1154-76-1607 **Yining Cao**, **Chuck Jia*** (jiac@iu.edu) and **Roger Temam**. *Time-stepping Method for Primitive Equations Modeling the Geophysical Flows In Presence of Topography.*

In this talk, we present a time-stepping method for solving systems of primitive equations modeling the atmosphere with humidity and saturation in presence of topography. Although dealing with the atmosphere, we encounter many difficulties that are common with ocean modeling as well. To overcome the difficulties caused by the nonlinear constraints in the equations, we introduce a fractional time-stepping scheme with a type of projection method. Physically plausible boundary conditions are used in our models. A compatibility condition is introduced and used in the projection method to enforce the boundary conditions and the incompressibility condition. We will demonstrate our time-stepping method by showing the results of numerical experiments with realistic parameters. This is joint work with Yining Cao and Roger Temam. (Received September 16, 2019)