1153-18-223 **Kenny Courser*** (kcour001@ucr.edu) and **John C. Baez** (baez@math.ucr.edu). *Structured cospans.*

One goal of applied category theory is to better understand networks appearing throughout science and engineering. Here we introduce 'structured cospans' as a way to study networks with inputs and outputs. Given a functor $L: \mathsf{A} \to \mathsf{X}$, a structured cospan is a diagram in X of the form $L(a) \to x \leftarrow L(b)$. If A and X have finite colimits and L is a left adjoint, we obtain a symmetric monoidal category with objects being those of A and morphisms being isomorphism classes of structured cospans. However, this arises from a more fundamental structure: a symmetric monoidal double category where the horizontal 1-cells are actual structured cospans. We explain how our framework is related to Fong's theory of 'decorated cospans'. (Received August 28, 2019)