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Daniel J. Lithio and **Timothy J. Pennings*** (tpennings@davenport.edu), Davenport University, Department of Mathematics, 6191 Kraft Avenue, S.E., Grand Rapids, MI 49512, and **Eric M. Webb**. *Optimizing a Volleyball Serve*.

As explained by the Women's Volleyball coach, an optimal serve is one which is struck so as to clear the net and land within five feet of the net as quickly as possible. This talk explores how, at the request of the coach, two NSF-REU undergraduates and a professor developed a mathematical model involving gravity, air resistance and the spin of the ball in order to provide the coach with optimal serving strategies. In particular, we demonstrate all aspects of the mathematical modeling process including 1) making simplifying assumption in order to form a workable but realistic model, 2) developing (shoestring budget) methods to determine the various coefficients, 3) testing of the model, 4) using the model to predict optimal strategies, and 5) noting the end result as determined by victories on the court. (Received September 10, 2013)