1106-52-2160 **Bryan A Curtis*** (bcurti11@msudenver.edu). *Finding The Inverse Of A Doodle.* Preliminary report.

In his paper, *The Mathematics of Doodling* [The American Mathematical Monthly, Vol. 118, No. 2, 2011], Ravi Vakil begins by describing a method for doodling conceived during his childhood. Based on his description, a doodle is the result of drawing a curve tightly around some shape on a piece of paper and then continuing to repeat the process about the previously drawn curve. The resulting doodle is, in some respects, the radius r neighborhood of a planar set X, i.e. the collection of points within a distance r of the set X, denoted $N_r(X)$. Vakil explores the geometry of such objects and extends these ideas to polyhedra and beyond.

In this talk, we consider the question: given a set $X \subseteq \mathbb{R}^n$, does $N_r(X)$ have an inverse operation? With Vakil's childhood doodle in mind, define the radius r retraction of a set X, denoted $U_r(X)$, to be the set of points a distance greater than r away from every point outside of X. We explore the radius r retraction as a possible inverse to the radius r neighborhood. Surprisingly, $U_r(N_r(X)) = X$ only under certain hypotheses. In particular, this problem has interesting ties to convex geometry. (Received September 15, 2014)