1135-J5-2512 **Rachel L. Rupnow*** (rachr15@vt.edu). *A Refinement of a Genetic Decomposition for Differentiating a Function to a Function Power.* Preliminary report.

Functions of the form $f(x) = g(x)^{h(x)}$, including constant functions, power functions, and exponential functions, are examples of functions that differential calculus students should be able to differentiate. Yet students often struggle to distinguish between these forms. Drawing on APOS (Action-Process-Object-Schema) theory and Piaget and Garcia's Triad of Schema Development, this talk refines a genetic decomposition of the schemas students build for finding the derivative of a function to a function power. We analyze which differentiation rules students chose to use with different function structures of a function to a function power. A previous genetic decomposition, which was informed by existing literature and a pilot study based on clinical interviews with two students, was refined using 18 differential calculus students' homework and exam papers. These papers were collected regularly throughout a fall semester course. Central aspects of the genetic decomposition include the necessity of a strong background in functions, logarithms, and other differentiation rules. This genetic decomposition could help inform the teaching of calculus by highlighting the need to develop students' pre-calculus knowledge of functions and logarithms while teaching calculus concepts. (Received September 26, 2017)