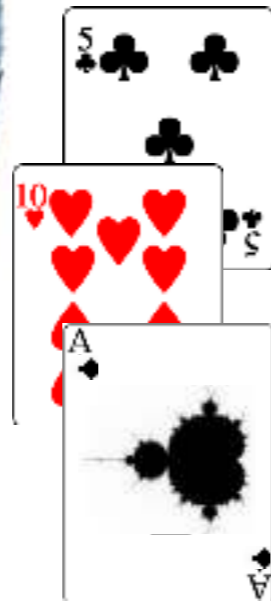
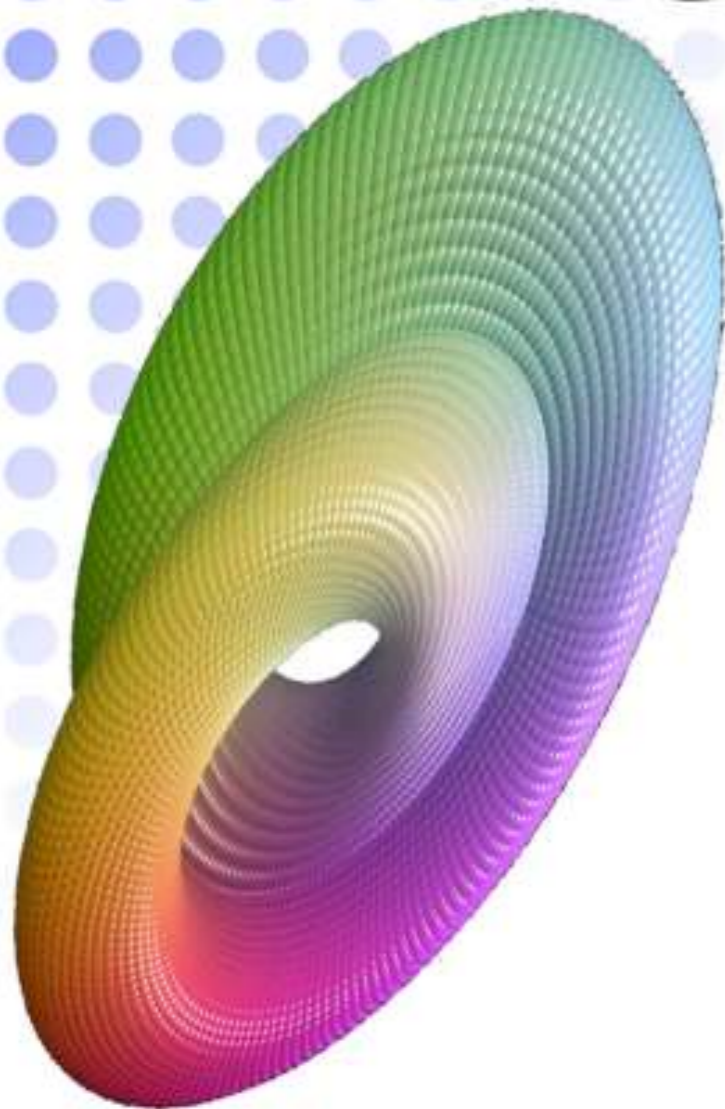
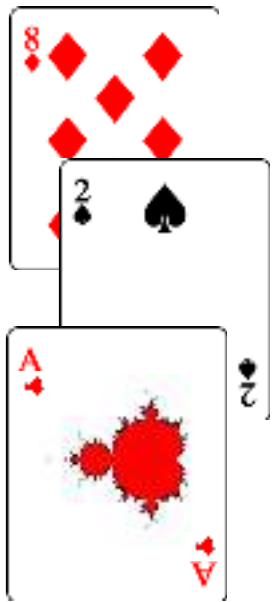


# Michigan Math Club

Thursday at 4pm in the Nesbitt Room  
Free Pizza and Pop



## Shuffling cards with the Mandelbrot set



Sarah Koch

Abstract for 12 April 2018

Each complex number  $c$  determines a function

$$p_c : \mathbb{C} \rightarrow \mathbb{C} \quad \text{given by} \quad p_c(z) = z^2 + c.$$

Although  $p_c$  is just a quadratic polynomial, a wealth of complicated and deep behavior can emerge when it is iterated. In this talk, we iterate quadratic polynomials and explore the famous *Mandelbrot set*, a certain subset of the  $c$ -parameter plane. We then find some very special values of  $c$ , contained in the Mandelbrot set, for which the associated polynomials  $p_c : \mathbb{C} \rightarrow \mathbb{C}$  shuffle around a particular finite subset of  $\mathbb{C}$ . Finally, we apply these ‘Mandelshuffles’ to a deck of playing cards, leading to some fantastic card tricks! This talk features at least one musical performance. 🎵

