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Victor V. Cifarelli*, Department of Mathematics & Statistics, University of North Carolina at Charlotte, 9201 University City Boulevard, Charlotte, NC 28223-0001, and **Volkan Sevim** (vsevim@uscb.edu), Department of Mathematics and Computational S, University of South Carolina-Beaufort, Hargray 226 One University Blvd, Bluffton, SC 29909. *A Exploration of College Algebra Students' Understanding of Higher Order Polynomial Functions.*

The mathematics community agrees that the study of non-linear functions must have a prominent place in the school mathematics curriculum (NCTM, 2000). This paper reports on the first in a series of studies we are conducting with College Algebra students, addressing their understanding of non-linear functions. The current study examines students' understanding of polynomial functions of degree $n > 2$, $f(x) = anx^n + an - 1x^{(n-1)} + \dots + a1x^1 + a0$, with particular emphasis on how students' conceptions guide their actions to produce and make connections among graphs of polynomial functions that are of degree three or more. The study included interviews with students as they completed mathematical problem tasks, enabling a focus on the students' on-going cognitive actions. The results seem to support our hypothesis regarding how students' prior experiences with quadratics might limit their developing a sense of invariance when acting on polynomial functions of degree three or higher. Specifically, most students related the graph of the given polynomial functions to parabolas in some way; and all demonstrated some degree of static shape thinking (Moore & Thompson, 2015). The presentation will illustrate some of these findings with results from two students. (Received September 26, 2017)