

COLLEGE OF ENGINEERING

# Control Seminar



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## Physical Flow Over Networks: Analysis, Control and Computation



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**3:30 – 4:30 pm 1500 EECS**

**ABSTRACT:** Network flow provides a compelling framework to model several civil infrastructure systems, including transportation and power. Traditionally, network flow methodologies have focused predominantly on fast computation of performance metrics in static settings, under only flow conservation. Extensions to additional canonical physical constraints and dynamics underlying civil infrastructure systems, and to robustness analysis and control synthesis have been challenging. This is, in part, due to non-convexity, switched dynamics and hybrid state space. We present recent results that overcome these challenges by exploiting structure through the lens of monotonicity, equivalent relaxation, incremental network reduction, and principled abstraction synthesis. Case studies and examples to illustrate the proposed methodologies will also be presented.

**BIO:** Ketan Savla is an associate professor and the John and Dorothy Shea Early Career Chair in Civil Engineering at USC, with joint appointment in the Departments of Civil and Environmental Engineering, Electrical Engineering-Systems, and Industrial and Systems Engineering. Before joining USC, he was a research scientist in the Laboratory for Information and Decision Systems at MIT. He received his PhD in Electrical and Computer Engineering from the University of California at Santa Barbara. His current research interest is in distributed robust and optimal control, dynamical networks, state-dependent queueing systems, and incentive design, with applications in civil infrastructure and autonomous systems. His recognitions include NSF CAREER, an IEEE CSS George S. Axelby Outstanding Paper Award, and AACC Donald P. Eckman Award.