1023-J1-405 **Paul R Bouthellier*** (`pbouthe@pitt.edu`), 504 East Main Street, Titusville, PA 16354. *Visually Illustrating Rotations, Reflections and Translations in Flash.*

In this talk matrices, cross products and dot products will be used to translate, scale, skew, reflect, and rotate 3-dimensional objects created in Flash. Using the ActionScript programming language of Flash, programs are written which, via user interaction, will visually illustrate important concepts in linear algebra. The programs allow for classroom discussion of the mathematics involved and experimentation with the concepts.

Using meshes of polygons, objects such as cubes, obelisks, and chess pieces are created in Flash. The objects created can then be scaled, skewed and reflected across planes using the corresponding matrices.

Objects will be rotated about the object space axes and arbitrary vectors relative to the object's axes and then translated using 4x4 matrices. Objects will also be rotated about axes in world space by rotation matrices. As the object rotates, cross-products are used to compute normal vectors which allow the programs to determine which polygons of the object to draw. The noncommunitive nature of rotation matrices is also illustrated.

The programs allow the user to see the effects of matrices on an object. The programs also allow for a discussion of the most efficient ways to compute sequences of rotation matrices. (Received September 12, 2006)