1136-55-481 **Brenda Johnson*** (johnsonb@union.edu), Department of Mathematics, Union College, Schenectady, NY 12308. *Functor Calculus and Cartesian Differential Categories.*

The abelian functor calculus associates to a functor between abelian categories a tower of functors that has properties analogous to those of a Taylor series for functions. We will discuss connections between this functor calculus and cartesian differential categories as defined by Blute, Cockett, and Seely. In particular, we define a directional derivative in the abelian functor calculus, and prove that this directional derivative endows a particular category of functors of abelian categories with the structure of a cartesian differential category. As a consequence, we obtain a higher order chain rule for abelian functor calculus. This is joint work with Kristine Bauer, Christina Osborne, Emily Riehl, and Amelia Tebbe. If time permits, we will discuss extensions of these results stemming from work with K. Bauer and S. Yeakel. (Received January 21, 2018)