1010-51-72 **Joseph O'Rourke*** (`orourke@cs.smith.edu`), Department of Computer Science, Smith College, Northampton, MA 01063. *A Geometric Theorem on Producible Polygonal Protein Chains.*

Fixed-angle polygonal chains in 3D can serve as a model of protein backbones. The production of a protein in the ribosome can be crudely modeled as the emission of a polygonal chain through the apex of a cone. We call this notion *producible*, and prove that a chain whose maximum turn angle is $\alpha \leq 90°$, is producible in a cone of half-angle $\geq \alpha$ if and only if the chain is flattenable, that is, iff the chain can be reconfigured without self-intersection to lie flat in a plane. This result establishes that two seemingly disparate classes of chains are in fact identical.

As a corollary, we prove that the producible chains are "rare" in a technical sense: the probability that a random configuration of a random chain of n links, drawn from a class of chains has a locked configuration, is producible, approaches zero geometrically as $n \to \infty$.

This talk is based on the paper "Geometric restrictions on producible polygon protein chains," by Erik. D. Demaine, Stefan Langermann, and J. O'Rourke, *Algorithmica*, to appear. (Received August 19, 2005)