1067-14-177   **Daniel Moore*** (`djmoore@cs.hmc.edu`) and **Dmitri Skjorshammer**. *Picard-Fuchs Equations for a Family of K3 Hypersurfaces.*

String theory, an attempt to unify the theories of general relativity and quantum mechanics, supposes that the Universe contains several extra dimensions wrapped up in complex shapes called Calabi-Yau varieties. We consider Calabi-Yau varieties realized as hypersurfaces in toric varieties, which can be constructed from fans in $\mathbb{R}^n$; these fans can in turn be constructed from polytopes. In addition to developing computational methods for measuring properties of hypersurfaces, including quasi-smoothness and regularity,we studied a particular family of K3 surfaces in a toric variety constructed from an octahedron in $\mathbb{R}^3$. We computed the Picard-Fuchs differential equation for this family; this equation describes the complex structure of a family of varieties. The equation we computed is consistent with known results. (Received July 28, 2010)