This composite image illustrates the diffusion-trap mechanism underlying store-operated calcium entry at the single-molecule level. As shown by its trajectory (yellow), a single Orai1 channel labeled with GFP diffuses freely in the plasma membrane of an HEK cell after ER calcium stores have been depleted but becomes trapped upon entering an ER-plasma membrane junction enriched in the ER calcium sensor mCherry-STIM1 (red). Binding to STIM1 traps Orai1 and also opens it, allowing calcium to enter the cell. Eventually the Orai1 channel escapes, presumably due to stochastic interruptions in its connection with STIM1. See the article by Wu et al. on p. 3672 of this issue of MBoC. (Image: Minnie M. Wu, Elizabeth D. Covington, and Richard S. Lewis, Stanford University School of Medicine)