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Elisha B Peterson and **Francis Edward Su*** (su@math.hmc.edu), Department of Mathematics, Harvey Mudd College, 1250 N. Dartmouth Ave., Claremont, CA 91711. *A Polytopal Generalization of Sperner's Lemma.*

Sperner's Lemma is a combinatorial theorem about labellings of triangulated simplices whose claim to fame is its equivalence with the topological fixed point theorem of Brouwer. In this talk we prove a generalization of Sperner's Lemma to polytopes that was conjectured by Atanassov in 1996. In the spirit of the original Lemma, we give a constructive and a non-constructive proof of this conjecture for simplicial polytopes. The non-constructive proof shows that the conjecture is equivalent to asking whether it is possible to place $(n - k)$ points in an n -vertex k -dimensional polytope such that any simplex spanned by main vertices of the polytope contains at most one such point? The constructive proof uses a "path-following" argument. We close by discussing some applications of Sperner's lemma and generalizations to fixed point theory and "fair division" problems in game theory. (Received August 29, 2000)