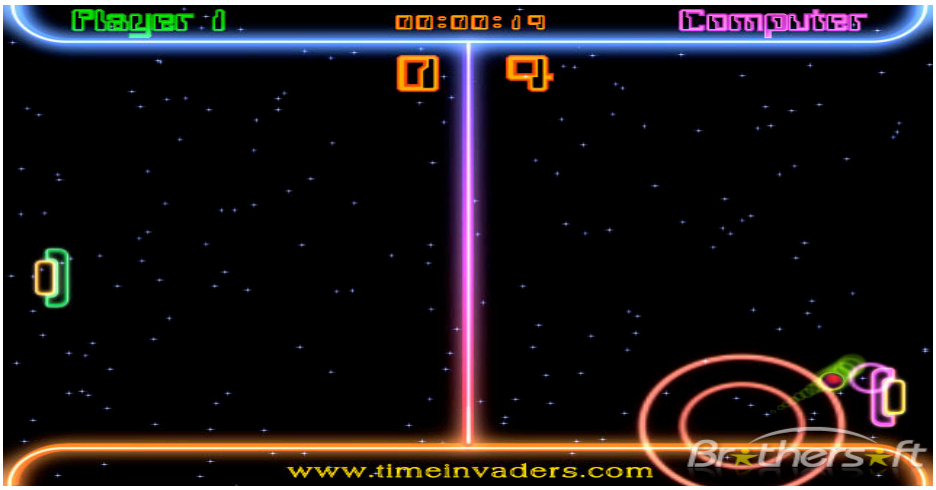
The SUMO Speaker Series for Undergraduates

(food from Pizza Chicago)
Wednesday, January 20
4:40-5:30, room 380C

Symmetries, ping-pong and outer space

Prof. Karen Vogtmann (Cornell)



Abstract: Groups may present themselves as strictly algebraic objects, but one can often find an alternate description as symmetries of a geometric object. Gromov showed that in fact any finitely-presented group can be described as symmetries of a naturally associated geometric object, and the geometric properties of the object can reveal characteristics of the group which were not obvious from the original algebraic description.

One of the simplest of all types of groups are free groups. I will discuss the geometry of free groups, and use it to show how to recognize when a group which looks like it might be very complicated is in fact just a free group. The method is to use the geometric object as a ping-pong table; the reason for this terminology will be clear when the method is described.

The symmetries of free groups themselves form a group; the ping-pong table for this group is known as Outer space, and I will show how to play ping-pong in Outer space.