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**Shawn W Walker\*** ([walker@cims.nyu.edu](mailto:walker@cims.nyu.edu)), 251 Mercer Street, Warren Weaver Hall, New York, NY 10012-1185, and **Michael J Shelley**. *Shape Optimization of Peristaltic Pumping*.

We present a variational method for optimizing peristaltic pumping in a two dimensional periodic channel with moving walls to pump fluid (peristalsis is common in biology). No a priori assumption is made on the wall motion, except that the shape is static in a moving wave frame. Thus, we pose an infinite dimensional optimization problem and solve it with finite elements. Additional physical effects are also investigated (i.e. elastic walls, variable viscosity). (Received March 10, 2010)