



University of
Central Arkansas™

UCA Research in STEM Education Seminar

- Speakers:** Dr. Jason Martin and Undergraduate Researchers, Cyrus Koch, Sarah Zimmerman and Katie Burden
UCA Department of Mathematics
- Title:** Interactive Images to Support the Formation of Conceptual Models in Calculus
- Date:** Thursday, April 9, 2015
- Time:** 1:40-2:30 p.m.
- Place:** MCS 115



Abstract: In K-6 education there is an abundance of literature on the effects of interactive images, but as school grades increase, literature on interactive images takes a noticeable dive (Moyer-Packenham, & Westenskow, 2013). We are attempting to add to this literature by implementing a comparative study documenting student's understanding while modeling contextual problems using concepts from calculus. We anticipate that well designed interactive images will be advantageous in calculus because they can demonstrate continuous change in real time, rather than merely representing change on a static, unmoving sheet of paper (Castillo-Garsow, 2012). With this in mind, animations and virtual manipulatives were constructed to support a series of calculus labs targeting limit, derivative, and definite integral. For each of these concepts, during clinical interviews, individual students were shown contextual and graphical representations with differing levels of interactivity, including static images, animations, and virtual manipulatives. We ask, how do students' conceptual models relating relevant quantities change after being exposed to each of these images? Early results indicate that students first engaged in general spatial reasoning and that the transition from static to animated representations tended to correspond with a recognition of changing quantities.