1086-D5-151   **Paul R Bouthellier*** (`pbouthe@pitt.edu`), 504 East Main Street, Titusville, PA 16354.
Approximating the Mass, Volume, Cross-Sectional Areas, Surface Areas and Trajectories of Projectiles.

In this talk we shall use computational methods to approximate flight trajectories, maximum height and distance and the angle necessary to reach a maximum distance for the following problems: striking a golf ball with a club and launching an object out of a cannon. Using Studio 3D Max we create triangular mesh models of our objects from which we can estimate the object's mass, volume, cross-sectional and surface area. This is done by writing a program in 3D Max to loop through the faces making up the mesh and computing the areas and volumes using the edges as vectors (to find surface and cross-sectional areas) and the vertices to create tetrahedrons (to find volumes and masses). With the above approximations of the object's mass and cross-sectional area (also incorporating the object's coefficient of drag and rotation, gravity, and the effects of wind), the vector differential equations for velocity and acceleration are then numerically solved to approximate the trajectory of the object in R3. This trajectory is then programmed and rendered in the 3D graphics package Poser. The objects trajectory can then be studied from any point and angle in R3 and the model can be freely rotated to study the results. (Received July 30, 2012)