1056-54-131　　　　　　**Christian Laing*** (`cl84@nyu.edu`) and **De Witt Sumners**. *The writhe of oriented polygonal graphs.*

The directional writhe of a simple closed curve is the sum of the signed crossings in the projection of the curve in the given direction. The writhe of a simple closed curve in 3-space is the average over all directions of directional writhe. We extend this definition to apply to edge-oriented finite spatial graphs. This definition of writhe covers spatial polygonal arcs and non-connected graphs, and does not require the ad hoc closing of arcs to eliminate the problems posed by endpoints. The writhe is used to describe and compare the spatial structure of DNA, RNA and proteins. This talk will discuss some of these applications, and give a new formula for the additivity of writhe for structures constrained to separate topological domains. (Received July 28, 2009)