



## Alice Ting

Stanford University

Tuesday, October 22, 2019; 8:10 AM

Alice Ting is Professor of Genetics, Biology, and Chemistry at Stanford University. From 2002 to 2016, she was Professor of Chemistry at MIT. Ting's undergraduate education was at Harvard (chemistry), her Ph.D. was at UC Berkeley with Peter Schultz, and her postdoctoral training was at UCSD with Roger Tsien. Her lab develops molecular technologies for studying proteins and signaling pathways in living cells and organisms, and applies them to neuroscience and mitochondrial biology. Her tools include APEX and TurboID proximity labeling, fluorophore ligases, monovalent streptavidin, and the FLARE neuronal activity integrator. Her work has been recognized by the NIH Pioneer Award, the McKnight Technological Innovations in Neuroscience Award, and the ACS Arthur Cope Scholar Award, among other prizes. She is an investigator of the Chan Zuckerberg Biohub.

### **Abstract: Molecular Tools for Probing RNA Localization and Interactions in Living Cells**

Spatial compartmentation underlies all cellular signaling, but existing methods to study the subcellular organization of endogenous proteins and RNA - by imaging and fractionation-mass spec for example - have important limitations. We developed an alternative approach, enzyme-catalyzed proximity labeling, for the high-resolution spatial mapping of subcellular proteomes and transcriptomes in living cells. I will describe the development of this approach, which includes enzyme directed evolution, and its application to uncover some new mitochondrial biology. I will show some preliminary results combing this approach with CRISPR-based technologies.

In the second part of the talk, I will describe synthetic protease-based optogenetic circuits that convert transient molecular events into stable cellular signals. I will give an example of how these tools can be used to access and study specific neuronal subpopulations that are activated during particular animal behaviors.