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Lorena Bociu and **Lucas Castle*** (lcastle@ncsu.edu), 2311 Stinson Dr., Box 8205, NC State University, Raleigh, NC 27695. *Optimal Control in a Free Boundary Fluid Structure Interaction*. Preliminary report.

We consider an optimal control for the problem of minimizing flow turbulence in the case of a nonlinear fluid-structure interaction model. If the initial configuration is regular, then a class of sufficiently smooth control inputs contains an element that minimizes, within the control class, the vorticity of the fluid flow around a moving and deforming elastic solid. We establish this existence and discuss the first order optimality conditions on the optimal control. (Received January 15, 2017)