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**Marilyn P Carlson\*** ([marilyn.carlson@asu.edu](mailto:marilyn.carlson@asu.edu)). *An Investigation of the Major Conceptual Strands of First Semester Calculus.*

This paper reports results from investigating first semester calculus students' understanding of major concepts of first-semester calculus (e.g., covariation, limit, derivative and accumulation). A brief overview of the theoretical frameworks that guided the development of four curricular modules will be provided. Sample curriculum and select interviews will be presented to reveal insights into the complexities of developing an understanding of these concepts and the effectiveness of these modules in promoting their understanding in first semester calculus students. The thinking revealed by these students suggests that strong covariational reasoning abilities (i.e., the ability to coordinate two variable and attend to the ways in which the variables change in relation to each other) are necessary for understanding the concepts of limit, derivative and accumulation. Select interview excerpts will be shown to illustrate how this conceptual strand emerged and evolved over the course of one semester. (Received October 03, 2000)