1145-O1-3033   **Dan Kalman*** (`kalman@american.edu`). *Newton Cooling in the Attic: Applying ODEs at Home.* This talk describes an application of ODE modelling I found useful in my own home. It concerns a poorly insulated attic crawl space containing water pipes. To protect the pipes from freezing, I constructed a chamber (or cavity) around the pipes, heavily insulated from the larger crawl space, but not from the adjoining heated room. If the temperatures of the heated room and crawl space are known, what temperature should be observed in the cavity?

This situation can be modeled with a standard Newton's cooling ODE, modified to include heat flow with respect to two different ambient temperatures. Heat flows from the heated room into the cavity at one rate, and from the cavity into the crawl space at a second, lower rate. Solving the associated ODE reveals an intuitively appealing relationship between the two ambient temperatures, the ratio of the rates of heat flow, and the steady state temperature in the cavity. This in turn allows us to answer a very practical question: if the ambient temperature in the heated room is 70 degrees, and if we don't want the temperature in the cavity to be at or below freezing, how cold a sustained temperature can be tolerated in the crawl space? (Received September 26, 2018)