

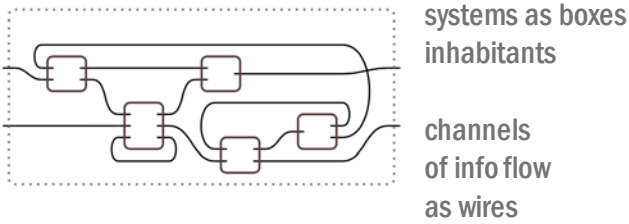
Compositionality in Cyber-Physical Systems Theory

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Cyber-physical systems require the management of several models

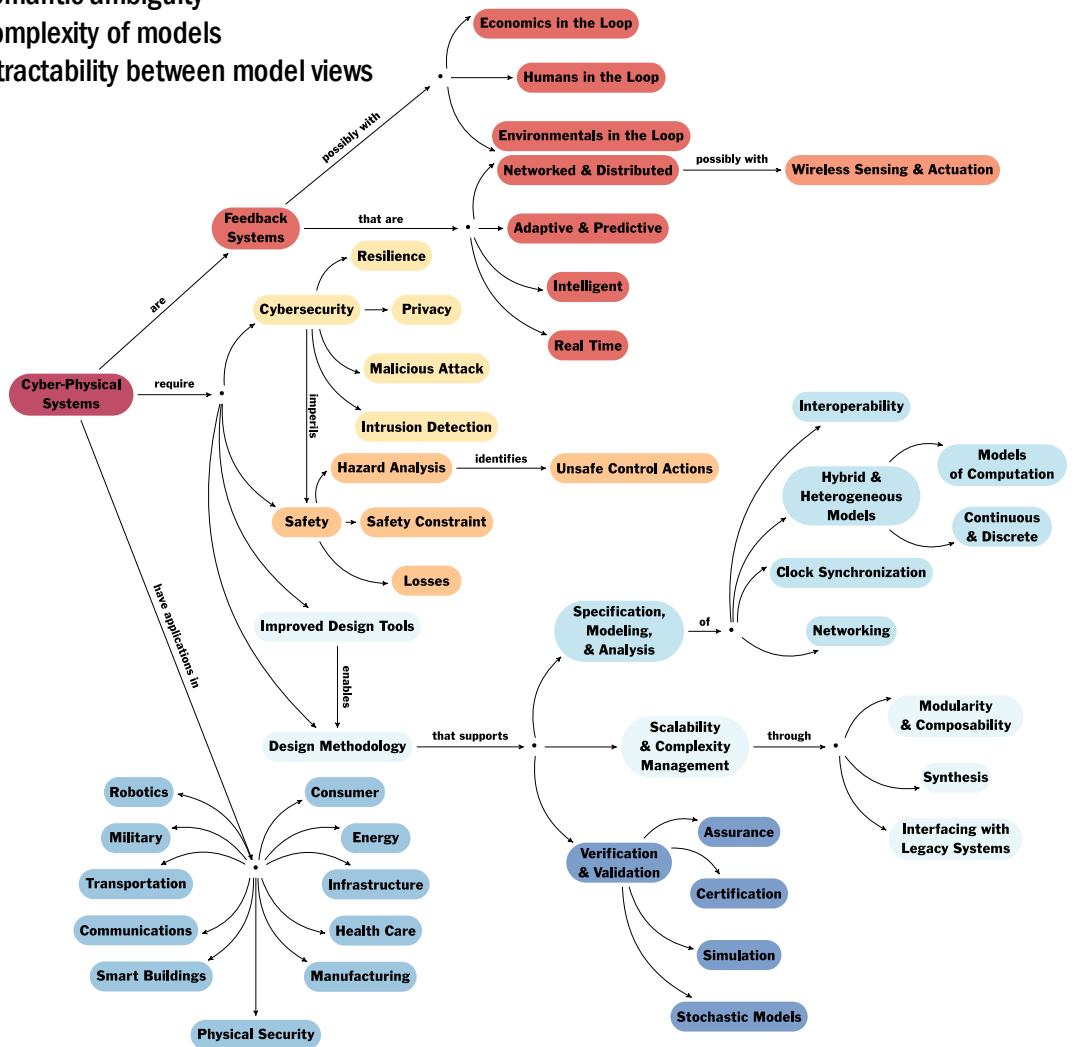
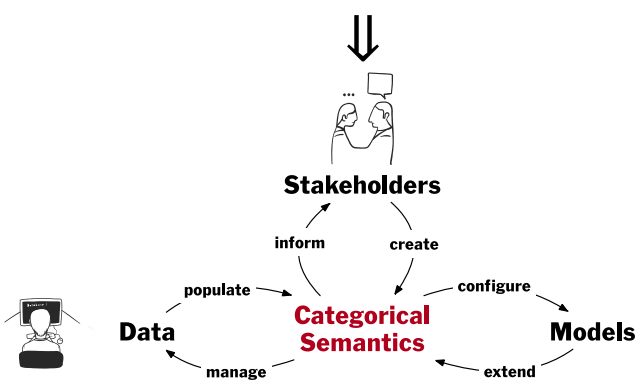
Semantic ambiguity
 Complexity of models
 Intractability between model views

