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Kristina Martin* (kmmarti6@ncsu.edu), North Carolina State University, Dept. of Mathematics, Stinson Dr., Box 8205, Raleigh, NC 27606, and **Lorena Bociu**, **Lucas Castle** and **Daniel Toundykov**. *Optimal Control in a Free Boundary Fluid-Elasticity Interaction*.

We consider an optimal control problem involving a free boundary fluid-elasticity interaction described by Navier Stokes coupled with the equations of nonlinear elastodynamics. We prove that turbulence in the fluid flow can be controlled by a body force on the fluid, and derive the first order optimality conditions on the optimal control. This is a joint work with Lorena Bociu, Lucas Castle (North Carolina State University), and Daniel Toundykov (University of Nebraska, Lincoln). (Received September 23, 2014)