1145-05-327   **Steven Schluchter*** (`steven.schluchter@gmail.com`), 4400 University Drive, MS 3F2, Fairfax, VA 22030, and **Tyrus Berry** (`tberry@gmu.edu`), 4400 University Drive, MS 3F2, Fairfax, VA 22030. *Applications of topological graph theory to 2-manifold learning.*

We show how, given a sufficiently large point cloud sampled from an embedded 2-manifold in $\mathbb{R}^n$, we may obtain a global representation as a cell complex with vertices given by a representative subset of the point cloud. The vertex spacing is based on obtaining an approximation of the tangent plane which insures that the vertex accurately summarizes the local data. Using results from topological graph theory, we couple our cell complex representation with the known Classification of Surfaces in order to classify the manifold. The algorithm developed gives a meaningful description of the embedding as a piecewise linear structure, which is obtained from combinatorial data by projecting points in the point cloud into estimates of tangent planes. (Received September 01, 2018)