1135-55-2335 **Greg Dreifus*** (gdreifus@mit.edu), Department of Mechanical Engineering, 35-214, Massachusetts Institute of Technology, Cambridge, MA 02139, and **Fred Cohen** (cohf@math.rochester.edu), Department of Mathematics, University of Rochester, Rochester, NY 14625. *A Topological and Algebraic Model for 3D Printing.* Preliminary report.

The purpose of this project is to give a model, which we call $AM^1(C, L)$, for 3D printing as follows. Consider the set of ordered pairs $(\vec{a}, \vec{b})$, where $\vec{a}$ is in the graph $C = (V, E)$ embedded in $\mathbb{R}^3$, where V and E are the typical vertex and edge sets in graph theory, $\vec{b}$ is in the x-y plane, and the distance between them is some fixed distance L. Let $AM^1(C, L)$ be topologized as a subspace of Euclidean space. We prove that the fundamental group is a product in non-singular cases and that $\pi_1 AM^1(C, L) = \pi_1(C)$ in singular cases. We examine the connectedness of a subspace of $AM^1(C, L)$, which we call $AM^2(C, L)$, by restricting the position of the line segment connecting $\vec{a}$ and $\vec{b}$ to only intersect with C at point $\vec{a}$, and we examine the connectedness of a subspace of $AM^2(C, L)$, denoted $AM^3(C, L)$, by imposing a parameterization on $\vec{a}$. Analogues with multiple linkages using the configuration space of distinct particles in C are also developed. (Received September 25, 2017)