

1145-D1-974

Douglas Dunham* (ddunham@d.umn.edu), Department of Computer Science 320 HH, University of Minnesota Duluth, 1114 Kirby Drive, Duluth, MN 55812, and **Lisa Shier**. *Embroidery of a Hyperbolic Fish Pattern*. Preliminary report.

We have investigated the possibility of using embroidery to render hyperbolic patterns using the Poincaré circle model. In particular we have created a pattern of fish inspired by M.C. Escher's "Circle Limit III" print which was based on the regular $\{8,3\}$ tessellation.

This fish pattern presents considerable challenges for the embroiderer. The features become smaller as the bounding circle is approached and not all features can be included. The detail level drives a desire for the largest possible scale of the embroidery, which comes with a cost in complexity of implementation. The stitches must also be oriented to maintain the symmetry of the original design.

Our pattern has different combinatorics than Escher's, being based on the $\{10,3\}$ tessellation, and has five fish meeting at right fin-tips instead of four as in Escher's print. This also requires more colors, six instead of four, to achieve (perfect) color symmetry. In fact the color symmetry group is the symmetric group $A(5)$. (Received September 23, 2018)