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**Detchat Samart\*** ([detchats@math.tamu.edu](mailto:detchats@math.tamu.edu)). *The elliptic trilogarithm and Mahler measures of K3 surfaces.*

The Mahler measure of an  $n$ -variable Laurent polynomial  $P$  is defined to be the arithmetic mean of  $\log(|P|)$  over the  $n$ -dimensional torus. We derive explicitly a connection between the Zagier elliptic trilogarithm and Mahler measures of certain families of three-variable polynomials. These results exhibit new relationships between families of  $K3$  surfaces and the families of elliptic curves which give rise to Shioda-Inose structures of the surfaces. We will also briefly explain how these results imply some identities relating the elliptic trilogarithm to special values of  $L$ -functions. (Received February 06, 2014)