ANNA MALTSEV, Queen Mary University of London
Localization and landscape functions on quantum graphs

I will discuss localization and other properties of eigenfunctions of the Schrödinger operator on quantum graphs. The motivation is to understand how graph structure impacts eigenfunction behavior. I will present two estimates based on the Agmon method to show that a tree structure aids the exponential decay at energies below the essential spectrum. I will furthermore present adaptations of the landscape function approach, well-established for $\mathbb{R}^n$, to quantum graphs and its limitations. In our context, a "landscape function" $\Upsilon(x)$ is a function that controls the localization properties of normalized eigenfunctions $\psi(x)$ through a pointwise inequality of the form $|\psi(x)| \leq \Upsilon(x)$. The connectedness of a graph can present a barrier to the existence of universal landscape functions in the high-energy régime, as we demonstrate with simple examples. However, at low and moderate energies landscape functions can be made explicit. This talk is based on joint work with Evans Harrell.