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*Mystery Plots: Motivating Algebraic Function Models using Dynamic Mathematics Software.*

Functions are central to the study of mathematics. As Froelich, Bartkovich, and Foerster (1993) note, "the concept of function is probably the most important idea in mathematics" (p. 1). Although students in introductory courses spend significant time working with functions, much of this time is spent transforming familiar functions - for instance, stretching, reflecting, and translating exponential, quadratic, square root, and sinusoidal functions - rather than creating original functions. The tendency to modify and "borrow" rather than create impacts students' attitudes regarding mathematics. Functions become "gifts" from teachers rather than objects of discovery in their own right. Mathematics is not construed as a creative area of study.

In this talk, we explore the use of dynamic mathematics software (DMS) as a medium for constructing algebraic function models that extend student knowledge of function. We share a strategy for developing original function sketches, the three-step **MTA process** (Measure - Trace - Algebratize). The MTA approach provides students with opportunities to explore and construct remarkably non-standard functions - often beautiful, unexpected, and thoroughly original. We share several examples of such functions in our talk. (Received September 19, 2011)