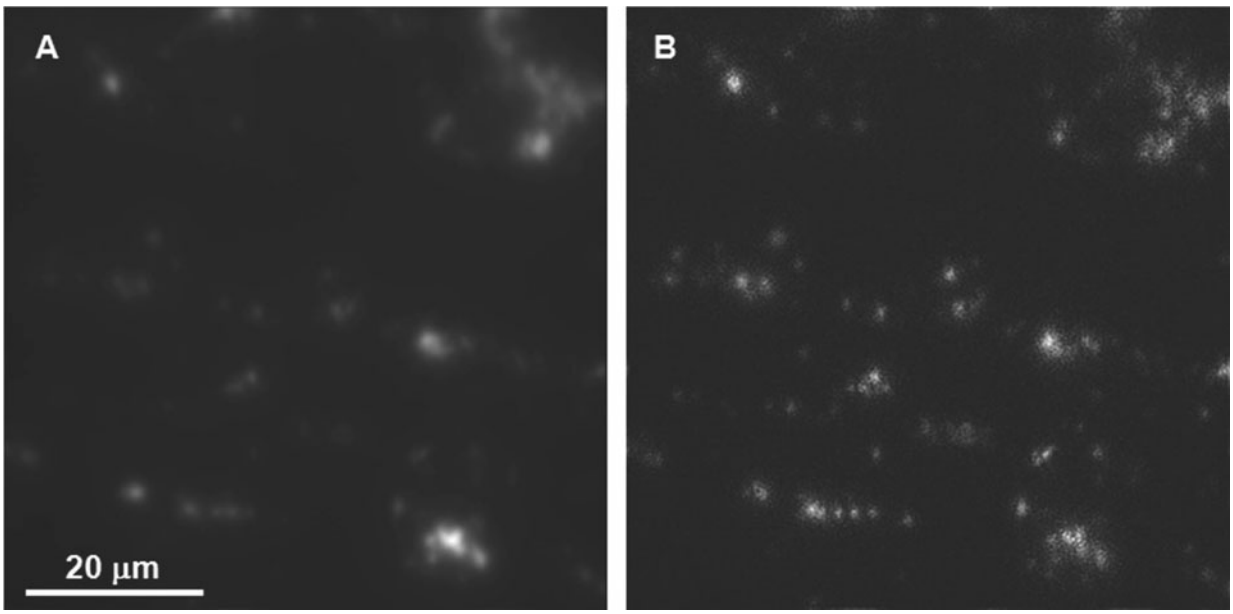
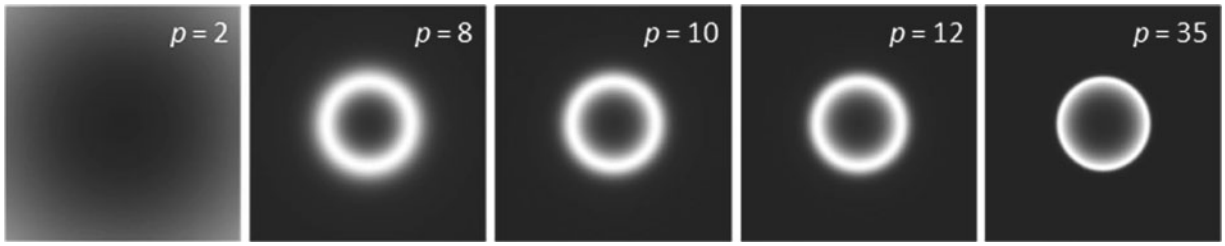


Supplementary Figure 1. Focus series were collected of 200 nm fluorescent beads under (**A**) conventional and (**B**) super-resolution imaging modes. Supplementary Movies 1 and 2 demonstrate the clear advantage of the super-resolution imaging capability of the GPU-enabled real-time processing and display. Both focus series were collected with 0.13 μm focal step. Each super-resolution images were generated from 16 raw images. However, the total throughput was limited by the data acquisition hardware response rate only (1 s for each raw image acquisition) and the processing time to generate the super-resolution image from the raw images was negligible (few tens of milliseconds).



Supplementary Figure 2. The inverse optical transfer function can be modified and applied to super-resolution image processing during data acquisition. The effects of a wide range of values for the -order low-pass filter are shown.