Cyber-Physical Systems are characterized by large numbers of tightly integrated heterogeneous components in a network, which may expand and contract dynamically. Cyber-Physical Systems are very common and are becoming increasingly ubiquitous. The control of such systems presents huge challenges and requires designs drawn from approaches such as those in traditional control, hybrid control systems, discrete event systems, and networked control. In addition, robustness, reliability and security issues for reconfiguring dynamical systems must also be addressed.

Passivity and dissipativity are “energy like” concepts that may be used to guarantee properties, such as stability, in complex heterogeneous interconnected systems that are changing dynamically. Passivity and QSR-dissipativity approaches have been proposed by our group to control CPS, together with Lyapunov approaches and symmetry concepts. We use passivity indices, which provide a measure of the degree of passivity, and their relation to conic systems to generalize known results in interconnected systems. Results for continuous, discrete, switched and networked systems, together with event triggered control architectures will be shown.