

1056-35-1634      **Roger Thelwell\*** ([thelwerj@jmu.edu](mailto:thelwerj@jmu.edu)), Dept. of Math and Stats, MSC 1911, James Madison University, Harrisonburg, VA 22807. *Reinventing the Wheel!*

The chaotic waterwheel is a well studied and fairly well understood problem in dynamical systems literature. In brief, a wheel with punctured cups equally spaced around a wheel driven by a single source of water will display chaotic behavior by tuning two parameters: flow rate and friction. This talk will begin with an introduction to the physical setup of the waterwheel and the mathematical analyses.

Students at James Madison University were the first, to our knowledge, to do either a mathematical analysis or build a prototype of a sand-driven wheel. How does sand behave differently than water? How does this impact the mathematics and the mathematical conclusions? Be prepared to be surprised by the counterintuitive conclusions of this talk. (Received September 23, 2009)