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Catherine M Trentacoste* (trentac@clemsun.edu), **Kevin James, Hui Xue, Kelly Crone-Dye, Tony Feng, Carolyn Kim** and **Eric Ramos**. *Sizes of 3-Selmer Groups*. Preliminary report.

In this talk we will consider a specific family of elliptic curves with rational 3-torsion subgroup. We will algebraically define 3-Selmer groups through 3-isogeny and a 3-descent map, then associate the image of our 3-descent map to solutions of a homogeneous polynomial affiliated with our elliptic curve E . Using the work of Cohen and Pazuki, we will give solubility conditions for the homogeneous polynomials. Using these conditions, we will give a graphical approach to the size of 3-Selmer groups. Finally, we will demonstrate how to change the conditions on graphs into a question about ranks of matrices. (Received July 31, 2011)