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An Integrative Model of Excitation Driven Fluid Flow in a 2D Uterine Channel CHARLES MAGGIO, LISA FAUCI, JOHN CHRISPELL, Tulane University — We present a model of intra-uterine fluid flow in a sagittal cross-section of the uterus by inducing peristalsis in a 2D channel. This is an integrative multiscale computational model that takes as input fluid viscosity, passive tissue properties of the uterine channel and a prescribed wave of membrane depolarization. This voltage pulse is coupled to a model of calcium dynamics inside a uterine smooth muscle cell, which in turn drives a kinetic model of myosin phosphorylation governing contractile muscle forces. Using the immersed boundary method, these muscle forces are communicated to a fluid domain to simulate the contractions which occur in a human uterus. An analysis of the effects of model parameters on the flow properties and emergent geometry of the peristaltic channel will be presented.

Charles Maggio
Tulane University

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