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Mary Therese Padberg* (mtpadberg@gmail.com), **Isabel Darcy**, **Stephen Levene** and **Rob Scharein**. *Exploring the Conformation of DNA: Adding Geometry to Known Topology*.

Understanding the conformation of protein-bound DNA is extremely important for biological and medical research, including improvement of drug creation and administration methods. Many protein-bound DNA conformations have been catalogued in the Protein Data Base; however the process of cataloging larger complexes can prove extremely difficult or unsuccessful. When standard lab techniques fail to determine a conformation, we turn to a branch of mathematical knot theory, tangle analysis, used in conjunction with difference topology experiments to analyze the topology of protein-bound DNA. In this talk, we will discuss these techniques and explain why topology alone is not enough. We will introduce preliminary software which can be used to determine likely DNA geometries consistent with protein-bound DNA topologies. Combining geometric and topological solutions will allow us to more accurately describe conformations for large protein-bound DNA complexes. (Received July 31, 2011)