1067-51-2372   **Michael T Mara*** (`mtm1@williams.edu`), 63 St. James Ave., Chicopee, MA 01020, and **Yifei Li**, **Elena Wikner** and **Isamar Rosa**. *Perimeter-Minimizing Tilings with Penalties for Vertices.* Preliminary report.

In 2000, Hales famously proved the longstanding Honeycomb Conjecture: the regular hexagon tiling is the least perimeter way to tile the plane (and torus) with equal area tiles. We seek torus and planar tilings minimizing perimeter plus a vertex penalty and prove optimal properties of tilings by regular hexagons, squares and equilateral triangles for certain weighings of the vertex penalty. (Received September 22, 2010)