Abstract: Given an abelian variety over a number field, its Sato-Tate group is a compact Lie group, and it is conjectured to control the distribution of Euler factors of the L-function of the abelian variety. In this talk we will begin with a discussion on the Sato-Tate conjecture for elliptic curves and discuss work that computes the Sato-Tate groups of families of hyperelliptic curves of arbitrarily high genus and discuss some open problems in this area. This work is joint with H. Goodson and A. Peyrot.