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**Adrian Clinger, Charles F Doran\*** (doran@math.washington.edu), **Jacob Lewis** and **Ursula Whitcher**. *Normal Forms, K3 Surface Moduli, and Modular Parametrizations*.

We consider normal forms for certain lattice polarized K3 surfaces, realized as singular quartic hypersurfaces in  $\mathbb{P}^3$  and generalizing the Weierstrass normal form for elliptic curves. Explicit algebraic correspondences are constructed between these surfaces and Hodge theoretically equivalent abelian surfaces, just as predicted by the Kuga-Satake Hodge conjecture. Furthermore, the Griffiths-Dwork method, when applied to these hypersurfaces, yields Picard-Fuchs equations describing their periods. Parametrizations of curves in moduli supporting further Picard lattice enhancement are then shown to solve a class of auxiliary nonlinear differential equations derived from these Picard-Fuchs equations. The result generalizes also to include modular parametrizations of “moonshine” type not arising from K3 surface moduli in this way. (Received February 10, 2008)