

# Wavelet Frames and Differential Operators: Bridging Discrete and Continuum for Image Restoration and Beyond

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The first half of my talk is based on a series of four papers. We established rigorous connections between wavelet frame transforms and differential operators in variational framework, and established their connections for nonlinear evolution PDEs as well. The connections between wavelet frame transforms and differential operators provide us with new insights and inspiring interpretations of both wavelet frame and differential operator based approaches for image restoration, which also enable us to create new models and algorithms that combine the merits of both approaches. In the second half of my talk, I will discuss how these findings from image restoration can guide us in the process and analysis of more general data sets in high dimensional spaces, such as point cloud and graph data.