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Jarod Hart* (jarod.hart@wayne.edu), **Lucas Chaffee** (lucas.chaffee@gmail.com) and
Lucas Oliveira (oliveiral1985@gmail.com). *Weight Extrapolation for Square Functions with
Rough Kernels.*

In this joint work with Lucas Chaffee and Lucas Oliveira, we use the weight extrapolation theory developed by Rubio de Francia, Grafakos and Martell, and Duoandikoetxea to prove Lebesgue space bounds for multilinear square functions with rough kernels. Classically Lebesgue space bounds for square functions are proved by first obtaining an L^2 estimate and using vector-valued Calderón-Zygmund theory to extend to L^p estimates for $p \neq 2$; although this approach requires certain regularity estimates for the kernels. We remove these kernel regularity assumptions and prove Muckenhoupt weighted Lebesgue space estimates for the associated square function operators. In particular, this approach yields multilinear square function bounds on Lebesgue spaces with indices smaller than 1. We also introduce a strong Carleson condition for the square function operators that is sufficient for weighted Lebesgue space bounds. Furthermore, we show that when a square function is of convolution type, this strong Carleson condition is necessary and sufficient for Lebesgue space bounds. (Received February 04, 2014)