Making Super-Resolution Imaging Practical: Magnify Expansion Microscopy for Research and Translational Applications

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Abstract

Super-resolution microscopy has revolutionized cell biology, yet the high cost of specialized hardware remains a significant barrier to its widespread adoption. Expansion Microscopy (ExM) offers a powerful alternative by physically enlarging specimens, allowing for nanoscale imaging on any conventional microscope. However, traditional ExM protocols are often complex to optimize, time-consuming, and prone to inconsistent results.

In this talk, I will introduce the core principles of ExM and present Magnify, a streamlined, robust ExM platform that overcomes these challenges. I will highlight Magnify's broad applicability across cell biology, neuroscience, and pathology. Additionally, I will discuss HistoMagnify, our new method for achieving super-resolution in bright-field histology, and demonstrate how integrating deep learning with Magnify enables the automated analysis of renal pathology and the prediction of treatment outcomes in bladder cancer.