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Kristina Martin* (kmmarti6@ncsu.edu) and **Lorena Bociu**. *Optimal Control in Free or Moving Boundary Coupling of Navier-Stokes and Nonlinear Elasticity.*

We consider optimal control problems involving free or moving boundary fluid-elasticity interaction described by a coupling of Navier-Stokes with the equations of nonlinear elastodynamics in the context of isotropic elasticity. We prove in the free boundary, steady case that a distributed control can minimize the difference between the fluid velocity and a desired velocity. In the dynamic, moving boundary case we prove that a distributed control can minimize turbulence in the fluid flow. We additionally discuss sensitivity analysis, including derivation of the linearized adjoint equations. (Received September 12, 2016)