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**Michael Malisoff\*** (malisoff@lsu.edu), Department of Mathematics, 303 Lockett Hall,  
Louisiana State University, Baton Rouge, LA 70803-4918. *Stability And Robustness Analysis For A  
Multi-Species Chemostat Model With Delays.*

The chemostat is a laboratory device and a mathematical model for the continuous culture of microorganisms. Chemostat models have been studied extensively, because of their importance in biotechnology and ecology. This talk will discuss a chemostat model with an arbitrary number of competing species, one substrate, and constant dilution rates. We allow delays in the growth rates and additive uncertainties. Using constant inputs of certain species as controls, we derive bounds on the sizes of the delays that ensure asymptotic stability of an equilibrium when the uncertainties are zero, which can allow persistence of multiple species. Under delays and uncertainties, we provide bounds on the delays and on the uncertainties that ensure input-to-state stability with respect to uncertainties. No prerequisite background in biology or control theory will be necessary to understand and appreciate this talk. This work is collaborative with Frederic Mazenc and Gonzalo Robledo. (Received April 14, 2019)