1110-35-407 **Pooriya Beyhaghi** (pbeyhagh@ucsd.edu<mailto:pbeyhagh@ucsd.edu>), **Huan Yu** (huy015@emg.ucsd.edu) and **Thomas Bewley*** (bewley@ucsd.edu). *Contractive control design for three coupled Burgers equations, and its implications for Navier-Stokes systems.*

One approach to the linear stabilization of near-wall transitional= flow (i.e., of slightly-perturbed laminar flow) is via consideration of th= e Orr-Sommerfeld/Squire equations. This formulation is delicate, as it redu= ces the three momentum equations and the divergence-free constraint of the = incompressible NSE down to a highly non-normal set of two equations, one fo= r the wall-normal velocity and one for the wall-normal vorticity, and invol= ves inverting a Laplacian with boundary conditions embedded. A simpler formulation for the purpose of control design may be found by sim= ply dropping the divergence-free constraint from the problem considered alt= ogether, and at the same time dropping the pressure gradient from the momen= tum equations, which acts to enforce this constraint. What remains is three= coupled Burgers equations. The present talk will describe under what conditions a controller designed = in this simpler, unconstrained, higher- dimensional setting is also guarant= eed to work when the divergence-free constraint is reintroduced to the prob= lem formulation; namely, the trajectories of the controlled unconstrained s= ystem must be contractive. We then demonstrate this control design approach= with a few illustrative examples. (Received March 03, 2015)