1046-N1-1894 **Megan Elise Selbach-Allen*** (m095835@usna.edu), PO Box 15497, Annapolis, MD 21412, and **Sommer E. Gentry** and **Kevin L. McIlhany**. *How expert swing dancers exploit physics.* Preliminary report.

To determine whether and how expert swing dancers exploit physics to make their activity easier, this research focuses on a partnered spin. In this movement, two dancers connect hands and spin around a single vertical axis.

A theoretical model for the optimum spin pose for each couple was developed through analysis of inertia, torque and frictional forces. The differing size parameters for each couple are inputs to the model and the joint angles, θ, for the optimal pose are the outputs. The pose that maximizes the acceleration of the dancers is considered to be best:

$$\theta^* \quad = \quad \theta_{max} \frac{\tau(\theta)}{I(\theta)}$$

Where I(θ) is the moment of inertia of rotation around the vertical axis and $\tau(\theta)$ is the maximum torque the dancers could impose without overcoming the static friction between the floor and shoe.

To test the theoretical model, the motion of live dancers was captured using a motion capture system. Dance couples with varying degrees of skill were recruited for the study. The hypothesis was that expert dancers perform the spin in a pose closer to their optimal pose than novice dancers.

(Received September 16, 2008)