TAITE LAGRANGE, University of Waterloo
Graph Products and Variants of Twin-width

Twin-width is a graph and matrix parameter introduced in 2021 by Bonnet, Kim, Thomassé, and Watrigant as essentially a measure of the 'error' between vertex neighbourhoods over a series of vertex contractions. While standard twin-width measures how these errors interact via vertex degrees, we may want to modify what properties of these errors we count. Total twin-width is a variant of twin-width that counts the total number of errors that occur at any given point in the contraction sequence. Pettersson & Sylvester previously showed that the tensor product of any two graphs G_1 and G_2 has twin-width at most $\max\{tww(G_1) \cdot \Delta(G_2) + \Delta(G_2), tww(G_2)\} + \Delta(G_2)$ but nothing was known of how the tensor product affects twin-width variants. In this talk, we show that for a graph G, the total twin-width of the tensor product of G with K_2 is at least the total twin-width of G. We also show that there exists an infinite family of graphs $\mathcal{C}$ with $ttww(G) = 0$ for any graph $G \in \mathcal{C}$ and $ttww(G \times K_2) \geq 2^c$ for all constants c. This is joint work with Therese Biedl and Sophie Spirkl.