1122-41-240 **Hoang A Tran*** (tranha@ornl.gov), Oak Ridge National Laboratory, Oak Ridge, TN 37831.

Polynomial approximation via compressed sensing of high-dimensional functions on lower sets.

This work proposes and analyzes a compressed sensing approach to polynomial approximation of complex-valued functions in high dimensions. Of particular interest is the setting where the target function is smooth, characterized by a rapidly decaying orthonormal expansion, whose most important terms are captured by a lower (or downward closed) set. By exploiting this fact, we present a novel weighted ℓ_1 minimization procedure with a precise choice of weights, and a new version of iterative hard thresholding method, for imposing the downward closed preference. Theoretical results reveal that our computational approaches possess a provably reduced sample complexity compared to existing compressed sensing techniques presented in the literature. In addition, the recovery of the corresponding best approximation using these methods is established through an improved bound for the restricted isometry property. Numerical examples are provided to support the theoretical results and demonstrate the computational efficiency of the new weighted ℓ_1 minimization strategy. This is the joint work with Abdellah Chkifa, Nick Dexter and Clayton Webster. (Received August 15, 2016)