My aim is to build a theory of **compositional** systems theory

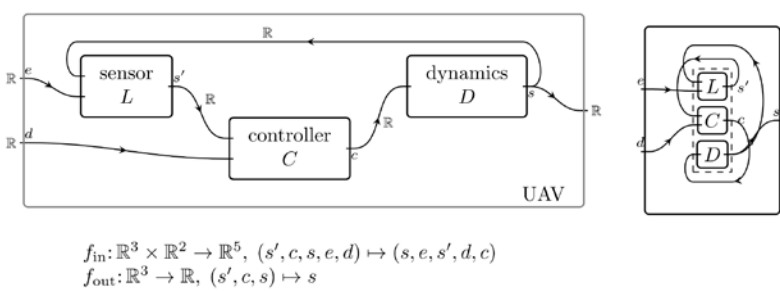


Category theory for system design

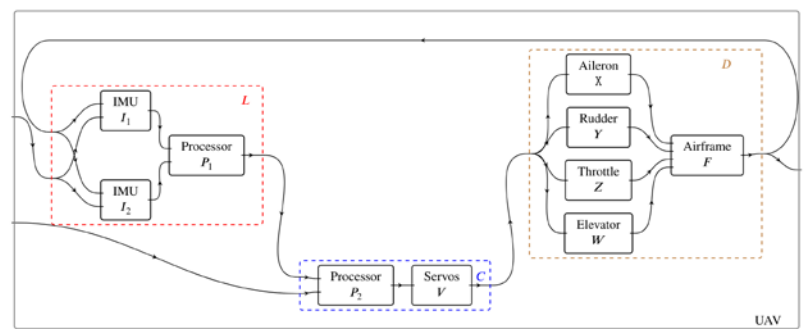
formal composition
 scalability
 unification



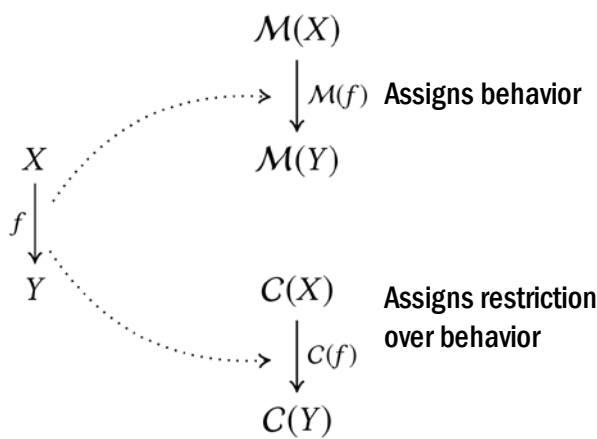
Control behavior as a compositional process



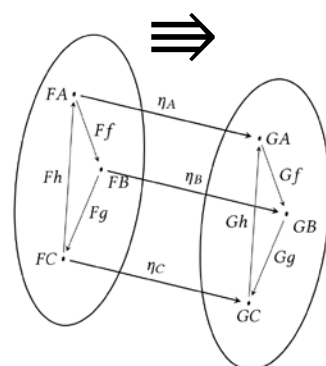
Architecture as formal decomposition



Unification



unifies behavior with restriction using a map of the form



$$\begin{array}{ccc} M(X) & \xrightarrow{\alpha_X} & C(X) \\ M(f) \downarrow & & \downarrow C(f) \\ M(Y) & \xrightarrow{\alpha_Y} & C(Y) \end{array}$$