

Elephants all the way down: the near-parabolic geometry of the Mandelbrot set

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Understanding the geometry of the Mandelbrot set, which records dynamical information about every quadratic polynomial, has been a central task in holomorphic dynamics over the past forty years. Near parabolic parameters, the structure of the Mandelbrot set is asymptotically self-similar and resembles a parade of elephants. Near parabolic parameters on these "elephants", the Mandelbrot set is again self-similar and resembles another parade of elephants. This phenomenon repeats infinitely, and we see different parades of elephants at each scale. In this talk, we will explore the implications of controlling the geometry of these elephants. In particular, we will partially answer Milnor's conjecture on the optimality of the Yoccoz inequality, and see potential connections to the local connectivity of the Mandelbrot set.