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617 N Santa Rita, Tucson, AZ 85721. *Flows to find (approximate) Riemann  
mappings*. Preliminary report.

Thurston's circle packing methods for finding approximate conformal mappings to the disk (solutions guaranteed by the Riemann mapping theorem) are now well-known. The key step in this process is that of taking a circle packing of a domain and then repacking it to a circle packing of the disk with appropriate boundary conditions (circles are internally tangent to the unit circle). For this reason, the packing problem is solved using hyperbolic geometry, letting boundary circles be horocycles (infinite radius). We investigate alternative boundary conditions with an aim to solve the packing problem using Euclidean geometry, in order to allow for discrete conformal structures other than circle packings. These boundary conditions are natural if one considers a generalization of piecewise Euclidean surfaces that allows for the surface to fold back on itself. This work also begs the question of whether one could use the (smooth) Ricci flow on surfaces with appropriate boundary conditions to solve the Riemann mapping problem. (Received August 19, 2011)