Earth Studies**

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## **A Computational Model of the Water Cycle of the Upper Rio Grande Basin**

by

**Dr. Larry Winter**

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*Wednesday, January 5, 2005*

*Mesa Lab, Damon Room*

*3:00 - 4:30 p.m.*

I'll discuss a computational model of the water cycle of the upper Rio Grande Basin from the point of view of a hydrologist who is interested in water supply. The model was developed at Los Alamos as part of the NSF's Sustainable semi-Arid Hydrology and Riparian Areas (SAHRA) science and technology center. The model traces the flux of water through the atmosphere, land surface, vegetation communities, and the subsurface including groundwater aquifers. It was designed to run as a collection of loosely-coupled processes on high-performance computers. The software design consists of separate sub-processes for the regional atmosphere, the land surface, and the subsurface, linked by a software coupler that manages memory and synchronizes sub-processes. Efforts are underway to include the effects of human systems, but they are preliminary so I won't discuss that.

In the first part of this talk I'll go over the rationale for the model design including its physical representation and software design. Then I'll discuss some aspects of its performance on massively-parallel processors, and I'll conclude by discussing the simulation of soil moisture in high-resolution.