1023-92-125 **Christian Laing*** (claing@math.fsu.edu), 208 Love Building, Tallahassee, FL 32306. *From RNA Molecules to Brain Structures: Geometric Measures as Shape Descriptors.* Preliminary report.

Geometric measures of polygonal curves involving combinations of writhe and average crossing numbers of their subcurves, as well as ropelength, can be computed to obtain a set of features for the purpose of shape characterization.

The function of nucleic acids and proteins are determined to a very large degree by the 3-dimensional shape of the molecule. We apply these geometric shape descriptors to RNA tertiary structures based on the polygonal carbon-phosphate backbone of the RNA.

In addition, classification and identification of differences in brain anatomy can play an important role in Neuroscience. We apply these geometric measures to a set of curves obtained by tracing sulcal paths on the gray matter surface of human brains. These surfaces are extracted from MRI scans of human brains. A clustering technique is used for the purpose of reducing the dimension of the data set.

In our preliminary results, an automatic differentiation between sulcal paths from the left or right hemispheres was possible. Also a male-female classification and younger-older classification was feasible.

Among tRNA motifs, a differentiation between thermophilic and non-thermophilic species is obtained, and also, a clear distinction between tRNA and diverse Ribozyme motifs is produced. (Received August 02, 2006)