

In **PALMS**, the operator turns on a random subset of widely separated fluorophores, identify their location with nanometer precision, and then turn them off. This cycle is repeated until a desired resolution has been achieved.

PALM takes advantage of molecules that can be turned on and off with different light sources.

- Using low activation intensity, a small and random subset of molecules in the field of view is activated.
- Next, a conventional image is taken, in which activated emitters appear as sparse spots.
- The molecules are then deactivated through photobleaching or by switching back to their off state.
Each spot has a diffraction-limited extension of $\sim \lambda/2$, but its center can be localized with much higher accuracy (see first below), in practice down to 10 to 40 nm.

By repeating the activation-imaging-deactivation cycle many times, a composite image made up of the positions of all individual molecules is created, much like in a pointillist painting." **[Ref 1]**

[Ref 1] F. Pinaud and M. Dahan, "Zooming Into Live Cells," Science **320**, 187 (2008).