Abstract:

I will first talk about a recent project focusing on regulation of cell aging:

Cell aging is a universal biological phenomenon, but mechanisms that regulate aging remain unclear. Using novel microfluidic technologies, we tracked the replicative aging of single yeast cells and found a dramatic loss of heterochromatin silencing leading to cell aging and death. The dynamics of silencing loss during aging can be dissected into an early phase with sporadic silencing loss, followed by sustained silencing loss preceding cell death. Although the length of the later phase is relatively constant, the length of the early phase is highly variable among cells and largely determines lifespan. The intermittent silencing dynamics during the early phase depends on a conserved histone deacetylase Sir2 and is important for longevity, whereas either sustained silencing or loss of silencing shortens lifespan. These findings reveal that the temporal dynamics of key molecular processes can directly influence cell aging.

I will then show a couple of examples of projects, in which we are facing challenges in single-cell imaging analysis.