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Edray Herber Goins* (egoins@math.purdue.edu), Mathematical Sciences Building, 150 North University Street, West Lafayette, IN 47907-2067. *Belyĭ Maps on Elliptic Curves and Dessins d'Enfants on the Torus*. Preliminary report.

A Belyĭ map $\beta : \mathbb{P}^1(\mathbb{C}) \rightarrow \mathbb{P}^1(\mathbb{C})$ is a rational function with at most three critical values; we may assume these values are $\{0, 1, \infty\}$. A Dessin d'Enfant is a planar bipartite graph obtained by considering the preimage of a path between two of these critical values, usually taken to be the line segment from 0 to 1. Such graphs can be drawn on the sphere by composing with stereographic projection: $\beta^{-1}([0, 1]) \subseteq \mathbb{P}^1(\mathbb{C}) \simeq S^2(\mathbb{R})$. Replacing \mathbb{P}^1 with an elliptic curve E , there is a similar definition of a Belyĭ map $\beta : E(\mathbb{C}) \rightarrow \mathbb{P}^1(\mathbb{C})$. The corresponding Dessin d'Enfant can be drawn on the torus by composing with an elliptic logarithm: $\beta^{-1}([0, 1]) \subseteq E(\mathbb{C}) \simeq \mathbb{T}^2(\mathbb{R})$.

In this talk, we discuss the problems of (1) constructing examples of Belyĭ maps for elliptic curves and (2) drawing Dessins d'Enfants on the torus. This is work part of PRiME (Purdue Research in Mathematics Experience) with Leonardo Azopardo, Sofia Lyrantzis, Bronz McDaniels, Maxim Millan, Yesid Sánchez Arias, Danny Sweeney, and Sarah Thomaz with assistance by Hongshan Li and Avi Steiner. (Received July 03, 2015)