

Abstract: For the purposes of this talk, we define a quantum graph to be a triple $\mathcal{G} := (B, \psi, A)$ consisting of a finite-dimensional C^* -algebra B with state ψ and linear map $A: B \rightarrow B$ satisfying a quantized version of being an idempotent with respect to the Schur product. For example, every finite simple graph (V, E) yields such a triple: $(\mathbb{C}^V, \frac{1}{|V|} \sum_{v \in V} \delta_v, A)$ where $A \in M_{|V|}(\{0, 1\})$ is the adjacency matrix. Given a quantum graph $\mathcal{G} = (B, \psi, A)$, one can define a C^* -correspondence $E_{\mathcal{G}}$ over B called the quantum edge correspondence, which in the commutative case is simply the vector space \mathbb{C}^E endowed with the natural left and right actions of \mathbb{C}^V . In this talk, I discuss how the Cuntz–Pimsner algebra $\mathcal{O}_{E_{\mathcal{G}}}$ associated to this C^* -correspondence is isomorphic to a universal C^* -algebra defined in terms of linear maps on B that respect the quantum graph structure. An immediate consequence of this isomorphism is that the so-called quantum Cuntz–Krieger algebra $\mathcal{O}(\mathcal{G})$ admits a surjection onto $\mathcal{O}_{E_{\mathcal{G}}}$. Classically, this surjection is in fact an isomorphism, but recently we have discovered examples of quantum graphs \mathcal{G} where this fails and indeed $\mathcal{O}_{E_{\mathcal{G}}} \not\cong \mathcal{O}(\mathcal{G})$. This is based on joint work with Michael Brannan, Mitch Hamidi, Lara Ismert, and Mateusz Wasilewski, and ongoing joint work with Mitch Hamidi and Lara Ismert.