Abstract—Lyapunov functions are an important tool in nonlinear control systems theory. This talk presents new Lyapunov-based adaptive tracking control results for nonlinear systems in feedback form with multiple inputs and unknown high-frequency control gains. Our adaptive controllers yield uniform global asymptotic stability for the error dynamics, which implies parameter estimation and tracking for the original systems. We demonstrate our work using a tracking problem for a brushless DC motor turning a mechanical load. Then we present a new class of dilution rate feedback controllers for two-species chemostat models with Haldane uptake functions where the species concentrations are measured with an unknown time delay.